LEARNING RESOURCE CENTER CHARACTERISTICS OF THE 25 MOST PROFITABLE U.S. INDUSTRIAL CORPORATIONS: IMPLICATIONS FOR BUSINESS AND HIGHER EDUCATION

DISSERTATION

Presented to the Graduate Council of the University of North Texas in Partial Fulfillment of the Requirements For the Degree of DOCTOR OF PHILOSOPHY

By

James Ronald Nyberg, Jr., A.A, A.S., B.S., M.A.
Denton, Texas
December, 1996
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This study is a descriptive analysis of corporate learning resource centers. The study was designed to incorporate historical background and current status, organization and personnel, types and amount of alternate delivery instruction, and selected cost considerations in the establishment and maintenance of a learning resource center. A functional definition was furnished, with a deliberative attempt to encompass related synonyms. Discussion included training types or instructional delivery medium distinctions. A contribution of this study was the development, field testing, and enhancement of a survey instrument, which reflects the steps to be followed by those planning implementation of any learning resource center.

Findings of this study indicated that learning resource centers were young and transitioning to increased on-line individualized and self-paced learning. Training and learning will become much less interdependent. Training types will increasingly become nontraditional and technology driven. Courseware will be received and managed remotely. Partnerships and cooperative efforts are mandates for business and higher education. Learner mobility will become normative, not the exception. Internet training will rapidly
increase, most quickly among small business. Learning resource centers will continue to become more cost effective.

This study proposed the redefinition of both learner and educator roles within a changing learning resource center environment. It was suggested that the learner role must become more active and that the corporate educator role, as a result of technology, will increase in passivity, tending toward that of facilitation. Implications and recommendations were specifically noted for both business and higher education. Specified nomenclature of "learner centers" or clearly "learner centered" has been advocated, reflecting the continuing evolution of the learning resource center. Technology, instructional media, mobility, availability and sharing of resources, less formalization, life-long learning, fiscal issues, Internet access, information and knowledge explosion, and downsizing, all combine to provide the view and demarcation of the new "learner centers."
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CHAPTER 1

INTRODUCTION

The numbers of individuals trained in corporate America make a compelling argument for the study of corporate training. Demographic statisticians estimate that, by the year 2005, the number of persons working or looking for work is expected to reach 147 million. This figure represents an increase of 16 million from projections in 1994 (U.S. Bureau of Labor Statistics, 1995). In addition, the approximately 53 million students in their entirety represent 44% of the American workforce (Carnevale & Gainer, 1989). Although making projections is not an exact science, the range of 144 million to 153 million workers reflects different assumptions about change in labor force participation rates (U.S. Bureau of Labor Statistics, 1995). The sheer numbers in the workforce demonstrate the magnitude of the importance of corporate training.

The workforce numbers are growing and producing increased training requirements for several reasons. According to Richman (1988), the U.S. Bureau of Labor Statistics claimed that the American economy produced 31 million new jobs between 1972 and 1988 and that it will add another 21 million by the year 2000. This means that the workforce will grow by approximately 18% within the next 10 years. Although the actual increase over the years from 1982 to 1993 represents 12% growth, the labor force grew 18 million (U.S. Bureau of Labor Statistics, 1995).
The U.S. Bureau of Labor Statistics (1995) projections are based on the Census
Bureau projections of the population. The likely level of immigration also has a profound
impact on labor force dynamics. Minorities and immigrants comprise a larger share of the
U.S. population than in the past, and these increases will continue to rise into the year
continue to have significant implications for the labor force because different educational
and occupational backgrounds constitute a major effect on the training demands within an
organization. Kunde (1989b) and Johnston and Packer (1987) found that low-level jobs
are also declining. The National Commission on the Role and Future of State Colleges and
Universities reported the following:

[America has] a high school drop out rate ranging from 25 to 50 per cent, and
with almost 10 per cent of our total population functionally illiterate . . . at least
23 million adults who have been identified as functional illiterates. In addition
some 13 per cent of U.S. teenagers, and up to 40 per cent of minority
adolescents, have been found to be functionally illiterate. (as cited in "To Secure

Increasing numbers of employees are entering the workforce without the basic
skills required for even low-level jobs (Bartran, 1992; Carnevale & Gainer, 1989; Johnston
& Packer, 1987; Kunde, 1989b; Meister, 1994; Richards, 1990; Richman, 1988). There
are many examples of the low skill level that is affecting the workforce and the American
economy. One was observed by the personnel director at Southwestern Bell, which had to
process over 15,000 job applications merely to find 3,700 qualified to take an entry-level
test; of those, only 800 passed, and 220 of the 800 were disqualified due to the interview, physicals, and drug tests (Richards, 1990). Southwestern Bell's personnel director spent an entire year trying to find 20 production job employees for a $7.15 an-hour job that did not even require a high school diploma. Numerous authors observed the basic skills deficiencies and antiquated occupational preparation that are delimiting the effectiveness and opportunities facing the American workforce today (Carnevale, Gainer, & Meltzer, 1988; Carnevale & Gainer, 1989; Johnston & Packer, 1987; Richards, 1990; Richman, 1988).

In 1985 the U.S. Bureau of Labor Statistics stated that 54 million Americans claimed the necessity of job-related training to obtain their jobs (Carey, 1985). This number excludes those who want to keep their employment. Old jobs being redefined and restructured means the retraining of employees (Carnevale & Gainer, 1989). Hallett (1987) stated:

The turbulence and the uncertainty in the workplace could not be more clear. Everything is changing: every industry, every organization, every technology and every profession. Already, one of five people switches jobs each year, one of 10 switches careers, and 33 percent of all jobs today will be obsolete by 1992. (p. 15)

The gap between job demands and worker skills is widening. It has unmistakably grown deeper and wider with each decade. Yet the gap that America now faces at the turn of the century is unprecedented in history. Aaron Bernstein (1988) of Business Week claims:
The nation is facing a monumental mismatch between jobs and the ability of Americans to do them. As work becomes more knowledge-intensive, employers are fishing in a shrinking labor pool. Statisticians estimate that as many as 50 million workers may have to be trained or retrained in the next few years. (p. 104)

Exacerbating the skill deficit even further is the increasing level of skill required for employment of all but low-level jobs (Carnevale et al., 1988; Carnevale & Gainer, 1989; Johnston & Packer, 1987; Kunde, 1989b; Richards, 1990; Richman, 1988).

Because of the low skill levels of the labor pool and the required needs of businesses, corporate America has been instituting diverse formal and informal training and retraining programs to inculcate the skill levels required for employment. For a number of years, the American automobile industry has been leading the way in providing general skills training in the United States (James, 1995). Since 1982, the industry has offered training programs, jointly designed and administered by the United Auto Workers Union and the various automobile manufacturers for the development of active and displaced workers (James, 1995). The U.S. Bureau of Labor Statistics (1994-1995) projected that the majority of jobs through the year 2005 will become available as a result of replacement needs. Changing careers entirely or relocation to other forms of employment also necessitates retraining.

Formal corporate training annually amounts to over $30 billion, or $240 per worker, with informal training annually accounting for up to $180 billion (Carnevale & Gainer, 1989; Dentzer, 1993; DeVenuta, 1990; Graham, 1990; Kunde, 1989b). Ninety
percent of this amount is spent by only about 0.5% of firms, or 15,000 companies (Liddell, 1995). Seventy percent of Fortune 500 companies surveyed by the American Society of Training and Development (ASTD) planned even greater expenditures for education and training in 1991 (Carnevale & Gainer, 1989). Also, in 1988, over 70% of all other businesses increased their training budgets (Kunde, 1989a). Although many businesses claim to understand the importance of worker training, the U.S. Department of Labor's Employment and Training Administration (1992), in its surveying of four states, found that two thirds of employers actually spent less than $5,000 annually on education and training.

The American Society for Training and Development (ASTD), in conjunction with the U.S. Department of Labor (1992), stated that the larger companies have more internal and formal training than smaller companies (Carnevale & Gainer, 1989; Liddell, 1995). Larger corporations also have more funds, and their larger labor pool enables more efficient production of learning facilities and material production. Larger companies also offer more retraining and remedial or basic education (Kunde, 1989a; Liddell, 1995; Meister, 1994). Although "bigger may be better," it is also clear that "relatively little is known about the real costs or actual effectiveness of most on-the-job training programs" (Dentzer, 1993, p. 63).

The 25 most profitable U.S. industrial corporations are among the largest companies in the world. In 1989 all of these corporations were in the top 500 in terms of sales, profitability, formal training departments, stockholders' equity, and numbers of employees (Pak & Solo, 1990). In 1994, of the 25 corporations, 19 were ranked among
the 53 most profitable corporations in the world ("Fortune 500," 1995). The larger sales, profitability, formal training departments, stockholders' equity, and numbers of employees in the 25 most profitable U.S. industrial corporations combine to make a compelling argument for acquiring and analyzing information about their learning resource centers.

The 25 most profitable U.S. industrial corporations are utilizing technology for alternate forms of delivering cost-effective training. Research indicates that approximately 75% of Fortune 100 corporations are using electronic data interchange, or EDI (Carlisle, 1990). This indicates a growing utilization of both internal and external use of technology within Fortune 100 companies, which normally includes the 25 most profitable U.S. industrial corporations. The continual evolution of technology in hardware and the subsequent improvement and availability of educational software have spawned many other cost-effective forms of training delivery media such as can be found in learning resource centers (Kunde, 1989b).

An example of a successful learning resource center within the 25 most profitable U.S. industrial corporations was found in International Business Machines (IBM) in 1990, which had 162 learning resource centers that were an integral part of their training department (Mims, 1990; Pak & Solo, 1990). IBM had moved 50% of its training out of the traditional instructor-led classrooms and has saved between $200 and $300 million a year, with learners mastering lessons 25% faster and retaining more material (Graham, 1990). In a period of fiscal accountability and restriction, it is important to note that IBM was ranked first in profits in 1990 (Pak & Solo, 1990) and was the 12th most profitable corporation in the world in 1994 ("Fortune 500," 1995). Although many companies
appear to have adapted new technologies and services as they become available, Tuck (1988) proposed that companies are just beginning to explore the possibilities.

Statement of the Problem

The problem of this study concerned the characteristics of the learning resource centers of the 25 most profitable U.S. industrial corporations. These characteristics were analyzed and described according to the individual purposes of this study.

Purpose of the Study

The purpose of the study was to describe the characteristics of the learning resource centers within the 25 most profitable U.S. industrial corporations by describing and analyzing (a) the background and status, (b) the organization and personnel, (c) the types and amount of alternate delivery instruction deployed, and (d) the selected cost considerations in establishing and maintaining a learning resource center in these U.S. corporations.

Research Questions

To carry out the purposes of this study, the following research questions were ascertained from the survey questionnaire responses of the administrators of the 25 most profitable U.S. industrial corporations:

1. What are the background and history of learning resource centers?
2. What are the present status and condition of learning resource centers?
3. What are the characteristics of learning resource center administrators, staff, or personnel?

4. How are learning resource center procedures, policies, and organizational matters administered?

5. What types and amount of alternate delivery (software and hardware) are presently being utilized?

6. Are special connections, furniture, fixtures, or other features being utilized?

7. What are the economic considerations for the establishment and operation of a learning resource center?

Significance of the Study

As the United States is becoming more dependent on human capital, training is becoming more crucial to the American citizen, the economy, and the country's international standing (Bartran, 1992; Liddell, 1995; Johnston & Packer, 1987; Kunde, 1989a; Kunde, 1989c; Meister, 1994; Thurow, 1990). Carnevale and Gainer (1989) noted the importance of training:

Between 1929 and 1982, training on the job accounted for more than half the growth in the nation's productive capacity. The other principal contributors to improved economic performance were education and machine capital, which contributed 26 and 20 percent, respectively. (p. 51)

According to Bill Wiggenhorn, president of Motorola University, "Training is the hot button of the 1990's. Today's training manager not only wants to build a world class
training system for his or her organization but also needs to do so to keep pace with the changing environment" (Svenson & Rinderer, 1992, p. v). Everyone seems to be embarking on the quest for improved performance, striving for excellence, and capitalizing upon human resources (Svenson & Rinderer, 1992). Peters said in A Passion for Excellence, "To achieve distinction . . . requires not sleight of hand by geniuses but a commitment to excellence (quality, service make it better/innovation [sic]) by everyone. In short, people are the unmistakable base" (Peters, 1985, p. 201). Leading-edge companies have continued their success through their learning edge. Microsoft, famous for its growth, "has made clear that its continued success depends upon maintaining the learning edge," according to Bernard Vergnes, president of Microsoft Europe (Aubrey & Cohen, 1995, p. 18).

Besides the great impact that training produced in the past, presently, every effort is mandated to overcome several discouraging factors facing the United States. Demographic trends indicate that the workforce will be older and will increase in percentages of women, minorities, and immigrants, which traditionally have been less well educated, especially in technical fields (Johnston & Packer, 1987; Kunde, 1989a; U.S. Bureau of Labor Statistics, 1994-1995). The U.S. population and labor force are declining, with the occupations of the future requiring more training and retraining to obtain and continue employment (Johnston & Packer, 1987; Kunde, 1989a).

The lack of basic skills, the decline in low-level jobs, the increase in the skill level required for the majority of employment opportunities, the changing nature of jobs, the creation of many new jobs, the displacement of many employees to similar or entirely new
career paths, and the incontrovertible advancement of technology all suggest that studying
corporate training that is individualized and technology based is of tremendous value
(Carey, 1985; Carnevale & Gainer, 1989; Hallett, 1987; Johnston & Packer, 1987; Kunde,

Corporate learning resource centers are by definition designed to accomplish these
tasks in a cost-effective manner. They also enable individual employees to take
responsibility for their own training and retraining through employer-provided resources.
Life-long learning can be inculcated as a natural part of each employee's work experience.
Ray Waddoups, vice-president of Motorola University, stated, "Our mission is to lead the
corporation to a new culture of lifelong learning and develop new methods necessary for

In a time when the amount of information available is doubling every 2 and a half
years and 90% of all the information available to workers in 2007 will have been created
or discovered after 1987 (Hallett, 1987), training and retraining are of incalculable worth.
While workers are being forced to respond to increases in technology, trainers and
educators must utilize technology as a means to convey the necessary skills for the job
market. A learning resource center is an avenue available for employees and employers to
acquire the skills needed for a changing workplace (Graham, 1990; Miller, 1989; E. Mims,
personal communication, April 23, 1990).

This study is also significant in that the literature revealed no other study
specifically designed to describe and analyze the characteristics of learning resource
centers in the 25 most profitable U.S. industrial corporations. These companies are
effective and successful enough to be distinguished from all the others in sales, profitability, assets, stockholders' equity, and numbers of employees per annum (Kuhn & Morrow, 1989; Pak & Solo, 1990, “Fortune 500,” 1995). Graham (1990), of the Wall Street Journal, has written that companies claim that their education and training departments are on the cutting edge not only of new technology, but also of the latest and most productive training and educational findings.

Learning resource centers have existed in various forms for several decades, but they can now effectively become pioneers of information handling and dissemination methodology because of the greater power, lesser price range, improved hardware and software, increased availability, and greater acceptance of modern technology. Learning resource centers can enable teachers and learners to stay current with available resources and information. They can enable an individual to learn while utilizing the educational medium best suited to his or her learning style and motivational needs. In other words, a learning resource center can be individualized and personalized. Miller (1989) stated, "New York Life Insurance created a self-paced instruction Learning Center using technology to deliver training with flexibility, speed and consistency at just the right time" (p. 11). She commented on the cost benefits:

Such a training system ensures that training dollars are not wasted on unnecessary training and that necessary training is taken when it can be most cost effective . . . .

Because of this redeployment of training resources, New York Life expects to greatly reduce its costs. (Miller, 1989, p. 11)

Malaszczyk, the assistant vice president of New York Life noted:
Time spent studying is very expensive when we start pulling people away from projects and saying "you need to attend a five-day class." I can show you where teaching the same learning points through the learning center can get the same kind of skill levels as gained through ILT [Instructor Led Training] with 20 to 25 percent reduction in learning time. (as cited in Miller, 1989, p. 11)

The Carnegie Commission on Higher Education (1972) enunciated that advancing technology "can enrich the content of students' learning experiences, provide greater flexibility and variety in the organization of instruction, and give students a more self-reliant role in their own education" (p. 45). According to the Carnegie Commission, advancing technology "has the potential economic effect of spreading the benefit of investment in a single unit of instruction among very large numbers of students" (The Carnegie Commission on Higher Education, 1972, pp. 45-46). Learning resource centers will advance technology by familiarizing participants with technology and by the increase in software and hardware needed to accomplish these means. Finally, a centralized learning resource center can help meet the crosscultural, multidisciplined, transdisciplinary, and truly liberal learning that is necessary to cope with an ever-changing informational society.

Definition of Terms

No terms have restricted meaning as specifically designated in this study. Listed as follows are those terms and definitions that might provide further clarification:
Learning resource center: A specific location with access to resources, which is designed to allow training to take place. For this study, it will normally be self-paced or individualized learning provided via instructional technology systems. (Some synonyms include learning center, learning library, learning laboratory, resource center, media center, skills center, training center, alternate delivery center, information center, and computer learning center.)

Alternate (alternative) delivery instruction: All delivery instructional training, media, or methodologies that are technology based (not merely instructor-led or lecture based), yet not delivered through a technology other than sound amplification.

Delimitations

One limitation that must be recognized is that this study has solely described the learning resource centers of the 25 most profitable U.S. industrial corporations in 1994 ("Fortune 500," 1995). However, most of these corporations have been, and probably will be among this group in the future ("Fortune 500," 1995; Pak & Solo, 1990). An attenuated corporate response rate is also a factor that could possibly keep this study from being as useful as it could be. However, this factor was controlled by requiring at least 60%, or 15, of the most profitable corporations to respond. If the response rate fell below 60% of the population, then the next most profitable corporation on the list were also surveyed until 60% corporate responses were attained.

The effectiveness of this study could also have been limited if a large number of companies claimed not to have learning resource centers or if the formal training
organization or those surveyed at these corporations were unaware of the existence of their learning resource centers. Requiring at least one third of those surveyed to claim to have a learning resource center minimized this impact. If fewer than 33% claimed to have learning resource centers, then the next most profitable corporation on the list was progressively surveyed until at least one third of the corporations claimed to have a learning resource center.
CHAPTER 2

REVIEW OF LITERATURE

Dissimilar to the scholasticism of higher education, corporate educators rarely publish books or theoretical works. The scant materials written from corporate learning resource centers often appear in business journals or trade magazines. Internal documents abound yet are frequently maintained and shared only within organizations. Most are pragmatic and specific in nature. The literature discussed in this review has been organized into paralleling sections, corresponding to the respective purposes of this study.

Background and Status

The background or history of corporate learning resource centers has, in fact, led to their current status. According to Patten (1993/1994), "Unprecedented problems have given way to unprecedented solutions" (p. 411). While efforts heretofore have been unparalleled, some researchers may remember the corporate schools of the past. These have served as the foundation for the extensive efforts that America is now observing in corporate education. Patten wrote, "Old-time personnel managers may perhaps recall the Henry Ford Trade School, National Cash Register Training School, Chrysler Institute, and the Cincinnati Milling Machine Apprentice School, to mention a few exemplars of industrial-controlled schools of the past" (p. 419). Launched in the early 1950s and reputed to be the first corporate university, the General Electric Management...
Development Institute operated much like a "boot camp," where employees spent an entire month away from family and friends, living with coworkers (Meister, 1994).

During the 1950s, 1960s, and 1970s, corporate classrooms emerged in both small and large companies. These educational institutions within corporations spread across the United States and became known as corporate universities, institutes, or colleges, with the most sophisticated programs in existing companies with large investments in technology (Meister, 1994). It is now estimated that "at least 400 businesses presently include a building or campus labeled college, university, institute, or education center" (Eurich, 1985, p. 48).

Employers in U. S. corporations have long seen a decline in the basic skill level of those entering the workforce and are exerting great efforts to assist in the crisis affecting job readiness in a changing workplace. According to Foegen (1991), "Acting largely in self-defense, the private sector has moved considerably toward corporate schools. The American Society for Training and Development says that, in two years, 93% of the largest U.S. firms will be teaching employees basic work skills" (p. 55). For example, Motorola devotes almost 10% of its total training budget to basic skills training (Meister, 1994). In 1991, the American Society for Training and Development (ASTD) estimated that, as a group, U.S. employers spent $300 million on basic skills training, up from zero 10 years ago.

In 1987, Hofstra University researchers surveyed 558 corporations, identifying 26 industrial and service corporations with learning resource centers (Green & Lazarus, 1987). General Electric began the trend, reporting the first learning center, established in
1956. Palmer (1986) reviewed materials catalogued by the Educational Resources Information Center (ERIC):

The literature on educational technology often centers on the role of learning laboratories and learning resource centers (LRCs) in housing and making available nonprint media for student use. . . . There is every indication, then, that the functions of the library and the learning laboratory are being combined in LRC. (pp. 83-94)

Bianca Arnold, United Automobile Workers Education and Training Coordinator, has written, "'Both the union and the company felt that for General Motors to be more competitive--and for its employees to understand new technologies--we needed to focus more on education'" (Gunsch, 1993, p. 43). In order to accomplish this corporate educational goal, 36 General Motors plants nationwide have developed skill centers at all plants.

Within higher education, many learning resource centers have been designed for a specific sponsorship or discipline, such as science, English, mathematics, or other learning resource centers (Anderson, 1987; Avery 1985; Barker, 1986; Barr, 1987; DePaor, 1986; Duhrkopf, 1988; Goodrich, 1986; Goolkasian, 1988; Mueller & Marlies, 1989). Corporate learning resource centers reflect the characteristics of a specifically sponsored learning resource center, largely due to the variety of goods and services provided. For example, corporate learning resource centers may specialize in computers, automobiles, petroleum, or other specialty areas. General Telephone and Electronics (GTE), the largest local telephone company in America, with over 100,000 employees, and a company that has
won the National Malcolm Baldridge Quality Award, has many specialized data and telecommunications courses (S. Sherlund, personal communication, March 25, 1996). It would be expected that a company's strategic mission or vision would be specifically reflected in its learning resource center course offerings.

Diversification of skills needed in all companies are reflected in learning resource center courseware. Among these are basic common skills of typing, reading, speaking, and management. International Business Machines (IBM), which has been among the 25 most profitable U.S. industrial corporations for many years, GTE, Navistar, New York Life, and numerous other large companies maintain a diverse range of educational opportunities within their learning resource centers (Miller, 1989; Pak & Solo, 1990; S. Sherlund, personal communication, March 25, 1996). The American Express Learning Resource Center in Fort Lauderdale, Florida, offers courses that include basic-level work as well as advanced-level materials (Abbott & Dahmus, 1992).

A modern corporate learning resource center is a physical space, usually on company premises. It is often housed in a classroom conference room and is utilized for the formal development of employees at many different organizational levels (Green & Lazarus, 1987). Readily available because of the downsizing taking place in corporate America, space is converted easily, utilizing existing facilities and equipment with little or no cost for new construction or the purchase of equipment and furniture (Green & Lazarus, 1987). E. Mims, the Learning Center Administrator for IBM in Dallas, Texas, claimed that IBM had 162 learning or training centers of an amalgamated nature. Mims also mentioned that IBM's learning resource centers play an integral and required part of
the total training each employee receives (E. Mims, personal communication, April 23, 1990). Additionally, IBM has developed a refined approach to skills development within its organization. James (1995) noted that a detailed curriculum for every major job category is a feature of this flexible program of adaptation to the needs of employees and the company. Miller (1989) stated this of a major insurance and financial service company:

To serve its 1,000 MIS, 4,800 business and 4,800 field employees who may need technical training, New York Life has devoted six rooms and a full-time administrator to the learning center. The learning center consists of a reception area, two classrooms, a conference room, a reference library and a self-study room. (p. 11)

Organization and Personnel

Organizationally, corporate learning resource centers have a great impact on what a learning resource center actually becomes. Adding permanent full-time training directors, learning resource center administrators, or program coordinators to the payroll sometimes becomes necessary. A learning resource center program requires orchestration by a human resources professional able to perform many functions as a training facilitator (Patten, 1993). Aetna Institute has a full-time teaching staff of 60, including several former college professors, who teach 20 or more classes for 200 to 400 students each day (Durity, 1991). Outside consultants, teachers, university professors, or resource people within the corporation are often the pioneers in the establishment of learning resource centers (Green & Lazarus, 1987). Green and Lazarus (1987) note:
The staffing of courses, sessions, seminars, or workshops would thus take advantage of insiders and outsiders, drawing on their combined skills to attain learning objectives. There is no buildup of a permanent staff and training and development bureaucracy. Costs are controlled. (p. 58)

For example, of the 1,200 people involved in training and education at Motorola University, only 110 are full-time (Haas et al., 1993). Larger companies are likely to use a variety of consultants and outside training providers, whereas many manufacturing firms access community colleges, technical and vocational schools, and 4-year colleges and universities (Price & Waterhouse, 1994).

Types and Amount of Alternate Delivery

The types and amount of alternate delivery or the equipment utilized to create this learning environment is another shaping factor. Course offerings are adjusted on an ongoing basis to accommodate changing business needs and are delivered via mainframe and microcomputer. These courses are supplemented with texts, videotapes, and reference manuals. Students work in the learning resource center at their own pace on materials that have been chosen to meet their individual needs (Abbott & Dahmus, 1992). The authors wrote concerning learning resource centers at General Electric: "The centre [sic] uses self-instructional tapes to train people in the skills which are required for setup, maintenance and troubleshooting" (Abbott & Dahmus, 1992, p. 51).

Arnett, an education consulting service executive with Skill Dynamics, an IBM company, described a learning environment where "modular, multi-sensory instructional
modules will be distributed on demand to employees" (Meister, 1994, p. 121). The focus
will be shifted from a corporate classroom to be more conveniently located at the
employee's work station (Meister, 1994). Sophisticated education delivery media are
available in larger corporations, which are often in the forefront of technology. Rollier
(1988) indicated, for example, that IBM employs the latest technology in the training of its
workforce:

IBM employees throughout the U.S. can take courses in various topics, via
satellite, through the IBM Corporate Education Network (CENET). Using a
satellite owned by Satellite Business Systems, a division of MCI, CENET can
transmit from studios in Texas and New York to over 20 receiving sites
nationwide. All broadcasts are encrypted to prevent unauthorized viewings.
The courses encompass various subjects for programmers, systems designers and
analysts, telecommunications specialists, engineers, and administrators. In addition,
the instructor is alone at the studio, where camera focuses on the instructor and 2
others are used for displaying hard copy documents. Two-way communication
between the instructor and the students is available through a student response
monitor (SRM) in the studio. The SRM also is used to display questions and
record students' responses, which helps determine whether students are
comprehending the material. (pp. 62-63)

Miller (1989) demonstrated another diverse learning environment when describing
the equipment used by a major insurance and financial service company:
Within the self-study room are six training stations, each with a PS/2 system that allows access to PC and mainframe-based CBT [Computer Based Training]. Five stations also contain IVI [Interactive Video Instruction] equipment, and three contain VCRs [Video Cassette Recorders]. (p. 15)

GTE is a Fortune 500 Service Corporation that was the number-one utility company in the United States in 1989 (Pak & Solo, 1990) and the 19th most profitable company in 1994 ("Fortune 500," 1995). Primarily a telecommunications company, GTE has many learning resource centers that offer writing, speech and verbal communications, personal computer, software, programming, management, sales and marketing, technical skills, personal lifestyle management, training on quality, business, and various other types of courseware. The company utilizes reference material and has videotape, CBT, CD-ROM, sound cards, head phones, audiotape, connection to local and wide-area networks (LAN/WAN), and several other delivery media (S. Sherlund, personal communication, March 25, 1996). In her recently published book on corporate universities, Meister (1994) described alternative methods of learning on which many companies are pinning their hopes for the future:

Companies are experimenting with new ways for employees to learn using alternative learning technologies: technology-based methods operated by the learner. The list of these technologies runs the gamut from computer-based training, multimedia (i.e., a combination of computer-based training with full motion video, audio, animation, and graphics), interactive video, distance learning (providing one-way video and two-way audio communication between an educator
and a learner) and electronic performance systems, which integrate information, instruction, and system support to provide whatever is necessary to generate improved job performance. (Meister, 1994, p. 122)

According to Carnevale and Gainer (1989), of the American Society for Training and Development, "The competitive advantage of developed nations lies in the application of technological advances in combination with an increasingly skilled and adaptable work force" (p. 29).

Selected Cost Considerations

Initial establishment costs and maintenance or operational costs must be included in the planning and preparation for a learning resource center. Cost consideration in establishing training programs is a major factor in planning for and developing the learning resource center (Green & Lazarus, 1987). The National Alliance of Business stated that employers are already spending $210 billion annually on job training and retraining (Foegen, 1991). This figure has escalated dramatically since Aiman (1986) gave her prediction of only $40 billion for corporate training programs in 1986. This represents an astounding increase of approximately 425% in only 5 years. Although this may seem to be an exorbitant amount of money targeted at America's workforce, the American Society for Training and Development estimates that this figure is representative of only 1.4% of their payroll expenses (Meister, 1994).

Abbott and Dahmus (1992) discussed the investment in a single learning resource center at General Electric: "General Electric has invested $3,000,000 in its learning centre
[sic] at Columbia, Tennessee" (p. 51). Durity (1991) stated that Aetna Institute, which serves Aetna's 42,000 employees, operates with a budget of $50 million. In response to the monumental challenge of educating America's workforce, Aetna Life and Casualty constructed a $42 million building with 56 classrooms and 261 hotel rooms to house what is officially called the Aetna Institute for Corporate Education (Durity, 1991). Likewise, Motorola University now spends over $60 million annually, with an additional $60 million in lost work time, but considers it money well-invested (Haas et al., 1993).

Although little is known about actual cost benefits of training (Dentzer, 1993), Bill Wiggenhorn of Motorola University has the facts and figures to prove that "every $1 spent on training returned about $33" (Dobyns & Crawford, 1991, p. 134). This represents a 3,300% return on Motorola's corporate training investment. In addition, many corporations are summoning all their creative resources and establishing successful partnerships to meet the challenge of educating America's job forces. The most progressive companies, such as Motorola, Intel, IBM, and Xerox, to name just a few, are designing programs that will initiate change and reform in the local school systems. They are taking steps to insure that the students are learning the types of skills, knowledge, and competencies needed in the workplace in the 21st century. Meister (1994) noted that some companies are involved in cooperative endeavors in their communities with other companies and schools:

Passion for school reform is gripping corporate America. It is marshaling resources, energy, and influence to improve education. Hundreds of partnerships are blooming between school and business. They run the gamut: gifts of
equipment, paid work-study programs, teacher training, and literacy volunteers.

(Meister, 1994, p. 117)

The goal is even broader with some companies such as Intel and Motorola. Their mission is to align their district school's curriculum with the skills and knowledge required by local business leaders and colleges (Meister, 1994). Motorola stated the following in their 1991 year-end report:

"Motorola University seeks to form strategic partnerships with institutions of higher learning globally in order to gain access to educational and research sources that bring distinctive competencies in new technologies, program design, development and delivery or accreditation, and to influence their curriculum development to meet the skills and knowledge needs of all workers." (Meister, 1994, p. 168)

Although it seems, that in the past, corporations have not been characterized by their sharing of information and resources, the situation is rapidly changing. Bill Wiggenhorn, president of Motorola University, said, "We can no longer operate in single islands of achievement. We must build interlocking bridges that support the sharing of knowledge and technology" (Wiggenhorn, 1991, p. 2). Therefore, this well-funded plethora of significant educational activity must be ferreted out by interviews, survey instruments, partnerships, and studies such as the present one.
CHAPTER 3

METHODS AND PROCEDURES

Contacting Corporate Personnel

The 25 most profitable industrial corporations in the United States were listed in Fortune magazine, including the city and state listing of corporate headquarters ("Fortune 500," 1995). Because area or regional education and training departments existed, the headquarters of the corporations were contacted to obtain the required information. Many telephone calls were necessary to acquire the contact information needed to transmit or deliver the survey instrument. Telephone numbers were found in a variety of sources, such as magazines, information listings, and telephone directories.

To reach the appropriate persons, numerous calls became necessary. Switchboard operators who knew little about the corporation's structure were often reluctant to release contact information without the researcher's foreknowledge of the party being called. Normally, requesting to speak with the supervisor at least steered the contact to the next level of the corporate structure. Several corporations also required a human-resources-survey approval process prior to the granting of permission to send a survey because of the large number of requests received. This process included and was not limited to the approval of the following: (a) the research and its purpose, (b) the survey instrument, and (c) the intended use of the results. Almost all the corporations required anonymity in the
use of any information obtained. Proprietary or negatively utilized information was their greatest concern.

Contacting the appropriate person was difficult and required numerous interactions to obtain the necessary information. Typically, one would be given education and training department numbers to call where either a secretary or Interactive Voice Response Unit (IVRU) guarded the way to the next level of infrastructure, which required navigation. Certain IVRUs provided registration procedures or information that only employees were supposed to access. After many explanations, the researchers usually obtained names and numbers of someone closer to the education and training departments. Inability to reach contacts by telephone and delays occasioned by employee vacations were particular annoyances that often consumed several weeks.

Obtaining Cooperation for the Study

When the education and training directors or appropriate persons at these corporations were reached, permission was sought for their participation in the study. They were informed as to the nature of the study and asked for name, telephone number, title, mailing address, and fax number. Inquiry was made concerning their willingness to respond to this questionnaire, which helped rule out a typically weakened response rate due to incorrect addresses (Bailey, 1987). Although it is commonly known that some studies gain compliance by the use of inducements to reply (Mizes, Fleece, & Roos, 1984), a prior verbal commitment was obtained as opposed to the mailing of a commitment postcard. This was more personal, and, in a study by Childers and Skinner
(1979), it was also found that a prior commitment postcard did not significantly increase mail survey response or the speed of response.

Homogeneity of Response

Because the corporations had multiple learning resource centers, the calls also ascertained whether the learning resource centers were homogeneous or standard in nature. The education and training directors or managers often gave tentative statements such as, "I think . . .," or "it was . . .," or "this used to be different, but . . .," or "to the best of my knowledge. . . ."

If individual corporations had variant multiple learning resource centers, additional sampling was utilized. However, all learning resource center surveys from an individual corporation were combined, where 25 summary surveys would be representative of the 25 most profitable U.S. industrial corporations. This was only to take place where variant multiple learning resource centers existed. In other words, the increased number resulting from heterogeneity of multiple learning resource centers was to be combined and factored into one representation of that specific company learning resource center or the 25 individual corporations represented in this study. This combination was to be additive and summative for essay or short-answer questions, in essence eliminating weighting or factoring for this type of question.

Weighting of Questions

Quantitative questions were weighted to create a single corporate representation. For quantitative questions requesting totals, each survey question total was added to the
total of the same question from other learning resource centers within a corporation, and the resultant total was divided by the total number of surveys from that corporation. The resultant arithmetic mean then became representative of an individual question response score for that corporation, having the same weight as other solitary corporate representations, such as those found in homogeneous corporate learning resource centers. Essentially, this produced weighting equal to the percentage of responses from the individual corporation. A hypothetical example of this is demonstrated by Corporation 1’s Learning Resource Center 1 returning a value of 5 for Question 1. If Corporation 1’s Learning Resource Center 2 returned a value of 10 for Question 1, and if Corporation 1’s Learning Resource Center 3 returned a value of 15 for Question 1, the resulting arithmetic mean would be 10 for Corporation 1’s Question 1, which equals the number of Learning Resource Centers (3, divided by the total value, 30, which equals 10). It is still 10 if you take Learning Resource Center 1’s 5 multiplied by one third or 1.67; Learning Resource Center 2’s 10 multiplied by one third, or 3.33; and Learning Resource Center 3’s 15 multiplied by one third, or 5 (1.67 + 3.33 + 5 = 10). This utilizes and demonstrates the law of multiplicity.

Because of the possibility of multiple surveys being completed within a single corporation, multiple answers rather than single answers might have been found within individual questions. Therefore, an additional factored weighting was to be used to represent a single response. For example, if 10 surveys were returned from a single corporation and a question expected a single response, but five different responses were noted by 10 respondents from that corporation, a .2 weighting would be utilized for each
of the five responses to that question. Size or number variances would thereby be eliminated from individual question summaries found from multiple surveys in a single corporation's variant multiple learning resource centers.

For similar, standard, or homogeneous learning resource centers, any one learning resource center was, in fact, representative of them all. Heterogeneity and diversity alone required additional representation. Because the learning resource centers were uniform, either the headquarters, the pilot learning resource center, or another of their suggested learning resource centers was utilized for this study.

If the learning resource centers had been heterogeneous in nature, this researcher would have obtained a listing of the centers that utilized the individual corporation's permutation or coding scheme. If classifications existed or specific types of learning resource centers were categorized, then one learning resource center per category code would have been surveyed. In the instance of a disarrayed or nonclassified listing of heterogeneous learning resource centers, randomized sampling would have been performed, amounting to no less than 10% of the total population. If a randomized sampling of learning resource centers was necessary, additional information-gathering would have been necessary regarding contact information and the willingness to participate through another series of telephone calls.

**Inducements to Reply**

After learning resource center contact information was obtained, a cover letter and questionnaire were mailed or faxed to each of the learning resource centers being
surveyed. The cover letter and questionnaire included either a self-addressed stamped envelope for the convenient response of those mailing back the questionnaire or instructions and return fax numbers, dependent upon the transmission methodology selected (see Appendix A for a sample cover letter). Attention was given to the construction of a "permissive" letter, as studied by Scott (1961), who found that "permissive" letters receive higher response rates than "firm" letters.

Even with the aforementioned conveniences and specific content of the letter, no more than a 35% return rate was expected. Therefore, after approximately 2 weeks, a follow-up letter was sent to all nonrespondents of the questionnaire (see Appendix B for sample follow-up letter). Various studies have included attempts to determine the proper time to send a follow-up letter from various studies, without clear results (Gray, 1957). However, Scott (1961) noted that there is almost "universal agreement that follow-ups are effective in increasing response rates" p. 165). Therefore, after approximately another 2 weeks, a follow-up letter was sent to all non-respondents. Again, only 5% to 10% additional response was expected due to mailing delays, procrastination on the part of respondents, and this additional prompting.

After approximately 1 more week, an additional follow-up letter and an extra copy of the questionnaire were transmitted indicating the importance of a response and requesting prompt action. The expectation was for a probable 8% to 16% additional response rate. This additional follow-up letter was similar to the first follow-up letter, yet participants were informed that they would be presented with a summary of the findings of this study, conditional upon their completion of the survey in its entirety. When the
response rate fell below approximately 50%, another call was placed stating the importance of an immediate response. Earl Babbie, *Survey Research Methods* (1973), stated that a 50% response rate is considered adequate and 60% is considered good. Bailey (1987) contended that a response rate of 75% may be achieved with the use of follow-ups and reminders. Hence, the final call was really a catch for sickness and vacations and a last attempt at attaining those who were busy or undecided. The researcher reemphasized the importance of this study and assurance that the findings could save the respondents research time and money. If at least 60% of corporations did not respond at this juncture, the same process was to be initiated with the 26th most profitable corporation and progressively continued with the next most profitable corporation until at least a 60% response rate attainment.

The Population

The population consisted of the total number of learning resource centers of the 25 most profitable U.S. industrial corporations ("Fortune 500," 1995). These industrial corporations were those existing during the 1994 fiscal year, which was the most currently published list available to this study (see Table 1).

Sample Selection

The preliminary sample was the number of the 25 most profitable U.S. industrial corporations that had learning resource centers. It was not known how many would, in fact, have one or more learning resource centers. It was also not known how many would have multiple learning resource centers that were not all of a homogeneous or standard
Table 1
The 25 Most Profitable U.S. Industrial Corporations’ Revenues, Profits, and Assets in the 1994 Fiscal Year Ranked by Greatest Profit

<table>
<thead>
<tr>
<th>Profit rank</th>
<th>Corporation name</th>
<th>Revenues in millions of dollars</th>
<th>Profits in millions of dollars</th>
<th>Assets in millions of dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ford Motor</td>
<td>$128,439.0</td>
<td>$5,308.0</td>
<td>$219,354.0</td>
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<tr>
<td>2</td>
<td>Exxon</td>
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<td>$5,100.0</td>
<td>$87,862.0</td>
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<tr>
<td>3</td>
<td>General Motors</td>
<td>$154,951.2</td>
<td>$4,900.6</td>
<td>$198,598.7</td>
</tr>
<tr>
<td>4</td>
<td>General Electric</td>
<td>$64,687.0</td>
<td>$4,726.0</td>
<td>$194,484.0</td>
</tr>
<tr>
<td>5</td>
<td>Philip Morris</td>
<td>$53,776.0</td>
<td>$4,725.0</td>
<td>$52,649.0</td>
</tr>
<tr>
<td>6</td>
<td>Chrysler</td>
<td>$52,224.0</td>
<td>$3,713.0</td>
<td>$49,539.0</td>
</tr>
<tr>
<td>7</td>
<td>International Business Machines</td>
<td>$64,052.0</td>
<td>$3,021.0</td>
<td>$81,091.0</td>
</tr>
<tr>
<td>8</td>
<td>Merck</td>
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<td>$2,997.0</td>
<td>$21,856.6</td>
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<tr>
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<td>$2,727.0</td>
<td>$36,892.0</td>
</tr>
<tr>
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<td>Coca-Cola</td>
<td>$16,172.0</td>
<td>$2,554.0</td>
<td>$13,873.0</td>
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</table>

(table continues)
<table>
<thead>
<tr>
<th></th>
<th>Company</th>
<th>1991 Sales</th>
<th>1992 Sales</th>
<th>1993 Sales</th>
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<tr>
<td>12</td>
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<tr>
<td>13</td>
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<tr>
<td>14</td>
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<tr>
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<tr>
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<tr>
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<tr>
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<td>19</td>
<td>Motorola</td>
<td>$22,245.0</td>
<td>$1,560.0</td>
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<tr>
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<tr>
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<tr>
<td>24</td>
<td>Eli Lilly</td>
<td>$7,000.8</td>
<td>$1,286.1</td>
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<tr>
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<td>$1,146.0</td>
<td>$5,363.0</td>
</tr>
</tbody>
</table>
nature. Multiple standardized learning resource centers permitted one center to be just as representative as the next, and therefore only one learning resource center was a necessary representation of all centers within that corporation. Consequently, a sample of one learning resource center in a corporation could extend inferences to all learning resource centers within that corporation.

If corporations had variant multiple learning resource centers, two subclasses could potentially exist, paralleling two diverse sampling selections. These disparate sampling selections correlate with the following subclasses of corporations with multiple heterogeneous learning resource centers: Subclass 1 was defined as a corporation with multiple variant classified or specifically delineated types of learning resource centers. The type of sample selected for subclass 1 was a one-for-one ratio corresponding to the number of classifications, categories, or specifically delineated type of learning resource center. This multidimensional sample selection produced a stratified sample, which, in effect, conceptually resembled or emulated the homogeneous or standard learning resource center sample pertaining to each strata.

Subclass 2 was defined as a corporation with multiple variant nonclassified or unknown types of learning resource centers. The sample selection for subclass 2 was a randomized sampling amounting to no less than 10% of the total population of subclass 2. This randomized sampling was to be acquired from preexisting naming conventions and lists maintained and assigned by each corporation containing subclass 2 type learning resource centers.
Research Design

The basic approach applied in this study was a survey instrument. The study itself was designed (a) to analyze and describe those characteristics of learning resource centers observed in the 25 most profitable U.S. industrial corporations in 1994, and (b) to discover those demonstrated characteristics that either by frequency and experience of use have been researched or implemented for effective learning.

Instrument

Construction, Reliability, and Validity

No adequate survey instrument was found during the initial or any subsequent review of related literature. Therefore, it became imperative to construct one to be used in this study. This questionnaire or survey tool development consumed a major part of the study, taking over 4 years to develop and enhance its validity. It is inextricably linked to the purposes and research questions of this study. In fact, its evolution reflects this study and matches the thinking of anyone desiring to implement an effective learning resource center.

Generally, the survey instrument was created as a result of questions anticipated and projected from the needs-analysis phase during the design of a pilot learning resource center at GTE's Education and Training headquarters in Dallas, Texas. The face validity of this survey was assessed by a multi disciplinary team of graduate professors from the University of North Texas empirically studying the instrument. Appendix C contains a copy of the cover letter requesting face validity suggestions for improvement and
validation. For ease of survey completion, predefined responses or answers were added to the survey, which also permitted and included additional write-in response options.

In addition, content validity was determined and substantiated by a panel of corporate educators. This panel consisted of GTE's 1990 Associate Technical Degree Program (ATDP) Evaluation Committee (see Appendix D). The ATDP Evaluation Committee performed evaluations of GTE's Associate Technical Degree Program and candidates, which consisted of corporate managers and directors recognized for technical expertise, education, and training background. Several of these individuals also evaluated the hundreds of courses and instructors found within GTE's National Education and Training departments.

Concurrent criterion validity or pragmatic validation and fine-tuning of the instrument was accomplished by surveying five local corporations (Abbott Laboratories, American Airlines, Aerospatiale Helicopter Corporation, Texas Instruments, and 3M Corporation) prior to this study. These corporations participating in the piloting of the survey instrument reflected demographics similar to the actual corporations to be surveyed in this study; therefore, they provided valuable pilot feedback as to the cover letter and general contact information-gathering process (see Appendix E for the pilot cover letter).

Based on the participants' comments and on their understanding and answering of the questions, the instrument was revised. Additional predefined responses were added to those questions, with selections based on some common write-in responses that were not expected during prior survey development. Questions were eliminated or clarified, depending upon the responses, and format changes were adopted. Additional calls to pilot
participants provided clarification and robustness to survey questions. Once the final surveys were administered, the individual response patterns were tallied into frequency distributions, and the related written responses compiled and summarized.

Design

The purposes of this study were directly and categorically replicated as the four major sections of the learning resource center survey instrument. One major section was added to capture suggestions and further considerations, giving the instrument a total of five major sections. The major sections were broken down into the resultant research questions, which were further specified as individual questions on the survey instrument. A total of 52 questions was included on this survey instrument.

Various additions were desired, but exclusion or removal of some was necessary because of the nature of the respondents and survey participants. As would be expected, there appears to be a high correlation between increased questionnaire length and reduction in response rate. Although Scott (1961) compared a one- and two-page version of the same questionnaire, suggesting that a less cluttered format is preferable even though it requires a longer questionnaire, it is clear that there must be some point at which length would begin to make a difference (Bailey, 1973). It probably is beyond that of the one- and two-page version studied by Scott. Because of this phenomenon, the instrument was to be limited to three pages or fewer. Essay and open-ended-type questions permitted those who were willing to add as much detail as desired or necessary. Attachments also
were permitted but not required, also enhancing the participants' response rate. The survey instrument is found in Appendix F.

Section and purpose 1: History and condition. As observed from the instrument, describing and analyzing the background and status or history and present condition of the corporations' learning resource centers represent the detail associated with this study's purpose 1, and research questions 1 and 2. The survey instrument actually utilizes 21 multifaceted questions to demonstrate history and current status. The background and history were ascertained through questions 3, 6, 8, 9, 14 and the current status and condition were requested by questions 1, 2, 4, 5, 7, 10-12, 13, and 15-21.

Questions 1 through 4 determine the company name, the number of learning resource centers, the number of years it has existed, and the possibility of creating another learning resource center. Questions 5 and 6 determined whether the learning resource center was located in a training department or at the employee's work location and which department started the center. The numbers of students the center was designed to serve was requested on question 7, while questions 8 through 10 concerned how it started, who designed it, and who now controls the learning resource center. Questions 11 and 12 asked the number of rooms and the average square footage associated with each learning resource center room.

Purpose, both original and present, was measured by questions 13 to 15. Questions 16 and 17 described the type and extent of cooperative efforts with other learning institutions. The learning resource center's general target population was ascertained by
question 18 and the days and hours of operation by question 19. Questions 20 and 21 observed the quality control measures in place and the frequency with which this information was actually utilized in the enhancement process of the corporation's learning resource center.

Section and purpose 2: Organization and personnel. Both the describing and analyzing the organization and personnel or the administration and administrators of the corporations' learning resource centers are representative of the detail associated with this study's purpose 2, and research questions 3 and 4. The survey instrument actually utilizes 11 questions to describe the organization and personnel. The number of staff and the nature and amount of attention required for the various staff duties was learned from questions 1 through 3. The type of library or cataloging system was sought in questions 4 and 5. Advisement, scheduling, and registration procedures were requested by questions 6 and 7. Theft, check-out procedures, database administration, and data or accountability tracking were queried by questions 8 through 11.

Section and purpose 3: Alternate delivery and special features. The describing and analyzing of the types and amount of alternate delivery instruction deployed within the corporations' learning resource centers represent the detail associated with this study's purpose 3, and research questions 5 and 6. The survey instrument utilizes 13 questions for its description. The type and percentage of training type and which was most effective were requested in questions 1 through 3. Question 4 concerned the approximate number
of courses available to students. The use of workbooks, job aids, manuals, and other supplemental materials collectively was determined in question 5.

Courseware sourcing, including various types of internal or external material acquisition, was elicited by questions 6 and 7. Questions 8 through 10 requested information about various hardware and software acquisition and use; 11 through 13 sought information about special furniture, fixtures, features, and network and system connectivity.

Section and purpose 4: Economic considerations. As observed from the instrument, describing and analyzing selected cost considerations in establishing and maintaining the corporations' learning resource centers represents the detail associated with this study's purpose 4 and research question 7. The survey instrument actually utilizes six discrete questions to demonstrate economic factors for consideration in the establishment and operation of a learning resource center. Each question expeditiously accrued this information in approximate ranges, representing the average cost of each corporation's learning resource center.

Question 1 described the initial startup cost of the learning resource center, excluding the building space and salaries. Question 2 requested the annual budget, also exempting salaries. Survey instrument section 4, question 3 attempted to ascertain the estimated combined salary cost of all personnel at a given learning resource center.

Whether a corporation utilized maintenance agreements was gathered from question 4. Question 5 requested the approximate cost per instructional hour. Question 6
summarized in a yes or no fashion whether learning resource center training was cost effective when compared with any or all other training means.

Section 5: Additional suggestions or considerations. The final section of the instrument requested further suggestions or considerations that might be known by the learning resource center subject matter expert (SME), who was asked to complete the questionnaire. It was not associated specifically with any study purpose or research question, although it provided an opportunity for the SME to clarify any or all of them. It was an open-ended attempt at capturing those things not necessarily contained within the instrument, also possibly indicating additional instrument validity and reliability that might be observed by the absence of response. However, lack of response could also be explained by survey completion fatigue.

This final section and question provided for entrepreneurial initiative to be articulated without restriction from the instrument. If there was strong advocacy or avoidance concerning any question or if the respondent suggested the need for additional questions, the instrument could be scrutinized and corrective measures taken for the results of this study and those associated with any future use of the instrument. Most important would be the immediate comprehension of the participants' response to this study or the clarification of discrete response patterns that might need clarification and were not caught by other open-ended questions in each section or by participants choosing to write in responses next to questions of this nature.
Procedures for Analysis of Data

When the final questionnaires were collected, the data from each corporation's survey or surveys were transferred to a master survey document and spreadsheet to expedite the analysis. The master survey document contained an accumulation of all responses to all questions, and the spreadsheet contained numerical calculations and a more tabular format of the information in the master survey documents. The spreadsheet calculated totals. The master survey document was printed and also utilized for additional handwritten notes, including the totals from the spreadsheet. Both the spreadsheet and master survey document were used for reference and ease of data analysis.

Questions containing numeric or discrete finite response patterns were tallied. Arithmetic means were calculated, and percentile frequency distributions were factored, based on the number of respondents per question. Respondents were utilized as opposed to responses, to accommodate those survey questions that permitted or required multiple responses. Response and nonresponse-rate percentiles were also calculated, indicating a measure of reliability or weighted validity coefficient for each question. Based on this weighted coefficient, a greater than 30% non-response-rated questions were to be noted as having possibly spurious data, which had the possibility of producing leptokurtically or platykurtically skewed results for that question.

Written answers or comments were also listed in the master survey document. Aggregation of written answers or comments into meaningful groups was performed where commonalities substantiated additional categorization. For analysis of the data, the written-response questions were stratified into summative generalizations.
Further analysis of data was accomplished by calculating the non-response rate percentage based on each purpose of this study. This calculation was computed based on the total number of questions representing a research purpose, divided by the total number of required responses or actual responses (if multiple responses were permitted and exceeded the required responses), to complete each purpose of this study. Finally, a grand total non-response rate was calculated on the total number of required or actual responses that was divisible by the total number of responding corporations. After all computations were made, the data were entered into tables, column listings, and figures for ease of reporting and interpretation. Other information was displayed in typewritten form.
CHAPTER 4

RESULTS

Learning resource centers have been a major concern across the United States because of the declining employee skill level, knowledge explosion, the changing world and work environment, technological advancements, mobility, the frequency of job and career change, the billions of training dollars spent annually by corporate America, the lack of published corporate learning resource center information, the sheer numbers trained by corporate America, the numbers of functionally illiterate high school graduates necessitating retraining, the growing work force, and the widespread availability of new training types. All these issues combine to make the results and analysis of data observed from this study so important.

Analysis of Data

These data findings have been organized and ordered in accordance with the four purposes, which reflected four major sections of the five within the survey instrument. The fifth section attempted to ascertain additional suggestions or further clarification of the previous four purposes. These results have been further divided into the seven research questions also noted in chapter 1 and seen as separate subheadings to each major purpose and heading when appropriate. Otherwise, research questions were combined with the major section and purpose heading.
Section and Purpose 1: History and Condition

The background and status or history and condition of the 25 most profitable U.S. industrial corporations' learning resource centers utilized the corporate names for identification only. Although the individual responses of the specific Fortune 100 companies were interesting, it was unnecessary to identify them specifically. The knowledge gained from their learning resource centers could still be described without referencing a particular corporate name associated with the results. In fact, specifically identifying corporations was strictly forbidden as a requisite to their survey completion. All percentages were calculated from the total of corporations responding affirmatively to having at least one learning resource center or those responding to a particular question, unless otherwise stated. Most individual response/nonresponse rates are not mentioned unless they are somehow noteworthy or if they fall below a 30% non-response rate level, which could call into question the reliability or validity of a question or research area.

Research questions 1 and 2: History and status. In terms of which of the companies actually had learning resource centers, two thirds of the responding corporations claimed to have at least one learning resource center. Each corporation averaged about nine learning resource centers, although 60% of the respondents to this question failed to respond to the specific number requested. One third planned on adding learning resource centers, one third had no plans for additional learning resource centers, and one third were unsure of future learning resource center plans. There was a 70% non-response rate for those planning for additional learning resource centers, thus calling into
question its reliability. The average length of time that corporations had owned and operated learning resource centers was 10.2 years.

Learning resource centers were solely located at employees' work site about 17% of the time, solely at the training departments about 33% of the time, or a collocation of both work site and training departments about 50% of the time. This accounted for about 56% of the time at the training departments and 44% at the employees' work or job site. A 40% non-response rate was observed on the location of learning resource centers. Thirty percent of the learning resource centers were started by the training departments, whereas the remaining 70% were originated by the human resources department. Interesting to note is the fact that most training departments organizationally report to the human resources department.

These learning resource centers were primarily established by internal design. Sixty percent came about by internal design, 10% were designed by an outside consultant or vendor, and the remaining 30% utilized a combined approach or an amalgamation of internal and external design partnership. Combined approaches included task forces, internal facilities departments, outside audiovisual consultants, outside architectural firms, and, obviously, outside builders for construction. Significant work was cited to transform warehouse space into beautiful finished learning resource center space.

The smallest learning resource center was designed to serve fewer than 100 people, and 11% of corporations reported these. Of the corporations, 22% had centers serving fewer than 500; another 22% were designed to serve less than 5,000; and about 45% were designed to serve over 5,000. One corporation tracked 67,000 served in 1995.
As can be surmised from the design in the numbers served, this dramatically reveals and affects all other research areas to be described. This same corporation noted that a typical day serves about 250 students in classroom activities, with another 10 in self-paced instruction. Seventeen was the largest number cited as participating in self-paced instruction at this corporation for a given day, but one corporation noted that it is virtually unlimited in the number of people that theoretically could receive instruction, due to self-paced instruction availability. A total of about 55% of the corporations claimed that they were designed to instruct fewer than 5,000 people, and the remaining 45% were designed to instruct more than 5,000.

Historically, these learning resource centers primarily resulted from needs analysis studies. Needs analysis collectively accounted for half of the reasons for implementing learning resource centers; 10% of that 50% was shared with those that were administratively mandated. Those learning resource centers that were administratively mandated collectively accounted for 40% and individually accounted for 30%. The remaining 20% stated that their learning resource centers had evolved slowly over time. Those not resulting from needs analysis may have been due to the popularity of learning resource centers, or from executives who either saw other corporate studies, heard from peers in non-competing industries or simply thought that learning resource centers made sense and could thus benefit their corporation. It was also stated that turf battles between business and training needs for space were continually waged, even over specific functions such as meetings and customer presentations. This often affected needs analysis,
administrative mandates, and the slow evolution of actual learning resource center environments, especially related to on- or off-site training locations.

Although previously it was observed that 70% of the human resources departments initially started the learning resource centers, only 50% of the learning resource centers are now controlled by the human resources department. Figure 1 shows the initial startup versus the subsequent and present control of the learning resource centers. Previously it was noted that 30% were initially started by the training department and that 30% continued to be controlled by the training department. The remaining 20% started by human resources are now being controlled by either executive administration or corporate services. Corporate services also controls and administrates the scheduling of conference rooms. The 20% that human resources transferred to executive administration and corporate services is often due to the specified function of the learning resource centers involved and the population they serve.

The average number of rooms contained in learning resource centers was about 16, excluding some offices or office rooms. The smallest learning resource center consisted of one room, and the largest learning resource center was made up of 58 rooms. The rooms were different in nature and layout, reflecting their diversity of purpose. Some rooms were large or small classrooms; others were laboratories; some contained only self-paced stations; some had library style setups; and others were breakout or discussion rooms.

Surprisingly enough, about 45% of room-size averages were greater than 750 square feet or greater than a 25-foot by 30-foot room. Conceptually, this is larger than the
Figure 1. Human resources departments presently control 50% of the corporations surveyed, although 70% of the corporations report initiation by human resources. Training departments within corporations surveyed account for 30% of startup and current control, and executive or administrative departments now control 20%.
size of six average-size bedrooms. Thirty-three percent of the rooms were less than 250 square feet, or less than approximately a 16-foot by 16-foot room--approximately a bedroom and one half. The remaining 22% of room-size averages were somewhere in between, averaging between 500 and 750 square feet, or about a 25-foot by 25-foot room. It is easy to see that most rooms were designed for multiple people, equipment, or activities simultaneously, or they were designed for growth that would accommodate such.

Historically and currently, the purpose of these learning resource centers was quite eclectic. Originally, of course, all learning resource centers were designed for learning or most commonly described as training employees or providing employees with resources. Various descriptors were used for this because the question format was short answer or open ended. Descriptors included "business training," "designed for training," "train employees on software," "providing self-directed training resources," "training materials," "centralization of materials," "to provide one-stop information access to employees," and "training GM dealer service technicians." Obviously, this was the major focus of the Human resources and training departments, which started all these learning resource centers.

The current purpose of the learning resource centers was primarily the same as their original purpose; in fact, most noted that it was essentially the same. Some evolution or fine-tuning of purpose was observed by responses such as "train new employees and train managers," "training materials housed and accessed," and "training administration and delivery." These slight changes evidenced a more specified target audience and a
clearer understanding of the primary benefits that an actual learning resource center provides by centralizing administration and resources.

In order to permit some quantification of the learning resource centers' purposes, another discrete question was asked that categorized normal response patterns. About 89% stated a primary purpose was that of being a training resource room. About two thirds stated the purpose as being a library or central storage area for hardware, software, and/or other training materials. Also, about two thirds responded that a major purpose was providing prerequisite training, and about two thirds stated that the learning resource center functioned as a complete courseware provider. One third of the learning resource centers provided the complete curricula necessary for degrees or other certification completion. As demonstrated by the combined percentages above, this question permitted multiple responses and demonstrated the eclectic nature of purpose. Only 10% chose not to select multiple purposes, over 30% selected all of the above except one, and 20% selected all of the above. This clearly indicates that learning resource centers almost all have multiple purposes, with learning and resources being a major focus.

The sharing of resources by learning resource centers was disappointing, but understandable because of the competitive nature of business issues and security concerns. Forty percent of those responding claimed no cooperative endeavors or sharing of resources at all. Half of those remaining, or 30%, cooperated with or shared resources with other companies, presumably noncompetitive ones or those with a disparate business niche. The other 30% cooperated and shared resources with schools. None cooperated or shared resources with any community or library. An opportunity may exist for companies
and communities to leverage synergy from each other’s efforts. Certainly, tax benefits
might motivate businesses to seek to assist local communities or libraries or even to share
facilities. Educating librarians and community officials to these opportunities might also
encourage attempted partnerships with corporate learning resource centers.

There was a dismal 50% nonresponse rate for cooperative endeavors or sharing of
resources, which might question its reliability or validity. However, the question response
format may have been suspect, rather than the actual results. There were only three
discrete items that could be checked if the corporation had cooperation or sharing, but
none if they did not. Therefore, actual nonresponse could be understood as a "no"
response. This is supported by the observation that 40% of the respondents wrote in "no"
responses in an area not designed or designated as a response location. A probable
assumption would be that other respondents did not feel comfortable writing in a
nondesigned answer location and that the close to 100% response rate or a 0%
nonresponse rate was actually a result of the absence of response to this question. Clearly,
question 16 of research purpose 1, should have a "no" response added to be certain of
definitive response/nonresponse percentiles and to substantiate the reliability and validity
of the presence or absence of cooperative endeavors or sharing of resources. (See
Appendix G for the adjusted survey instrument.)

The type and extent of cooperative endeavors and sharing of resources had a 40%
nonresponse rate. The above discussion is apropos here, and the appurtenance can be
demonstrated by correlating responses to question 17 to that of question 16. In fact, 10%
of the nonresponse suspect questions above clearly have a "no" indicated in the write-in
short-answer response location, further demonstrating the validity and reliability of both questions 16 and 17 and the above-stated assumption that the nonresponse rate was indicative, not of the nonresponse rate, but of a "no" response concerning cooperation and sharing of resources.

All the extent and type of cooperative endeavors and sharing of resources were divided into either shared libraries, space or equipment resources, or cataloging. Partnerships primarily existed with public education such as community or technical colleges or universities. One corporation maintained limited corporate library borrowing with the UAW International Library, which has been exasperated by "labor-management conflicts." Life-long learning causes many individuals to go in and out of both higher education and corporate America; thus, universities often conduct classes at corporate learning resource centers as extensions to benefit employees, universities, and employers. These limited partnerships also provide university classrooms with corporate educators or guest lecturers, especially involving technical courses. As resources continue to tighten in both education and training arenas, these partnerships show every indication of becoming more commonplace.

The learning resource center target population was 100% employees. Twenty percent of this group also wrote in that their learning resource centers were providing services for other people as well. Besides the cooperative endeavors and sharing of resources mentioned above, visitors and customers were allowed limited use in some of these learning resource centers. Many centers charged fees for their services, depending on the type of person utilizing the learning resource center. Also observed were charge-
backs to departments, to an infrastructure-funding mechanism, and to vendors of contracting agencies for part-time or outside consulting employees. There were charges, too, for lost or misplaced items that were borrowed or checked out (S. Sherlund, personal communication, March, 25, 1996).

All learning resource centers were open at least 5 days a week, with one corporation open 6 days a week, and one open all 7 days. One corporation did not complete the days of operation, but did respond with "7-5" for the hours of operation. Two others actually were staffed after-hours as requested. Because check-out materials were offered, the actual hours were not as important as they would have been otherwise. Most learning resource centers were opened around 7 a.m. and closed around 5 p.m. These learning resource centers averaged over 75 to 77 hours per week, depending on whether a corporation not completing the days of operation intended 5 or 7 days per week. The 75 to 77 hours of operation per week for a center open 7 days a week amounts to about 11 hours a day. Centers open 5 days a week would have averaged about 15 hours a day. These hours reflect the needs of the employees and the desire of the corporations to help train and educate them.

Quality-control measures were in place for 90% of the learning resource centers responding. A general survey of participants for any and all training received accounted for 40% of the corporate learning resource centers. It was not determined what was contained on this general survey, but most contain a satisfaction rating of at least the following: (a) course materials, (b) instructor or facilitator, (c) facilities, and (d) suggestions or comments for improvement. Other information sometimes includes
participant or departmental information, length, accuracy, and future interests. Since most of these general surveys are similar, it is important to note whether such an instrument is regularly administered. (See Appendix H for a sample quality-control general survey submitted by one of the corporate learning resource centers.)

Fifty percent of learning resource centers utilize a special survey of participants for each type of training received. This is much more specialized, specifically monitoring a specific course. There are numerous surveys here, representing almost every course or discipline available. Our primary concern is whether a learning resource center is attempting qualitative feedback to represent the needs and desires of their customers.

Of the learning resource centers, 50% were implementing some other formalized system of quality control. This figure indicates that half of these corporations have taken a third step in quality assurance. One corporation respondent mentioned a mailing of about 4,000 surveys each month, dividing up special surveys to different levels and types of employees. Another corporation sent quarterly operational surveys. Some sent annual surveys and material evaluation forms.

Partnerships were formed between the learning resource center and the human resources department to jointly create a more robust survey. One special survey name was specifically mentioned, but it was proprietary to that individual corporation and the respondent failed to elaborate as to what that actually entailed. One corporation respondent described special surveys as being sent via electronic mail as attachments. The participants have only to reply, and the responses are compiled and collected on file
servers. Also listed by a corporation respondent as an other formalized quality-control measure was simply listening to the comments of the customers.

Quality-control measures being in place and actually utilizing the information obtained from that feedback are entirely different issues. All corporations responding actually claimed utilization of this information either monthly, quarterly, or annually. Fifty-six percent used this information to make positive changes every month. Eleven percent maintained quarterly evaluations, and 33% utilize this information annually. One corporation respondent claimed to "constantly" use this information on the self-paced curricula. How qualitative these quality-control measures actually are was not measured in this study. Quality-control measures were being used regularly, and that is a distinguishing statement for these learning resource centers.

Analyzing the data from the background and current condition of learning resource centers in the 25 most profitable U.S. industrial corporations laid some important groundwork. Noted were those that had learning resource centers, how many learning resource centers they had, how long they have had them, and whether they were planning on another learning resource center. The data revealed where the learning resource centers were located, who started them, who currently controlled them, how these centers came into existence, and how they were designed or established. Other data indicated how many people these learning resource centers were designed to serve, how many rooms existed, and approximately what size the rooms were.

Important mission information was analyzed that described the original and current purpose, the target population served, and the days and hours of operation. Cooperative
endeavors and sharing of resources provided further information about the scope of service. Data that described the type and use of quality-control measures revealed the current and possible future conditions of these learning resource centers.

This study's research purpose 1 demonstrated a very high degree of validity and reliability as observed from its overall weighting. The weighted response rate coefficient equaled .8833, whereas .1167 was the resultant nonresponse rate coefficient. Therefore, the average response rate for research purpose 1 was 88%, and thus the nonresponse rate was only 12%.

Section and Purpose 2: Organization and Personnel

Research question 3: Personnel, staff, or administrators. The organization and personnel or the administration and administrators of the 25 most profitable U.S. industrial corporations' learning resource centers begin with staffing. Surprisingly, no individual learning resource center had only one administrator. Forty percent had 2 to 5, 20% had 6 to 10, and 40% had more than 10. Although this question had a 100% response rate, it would have been easier and more precise to have requested the exact number of staff for the individual learning resource center, rather than have only four discrete boxes from which to select. Therefore, when this instrument is used again, question 1 of research purpose 2 should be revised to eliminate the category responses and leave one box requesting the exact number of staff associated with the individual learning resource center. (See Appendix G for its inclusion and the specific question adoption.)
This is further demonstrated by attempting to arrive at an average number of staff for all learning resource centers responding. The selections with the ranges could be made statistically accurate by taking the arithmetic mean to average in with all other scores, but this could be skewed if all respondents tended toward either the high or low extreme. However, normally and statistically this is not the case, because extreme scores tend to cancel themselves out and median scores tend to remain.

The real problem becomes clear when an attempt is made to calculate what a greater than 10 score should become in order to be factored into the group average. For the sake of a measure that could be quite accurate if scores tend to remain leptokurtically skewed toward the low end of the scale, a score of 14 was used to indicate an average. This score was written in an undesignated area, by 25% of those selecting the greater than 10 response. Recognizing and having stated the inherent possible weakness of this measure, the average number of staff members at an individual learning resource center was eight and one half persons. One corporation listed 23 learning resource centers, with a total of 165 salaried employees and another 160 college partner employees. This averages out to a little over 14 staff members when 325 is divided by 23.

The administrators' job or the duties of the staff members were varied, yet most resembled that of their peers at other corporations. The nature of their duties was not distinguished by the particular focus or mission of the corporation. Ninety percent of the administrators provided maintenance and set-up as a regular part of their responsibilities. Seventy percent performed record keeping, facilitation, and monitoring as a normal part of their duties. Sixty percent claimed administrative obligations, and 50% counseled or were
involved in advisement of learning resource center learners. Only 40% stated that filing was part of their job. One could theorize that either procedures are in place for learners to have an actual role in replacing materials, learning resource center activities have been greatly automated, or learning resource center administrators often have clerical assistance for this type of task. Ten percent of the learning resource center personnel wrote "research" in the other category. It was not specified whether this was research specifically for learning resource center learners or learner projects, or whether this was, in fact, related to the continuous improvement of the learning resource center.

Fourteen percent cited research as the duty or task that required the most attention. Another 14% listed facilitation, and still another 14% wrote in "center management" as the most time-consuming responsibility. Maintenance and set-up, monitoring, record keeping, facilitation, administrative, filing, and counseling or advisement were all stated by one administrator as requiring equal attention, or 14%, to "all duties" requiring the most attention. Probably "center management" could be combined with the "all duties" category to equal 28% instead of each listed separately, with 14%.

Clearly, administration was the learning resource center duty that required the most attention, accounting for 44% of respondents. In relation to the nature of duties and the time allocated for these duties, one administrator stated that they "pay a lot of attention to facilities, set-up service, etc." Also, one administrator stated that the "learning resource center does not get involved with content . . . that is up to the user departments." Unconventional as this sounds, evidently certain corporate learning resource centers have
multiple departments that control content, and the administrators maintain the facilities, processes, and procedures.

Research question 4: Organization, procedures, and policy administration. The library coding system or method of cataloging had a 40% nonresponse rate, although 30% of those described in the follow-up question some sort of individualized system about which they were uncertain of the specific cataloging nomenclature. This seems more a reflection of embarrassment about not knowing the name than not utilizing a specified system. Therefore, because it is apparent from the elaboration on the follow-up question, only a 10% nonresponse rate was noted, and percentages for this question were calculated accordingly. An individualized or other cataloging system was also combined and the question would be easier to quantify in the future by combining those to an "individualized/other" response. (See Appendix G for section 2, question 4's change in purpose.) Eleven percent reported implementing the Library of Congress system, and the remaining 89% had some other form of individualized or unknown library or cataloging system.

Explanations of these individualized cataloging systems included categorization by business unit or subject area, alphabetically by subject, by subject and author, topically, or by title. One corporation respondent stated that the corporate library is a separate off-site location, but that it is linked electronically, thus clarifying a lack of knowledge of the specific cataloging system. Others stated that titles were available on-line through the
Some admitted that their individualized library or cataloging system was "not very systematic," that it was evolving and in a state of flux.

Scheduling or registration procedures received a 90% response rate. The majority (67%) allowed the first learner to walk in or register, to be the first served. Also, 67% of learning resource center administrators utilized some form of electronic scheduling or registration procedures. Forty-four percent allowed appointments to be made prior to use of the learning resource center facilities. The appointments and electronic scheduling and registration are indicative of more sophisticated learning resource center administration policies and processes, due to the additional overhead of staff, paperwork, or systems that were designed for electronic tracking.

Paper was used by 44% of the learning resource center administrators as part of the scheduling or registration process. Environmentally, technically, and in order to effectively store and retrieve information for immediate and longitudinal record keeping, this trend will continue to decrease the quantity of paper transactions. Thus, paper scheduling and registration should continue to decline in use. A centralized corporate university or information technology center was stated as the specific entity that handled all scheduling and registration to training workstations within one corporation. One corporation permitted training requests and scheduling via telephone, notes, electronic mail, voice mail, or just a verbal walk-in request. Administrators add these requests in a computer system, and learners receive an electronic mail reminder "a few days in advance of the event." This flexibility is reflective of a customer or learner focus that is designed to remove some of the traditional roadblocks to learning.
Advisement of training opportunities is posted by 50% of the administrators through a catalog. Forty percent have implemented newsletters or similar mailings, and the remaining 10% are not currently advising employees of training opportunities but plan to implement a "desk drop" of training opportunities. In addition, about 40% of those listed above are also using other training advisement opportunities. Several have on-line electronic listings; one cited an intranet style "hypertext computer program" called Always Learning, which is a "part of the company electronic mail system." Another mentioned advisement "via electronic communication network," and still another respondent noted that advisement of training opportunities is "mentioned in new employee orientation." Some training advisement announcements were always available, others did not list time frames for advisement. One reported that advisement is an administrator's monthly procedure.

Twenty-five percent of the respondents stated that equipment or software either disappears or is stolen from their learning resource center. The administrator's role or assistance with this breach in ethical behavior requires new policies, policing, and replacement issues. Fortunately, 75% of the learning resource centers responding claimed that neither equipment nor software is stolen. It would be interesting to analyze the specific learning resource center layouts, personnel placement, and policies for both groups relating to security. The successful group may be preventing this theft problem, or simply the ethical standards of the employees within a given geography or profession of the corporation may explain the differences. This is unlikely because of the national and international nature of these corporations and because of the similarity between all the
most profitable corporate populations, at least in categories of work. Therefore, the group
where the theft problem persists might be able to alleviate the problem directly based upon
the information that could be obtained by the aforementioned study,

Those learning resource centers that permit check-out of materials all used either a
log book (80%) or computer database (60%) to track items. As observed from the total,
40% have implemented both a log and computer database system for check-out items.
None implemented a card catalog system for check-out items. All are manually inputted or
recorded, none are processed automatically or by a scanner. One corporation respondent
stated that all materials are given to those acquiring training. Obviously, either the
employee's department or the corporate policy is to finance these materials through the
training budget.

Eighty-nine percent of those that implemented a database stated that it is accessed
by the learning resource center administrator or other staff. Twenty-two percent of those
with databases permitted learners or nonstaff also to access their database. Obviously,
one permitted learners exclusive access to their database. The survey instrument was not
designed to acquire this information, but it would be interesting to have a follow-up
question that ascertained whether or not the learners were supervised or only had certain
database rights or privileges as opposed to full-access rights by the administrator or staff
employee. It is assumed that the access rights were differentiated by the functions that
both administrator and learner necessitated. The 22% that allowed learners access to the
learning resource center database probably found this to be administrative time saver that
was directly proportional to the computer experience of the learner, the database, and the user-friendliness of the database.

Data keeping or accountability of training classes and learner records indicated that all but one respondent have implemented either (a) computer managed instruction (CMI) on individual courses, (b) a separate database for all records, or (c) direct training record access. Of those implementing data keeping, 29% have implemented a combination of the above, with about 14% implementing CMI and direct training record access, and about 14% implementing a separate database and direct training record access. Again, of those implementing data keeping, CMI accounts for a total of 29%. It is often found within individual courses and is not necessarily integrated into the learners' training experience.

A separate database for all records is the most commonly used, with 57% implementation, and those with direct training record access account for 43% of learning resource center data keeping. The direct training record access normally is the most integrated learning records-keeping system, especially when available electronically. Microsoft stated that their employees or "people can see their transcript of internal training from their own desktop computer." As would be expected from Microsoft, this is a truly integrated electronic computerized records keeping system.

Analysis of the data from the organization and personnel of the 25 most profitable U.S. industrial corporations learning resource centers indicated the average number of staff and described the nature of their duties and which of these duties required the most attention. Briefly, the library or catalog system was ascertained and described, along with the scheduling or registration procedures. Also described was how learners were advised
of learning opportunities and the issue of theft of equipment or software. Procedurally, check-out and database administration were described, along with specific data keeping and training-record access.

This study's research purpose 2 demonstrated a very high degree of validity and reliability as observed from its overall weighting. The weighted response rate coefficient equaled .8455, whereas the resultant .1545 became the nonresponse rate coefficient. Therefore, the average response rate for research purpose two rounded to 85%, and thus the nonresponse rate rounded to a mere 15%.

Section and Purpose 3: Alternate Delivery and Special Features

Research question 5: Alternate delivery or hardware and software. The types and amount of alternate delivery instruction deployed or the equipment or technology that was utilized in the 25 most profitable U.S. industrial corporations' learning resource centers was described largely by the percentage of the type of training included. (See Figure 2 for three specific percentages of the training types included.) The legend in Figure 2 shows "% using," "total % used," and "avg % used." Generally, these are percentages of training types, delivery instruction type, or delivery medium. Training delivery medium is often referred to as alternate delivery medium or alternate delivery instruction when it concerns an instructional delivery medium other than instructor-led training (ILT). Alternate delivery instruction then includes all delivery types listed in Figure 2--interactive video (IV), video tape (VT), audio, lecture, computer based training (CBT), instructor-led
Figure 2. Percentage of training type. See training type definitions below.

IV = Interactive Video (Video instruction individualized based upon learner responses)\(^5\)

VT = Video Tape (Televised or pre-recorded visual images, normally including audio)

Audio = Audibly transmitted and received instruction (cassettes, compact disks, etc.)

Lecture = Lecture by Instructor

CBT = Computer Based Training (preprogrammed software delivered by a computer)\(^5\)

ILT = Instructor Led Training (may include lecture, discussion, small groups, etc.)

Satellite = Instruction transmitted via an orbiting Satellite from a transmitter to receiver

Slides = A transparent plate with light projected through it on to a screen\(^4\)

Records = Phonographically played disks structurally coded to reproduce sound

Text = Text-based (outlines, books, chapters, verses, quotes, often graphics, etc.)

Other = Any other training type or delivery medium\(^6\)
training (ILT), satellite, slides, records, text-based, and other—with the exclusion of ILT and possibly lecture (dependent upon the delivery or media type deploying the lecture).

The "% using" is the percentage of corporations claiming to be using the specified training type, irrespective of the actual percentage of a specified training type utilized by that corporation. As depicted in Figure 2, the training delivery medium that is used by most corporate learning resource centers is ordered as follows: (a) ILT, (b) CBT, (c) VT, (d) lecture, (e) satellite, (f) other, which included self-paced, self-study, or hands-on, (g) text-based, (h) IV, (i) audio, (j) slides, and (k) records. Lecture and satellite actually both had the same score of 40%, as did IV, audio and slides, each with 10%, respectively. The "% using" is not the actual percentage that a corporation is using. For example, in Figure 2, 60% of all corporations utilize CBT; however, the average percentile number of all the corporations' training where CBT is used is only 12%. This 12% represents the next legend or the "total % used."

The "total % used" is the total percentage of a specified training type used by all corporate learning resource centers, combined and divided by their total number. All training types combine to equal 100%. This percentage is the most helpful in obtaining an overall picture of how the learning resource centers of the 25 most profitable U.S. industrial corporations deliver their training. As may be seen in Figure 2, the training delivery medium that is used the most by all the corporate learning resource centers is ordered as follows: (a) ILT, (b) CBT, (c) VT, (d) lecture, (e) audio, (f) satellite, (g) text-based, (h) other, which included self-paced, self-study, or hands-on, (i) IV, (j) slides and
(k) records. Lecture and audio actually had the same score (4%), as did text, other, and IV (1%), and slides and records (0%).

Lastly, the "avg % used" in Figure 2 is the average percentage of all corporations that actually reported using the training type. All training types, when combined, total greater than 100, because each training or deliver type must be measured separately. This is the true percentage reported by the corporations for the specified training type, divided by the number of corporations that reported using that specified training type. Therefore, it does not make sense to combine the percentages from a specified training type with another or all other training types.

This measure provides a true picture of the average percentage of those companies that actually utilize a specific training type. Again, as depicted in Figure 2, the training delivery medium most frequently utilized by corporate learning resource centers is ordered as follows: (a) ILT, (b) audio, (c) VT, (d) CBT, (e) lecture, (f) satellite, (g) text-based, (h) other, which includes self-paced, self-study, or hands-on, (I) IV, (j) slides, and (k) records. Text-based, other, and IV actually had the same score of 5%, as did the training delivery types slides and records, with 0% each.

As can be deduced from the percentiles of training delivery types in Figure 2 (which demonstrated the consistent practice of learning resource centers), in theory, learning resource centers administrators thought that ILT was also the most effective training type. About 63% thought the ILT was the most effective, and 25% thought that some other "hands-on" or learner dependent training type was most effective. Lecture and IV were thought by about 12% to be the most effective training type.
Fifty percent of each corporation's learning resource centers each had fewer than 50 courses, and 50% had more than 50 courses. Out of the 50% that had more than 50 courses, 20% of those included between 50 and 200 courses, and 30% of the corporation's learning resource centers each had more than 200 courses available to learners. One corporation stated that it provided about 40 self-paced courses, but did not delineate whether that was included in the fewer than 50 courses it made available to learners. If it became desirable to obtain the exact average number of courses offered, then question 4 of purpose 3 would have to be altered to request a specific number rather than allow specified ranges.

At least 90% of these learning resource centers included self-paced training, and the self-paced training included workbooks, job aids, manuals, practice computer disks, or other supplemental materials. Only 10% of the learning resource centers either did not have any self-paced training or did not have any supplemental materials with their self-paced training. Supplemental materials would not necessarily be needed with those remotely obtained courses that were taken on-line, via satellite, text-based, audio, and live video feed. However, supplemental materials are often mailed or downloaded for these types of remote training.

External materials were purchased by 87.5% of the corporations' learning resource centers; 37.5% had materials developed for them, 12.5% leased, and 12.5 obtained materials from public domain libraries. Several corporations linked several of the above external material acquisition strategies. One corporation respondent stated that 5% was purchased, and the other 95% was developed internally.
Internal materials were developed by 100% of the corporations' learning resource centers responding. Combined with this approach, existing internal materials were acquired and utilized by 50% of the corporations' learning resource centers responding. One corporation stated that 95% of their learning resource centers' internal materials were developed. Internal material development is normally indicative of a growing or well-funded learning resource center, whereas the use of existing materials signals past growth.

Hardware was always purchased by all the corporations responding to this study. None listed leasing or renting hardware as an option. This may have been indicative of well-funded learning resource centers, or they had received surplus hardware from other existing departments.

The number and type of hardware inventory found in these learning resource centers was presumably not a comprehensive list, and the question was cumbersome. One corporation responded that the hardware list was "too extensive to list (not owned by one department), approximately 150 individual student machines, about 10 BARCO projection systems connected to instructor machines." "Pentium workstations" was a response by another corporation, whose questionnaire was returned just after Pentiums made their debut in the public market.

Personal computers (PCs) were frequently cited by most respondents; IBM PCs were specifically mentioned by name. Personal computers "equipped for multimedia (including MPEG, CD-ROM, laser disks on/with certain machines), some Macintosh units" were all indicated by another corporation as existing within its self-paced instructional areas. Specific types of PCs, Sony video projectors, overhead slide
projectors, VHS VCRs, amplifiers, 35 mm slide projectors, video monitors, facsimile (FAX) machines, copiers, Panasonic B555E Panaboards, and many types of printers, including specialized poster printers, were all contained in one corporation's learning resource centers. Still others repeated some of the items mentioned above, with one learning resource center citing specific numbers such as eight IBM PC compatibles, eight video players, eight monitors, and eight audiocassette players. Having a series of eight disparate hardware types or training delivery types available to learners appeared to be a conscious decision. One of the more technical corporations' learning resource center respondents stated that all its classrooms have two overhead projectors and a video projector. This same learning resource center had various types of laboratories reflecting the various types of hardware, such as (a) a MAC lab, (b) IBM labs, (c) a CAD/CAM lab, (d) a manufacturing lab, and (e) a robotics lab.

Requesting learning resource centers to list the major types and number of software also was cumbersome to participants. Although 80% responded with some software listing, none stated the number of licenses available, and probably none gave a complete list. One simply responded with "all major types" and another, with "all Microsoft products."

Listed below are various other software packages cited: Computer Select, HS Specifications and Standards, Netscape, ARI/Inform, Inspec, Training Partner by Geometrix of Canada, Datatrack (an on-line catalog for serials, acquisition, and circulation), Lotus 1-2-3, Reflow, Rumba, TRACS, Word Perfect, various Microsoft DOS & Windows products (Access, DOS, Excel, Power Point, Windows, Windows 95, Word,
etc.), various marketing services software, an in-house on-line catalog (a system that includes software), Titles from Career Track (video and workbooks), various foreign language CD-ROMs, and other computer software and laser disk titles. Differentiation was stated for the software used by a learning resource center administrator and that which was made available as a training course or for training purposes.

**Research question 6: Special connections, fixtures, or features.** The respondents perceived the listing of special furniture or fixtures used in the learning resource centers of the 25 most profitable U.S. industrial corporations to be a tedious task. Answers such as "sure (too much to list)," indicated an unwillingness to divulge or comply with this arduous request. However, 80% did respond with a myriad of information about custom desks, chairs, easels, speakers, fabric-covered walls to reduce noise distractions, individualized cubicles, various safety gear, blueprints of floors, specific line equipment, manufacturing props and aids, cable accommodation design, cubicles with a PC, video, and an audio player in each, "CBTs . . . segregated into separate cubicles," and design of computer laboratories for classroom training of 12 to 15 learners at a time. A "Tech Commander--allows instructor to put anyone's screen up on the big screen)," "tables were selected with wire management in mind." One respondent stated, "The learning center maintains conference center standards (member International Association of Conferences Centers) so furniture is excellent."

Network connectivity to these learning resource centers was mentioned by 89% of all corporations responding. Multiple network connectivity types were articulated in all
but 22% of those maintaining network connections. Local Area Networking (LAN) was installed in 55% of these learning resource centers. Tantamount to LAN connectivity was the 55% connected to mainframe systems. Internet connectivity was the most popular connection type; it was found in 66% of the corporate learning resource centers. Internet connectivity now provides learners with text-based, audio, video, CBT, and other interactive types of alternate delivery instruction. One corporation articulated strenuous advocacy of Internet control and strict security measures. Internet connectivity provides learning resource center learners access to outside libraries and other nonregulated or noncontrolled learning opportunities. Eleven percent enunciated an other connectivity that entailed an internal electronic mail system, presumably an integral part of, or at least dependent upon, a local area network.

A request for information indicative of entrepreneurial initiative might elicit the dismal 60% nonresponse rate attained when inquiry was made about other special features. Other special features often include such things as libraries of graphics, sounds, templates, animation, utilities, tool-kits, helpful hints, job aids, menus, labeled and documented programming segments or libraries, most of which are maintained departmentally within isolated development teams. One corporation's learning resource center claimed to keep and maintain none of these types of specialized features.

One respondent mentioned video libraries, and innovative features such as an "idea lab for electronic brainstorming, guest offices for facilitators," dining rooms, and 2-way video conferencing were all a part of one corporation's learning resource center facility. One corporate administrator cited "using vendor produced and internal materials," with
everything in an electronic format, and thus "moving quickly to internal WEB sites for help files and interactive tutorials." This same administrator stated that the trend is toward fewer instructor-led courses for technical training and on a fundamental level, more self-study.

The data from the types and amount of alternate delivery instruction deployed in the 25 most profitable U.S. industrial corporations' learning resource centers indicated the percentage demarcations and effectiveness that existed between the various types of training or instructional delivery types. Also indicated was the approximate number of courses and whether the self-paced training included workbooks, job aids, manuals, or other supplemental materials. Both internal and external material acquisition information was also noted. How hardware was obtained and the numbers and types of hardware and software inventory were also described and analyzed. Learning resource center connectivity was described in terms of networking and systems access. Special furniture, fixtures, and other special features were also listed and described as ancillary to corporate learning resource center mainstream.

This study's research purpose 3 demonstrated a very high degree of validity and reliability as observed from its overall weighting. The weighted response rate coefficient equaled .8462, and the resultant .1538 became the nonresponse rate coefficient. Therefore, the average response rate for research purpose 3 was 85%, and the nonresponse rate was only 15%. This was especially high considering the amount of listing requested from participants by purpose 3.
Section and Purpose Four: Economic Considerations

Research question 7: Selected costs for establishment and operation. The cost considerations in the establishment and maintenance of learning resource centers observed in the 25 most profitable U.S. industrial corporations were deliberately selected to encapsulate major cost categories. Learning the approximate initial set-up cost for each learning resource center, excluding salaries and building space costs, was an attempt at quantifying historical data related to design, purchase, and implementation of a learning resource center. One administrator stated that the learning resource center was started 40 years ago and therefore this cost was unknown. Still another found difficulty even guessing this cost based upon the "situation" or environment. Presumably, this indicates either that various other organizational infrastructure budgets exist and fund the learning resource center or that the administrator is largely removed from these financial concerns. Confirming this assumption, another respondent stated that this cost was "absorbed by corporate building budget, . . . several internal training groups, plus the library." Two thirds of those who did state an approximate initial set-up cost noted that it was greater than $250,000. Seventeen percent approximated the cost to be between $150,000 and $250,000, whereas 17% asserted the initial set-up cost to be less than $10,000. Thus, 83% of the learning resource centers must have been large in comparison with the 17% that were considerably smaller, as indicated by the initial set-up costs.

The approximate annual budget for each learning resource center, excluding the salaries, was unknown to 30% of participants. Therefore, since unknown was an actual response (although not a desired one, and a write-in response), these respondents were
excluded from the percentile totals associated with the calculation of actual response rate percentiles. In accordance with this, about 14% stated the annual budget to be less than $10,000, and 14% stated that their annual budget was between $50,000 and $100,000. The remaining 72% responding claimed that their annual budget, excluding salaries, was in excess of $250,000. This indicates that more than a quarter of million dollars annually was budgeted for software, hardware, maintenance, and all other costs (excluding salaries) associated with the operation of the majority of individual learning resource centers.

In estimating the salary costs, 20% were uncertain, and therefore were eliminated from the percentile totals as described above. Twenty-nine percent of the individual learning resource centers expended less than $50,000 annually for salary costs. Over 71% stated that expenditures were greater than $150,000 dollars for annual salaries. Noting various comments about the actual numbers of personnel at specified learning resource centers, question 3 in section 4 will be revised to include additional and greater salary cost response options. (See Appendix G for the specific adoption of question 3.)

It seemed that the vast majority of learning resource centers responding utilized maintenance agreements (78%) rather than service their own equipment. Therefore, only 22% performed their own maintenance or had an internal organization handle maintenance. One corporation stated that its maintenance agreements protected only audiovisual equipment and computers. Several other learning resource center respondents also indicated that computer or other specialized equipment was the most common to be covered under maintenance agreements. Although some learning resource centers' leasing
options protect courseware or other equipment, none of these corporations leased or rented any hardware.

Inauspiciously, the approximate cost per instructional hour had one of the poorest response rates of this entire study. The nonresponse rate was 60%. Further aggravating the results of the 40% responding was that half of these respondents either stated their uncertainty of this cost or the confidentiality of it within their own corporation. Therefore, it is highly probable that the average cost per instructional hour ($18.50) was not the most accurate. Another corporation's learning resource center claimed that all vendor-delivered instruction was charged at a flat $100 per instructional hour.

Although $18.50 is an approximate cost per instructional hour, it would be interesting to further study this cost per training type or delivery methodology. Unfortunately, these costs do not currently appear to be tracked or measured even on a combined basis. Therefore, a study within the 25 most profitable industrial corporations' learning resource centers would first have to assist in commencing a measurement based on each training type. Further complicating this study would be those training types that were not deployed at all learning resource centers. Even with all of these issues and restrictions, a study of this topic would be prodigious to all those contemplating starting or even annexing additional cost-effective training types to preexisting learning resource centers.

The most important and most accurate question for anyone considering the cost effectiveness of a learning resource center as compared to other training means is a simple one: "Is learning resource center instruction as cost effective as other means?" The vast
majority answered yes; only one respondent did not think so. Though this is a positive outcome and measure, it is helpful to focus on the one who did not think it was as cost effective.

This respondent recognized the unconventionality of the response and, thus, wrote this explanation in a nonrequested location (the margin). "Much of training is outsourced because of costs, focus of core business is not training." This seems to be indicative of and consistent with the corporate philosophy of continuing to downsize or rightsize nonessential business units. Outsourcing or partnering with those specialized training corporations allows corporations without a training mission to more fully concentrate on their specific core business vision. The difficulty for any corporation then is to actually quantify the impact upon learners and the resultant impact upon the corporation's bottom line. Obviously, this would be another good study opportunity.

Inconceivably, three corporations did not answer this yes or no question. It may be argued that this is a direct result of not accurately quantifying their own training costs enough to know which is most cost effective, or that it is simply another nonresponse issue. Because of this, the adjusted survey instrument will add an "unsure" response option to question 6 of section 4 in order to determine this information, in the instance that this instrument is to be used again for future or longitudinal studies. An additional question 7 will be added concerning the rationale behind any "no" responses attained from question 6. (See Appendix G for these specific question implementations.)

This study's research purpose 4 demonstrated a fairly high degree of validity and reliability as observed from its overall weighting. The weighted response rate coefficient
equaled .8000, whereas the resultant .2000 became the nonresponse rate coefficient. Therefore, the average response rate for research purpose 4 was 80%, and the nonresponse rate was 20%, or adequate.

Section 5: Additional Suggestions or Considerations

Although the purposes or research areas of this study have been propitiated by sections 1 through 4, section 5 provides corrective measures or additional information that may provide additional clarification, suggestions, or information helpful in correcting instrument inadequacies without the need to study the same participants again with a revised instrument or subsequent telephone interviews. A 60% nonresponse rate was obtained for this question. Because this entire section 5 entails only one question, it is representative of the entire section. However, this is the only question to which such a limited response may be construed as positive and not necessarily attributed to normal survey fatigue. Optimistically then, the lack of response indicates an exceptionally thorough survey instrument, and because this is an essay-type question response, none of the responses are negated in any way.

One corporation respondent wrote that learning resource centers "are an integral part of learning centers around the world. We access most outside information through electronic means." Another corporation's learning resource center respondent stated: "In 1994, we did 290,000 + Mondays of Classroom training and will do almost 300,000 in 1995. In 1994, we did 37,000 + Mondays of Video Tape training and testing. In 1994, we
did 10,500 + Mondays of Satellite Downlink training.” Still another learning resource center administrator wrote:

Wide range of department specific—training groups have sprung up, as the company wide generic training groups are outsourced. Small classes. Job related professional skill training remains instructor-led; generic technical skills training is self-paced or outsourced, and handled divisionally.

Not one person or department [is] running "training" for the company.

Many changes in organizational structure. Corporate library has excellent resource services available to all employees, including research, videos, etc.

Specifics are confidential--do not identify company individually--responses are for use as research statistics.

Another corporation's learning resource center administrator indicated that there are numerous subsidiaries with different learning resource center emphases. These include "leadership training and other non-technical training centers," "marketing training centers," "production training centers," and other divisional training centers. The further suggestions and considerations section and question responses fall into the category of additional information about the respondent's corporation (e.g., total employees) or are a conglomeration or simply a mixture of whatever else they could recall about their specific learning resource center.
Response Rates

General Response Rate

General survey response/nonresponse is germane to all questions. Therefore, the previous data analyses may be strengthened or at least qualified by the knowledge that 16% of the surveyed corporations did not respond and another 24% responded by refusing participation. Normal responses from responding corporations refusing participation were similar to one which stated that the corporation was receiving "so many similar requests to participate in surveys, questionnaires and research projects that we have been forced to say no to all of them."

Twenty percent of the remaining 60% claimed to have no learning resource centers. However, it is impossible to ascertain whether this number is indicative of the absence of learning resource centers or is simply participation refusal. One corporation claimed to have no "formal company wide learning centers," but stated that "several divisions utilize hotel space or borrow space at existing facilities to manage training curriculums. We have no current plans for dedicated learning centers." Another claimed to have no learning resource centers and stated that "98% of all training is technical seminars and conferences (external)."

Figure 3 reveals the response/nonresponse and participation/nonparticipation percentiles. Corporations did not desire credit; they wanted anonymity. This was most often discovered by telephone conversations or by receipt of a short note with either a refusal to participate or requesting the confidentiality of the individual corporate response. A typical corporate response qualifier from a respondent stated, "Specifics are
Figure 3. Although 84% of the corporations surveyed responded to the survey, 24% refused participation, thus leaving the remaining 60% as the actual participants that actually completed and returned the survey questionnaire.
confidential—do not identify company individually--responses are for use as research statistics."

**Total Response Rates**

Section 5 was not a specified part of this study's research purposes and, therefore, was not included in the response rate/nonresponse rate total average. This response rate/nonresponse rate total average essentially is the validity or reliability coefficient of this entire study's findings. As observed in the respective sections and purposes above, section and purpose 1 maintained a response rate coefficient of .8833; section and purpose 2 had a response rate coefficient of .8455; section and purpose 3 had a response rate coefficient of .8462; section and purpose 4 had a response rate coefficient of .8000; and section 5 had a response rate coefficient of .6000 (which was excluded, as stated above).

Equal weighting was given to each research purpose in the calculation of the overall response rate/nonresponse coefficient, since each purpose contained homogeneous response patterns. It should be noted that there was little variation from an overall response rate/nonresponse coefficient calculated on an individual question total basis. Therefore, giving equal weight to each research purpose, calculation includes the addition of .8833, .8455, .8462, and .8000, for a total of 3.3750, divided by the number of research purposes (4), which gives a total study response rate coefficient of .84375 and a nonresponse rate coefficient of .15625. This approximate 84% response rate coefficient and approximate 16% nonresponse rate coefficient indicates a very strong overall study
validity or reliability based on the response, nonresponse percentiles. (See Table 2 for additional detail of complete response rate/nonresponse rate and total percentages.)

Summary

Data analysis was performed for corporate learning resource centers without specifying or ascribing individual names to data being analyzed or described. (See Table 1 for the specific corporations included in this study and for general inferences based on business entity or purpose.) Learning resource center history and current condition revealed that two thirds participating actually had learning resource centers and averaged about nine each. The oldest corporation learning resource center has been around for over 40 years, the newest was only 1 year old, and the average had existed for about 10 years. One third cited plans for additional learning resource centers, one third had no plans, and one third were unsure of future learning resource center establishment.

Learning resource centers were located in the training department about 56% of the time; 46% were at the work site, and most often were collocated at both work site and training department. The training department started and controlled the learning resource centers about 30% of the time, while human resources, executive administration and corporate services started and currently controls the remaining 70%. About 55% of these learning resource centers were designed to serve fewer than 5,000 employees, and about 45 percent, more than 5,000.

These corporate learning resource centers sometimes slowly evolved into existence (20%). Thirty percent of the time resulted from administrative mandates; 40% were a
Table 2

Response Rate/Nonresponse Rate Percentages

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<th>Section/question</th>
<th>Response rate</th>
<th>Nonresponse rate</th>
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| 3.08 | 100.00% | 0.00% |
| 3.09 | 70.00% | 30.00% |
| 3.10 | 80.00% | 20.00% |
| 3.11 | 80.00% | 20.00% |
| 3.12 | 90.00% | 10.00% |
| 3.13 | 40.00% | 60.00% |
| subtotal | 80.00% | 20.00% |
| 4.01 | 90.00% | 10.00% |
| 4.02 | 100.00% | 0.00% |
| 4.03 | 90.00% | 10.00% |
| 4.04 | 90.00% | 10.00% |
| 4.05 | 40.00% | 60.00% |
| 4.06 | 70.00% | 30.00% |
| subtotal | 80.00% | 20.00% |
| Sections and purposes 1-4 Grand total* | 84.38% | 15.63% |
| 5.01 | 40.00% | 60.00% |
| subtotal | 40.00% | 60.00% |

Note. This grand total for sections 1 through 4 is also the total response rate/nonresponse rate for this study. This grand total response rate added to the nonresponse rate shows an insignificant extra 100th of 1% because it was rounded to two decimal places. All response rates below 70.00% or nonresponse rates below 30% were considered possibly spurious.
result of a needs analysis; and 10% were a combination of mandate and needs analysis. The majority (60%) were internally designed or established; 10% were designed by an outside consultant or vendor; and the remaining 30% commissioned both internal and external expertise for design and establishment. Learning resource centers averaged about 16 rooms, excluding offices. One third of the rooms were less than 250 square feet in size, with two thirds greater than 500 square feet.

The learning resource center respondents primarily described the original and current purpose as being a training resource room, a library or central storage for hardware, software, and/or training materials, and providing prerequisite and complete courseware offerings. The target population was 100% employees, and yet 22% also permitted family, customers, or other visitors. The learning resource centers were open from 5 to 7 days each week, averaging from 11 to 15 hours each day. Check-out was also frequently provided, supplementing already extended service hours. Quality-control measure feedback was actually utilized either monthly, quarterly, or annually by all responding learning resource centers. These quality control measures included general surveys of participants after all training (40%), special survey for each type of training received (50%), and additional formalized measures were provided by 50% of all responding learning resource centers.

There was an extrapolated average of about nine administrators per learning resource center. Administrative duties were not distinguished by the particular business focus or mission. Varied learning resource center staff responsibilities included maintenance and setup (90%); record keeping, facilitation, and monitoring (70%);
administration (60%); counseling or advisement of learners (50%); filing (40%); and 10% performed research. Administration required the most attention from administrators, succeeded closely by a combination, or "all duties."

The Library of Congress cataloging system was used by 11%, and the remaining 89% used an unknown, individualized, or other system. None cited the Dewey Decimal as their system of cataloging. Two thirds permitted the first learner to walk in or register to be the first served, and two thirds utilized some sort of electronic scheduling or registration procedures. Appointments were permitted by 40% of learning resource centers, prior to the scheduled learning experience. Half refused paper registration or scheduling.

Training catalogs (50%) and newsletters or other similar mailings (40%) were the preferred methods of training opportunity advisement. Ten percent were not implementing any formal advisement or advertising of training available. Stolen equipment or software plagued only 25% of learning resource center respondents. Check-out of materials was maintained in either a log book (80%) or a computer database (60%), with 40% utilizing both methods of tracking. Twenty-two percent of those utilizing databases for material tracking permitted learners access. Record or data keeping most frequently was maintained in a separate database for all records (57%); 43% permitted direct training records access, and 29% used computer managed instruction (CMI) on individual courses.

Types and amount of alternate delivery addressed training types and equipment. The order of preferred training type or delivery medium used by most learning resource centers had the following permutation succession: ILT, CBT, VT, lecture, satellite, other
(including self-paced, self-study, or hands-on), text-based, IV, audio, slides, and records. The order of the total percentage using a training type by all corporations corresponded with 1 through 4, and 10 and 11, yet was dissimilar in that audio, satellite, text-based, other, and IV replaced the preceding order of 5 through 9. A similar measure, which measured the average percentage used by each corporation, was found in the following order: ILT, audio, VT, CBT, lecture, satellite, text-based, other, IV, slides, and records.

Therefore, ILT remained preeminent in all measures and was claimed to be most effective, while slides and records were always ordered last, because they were not implemented in any responding learning resource center. Fifty percent of all corporations had more than 50 courses, and 50% had fewer. Of all corporations, 30% had more than 200 courses. Ninety percent of self-paced training included workbooks, job aids, manuals, or other supplemental materials. It was discovered that 87.5% of all corporations acquired external materials by outright purchase, 37.5% had materials developed for them, 12.5% leased, and 12.5 acquired materials externally through public domain libraries.

All corporate learning resource centers acquired internal materials by developing them, and half of those also stated finding and utilizing preexisting materials within their corporation. Hardware was always purchased. Many specific types of hardware and software were listed as being used, most of which are commercially available to the public, such as personal computers or related devices and Microsoft Windows applications. Special furniture or features primarily included custom desks, chairs, learning resource center design, or instructor display technology.
Network connectivity was cited by 89% of all corporate learning resource centers responding, and 78% stated multiple network connectivity types. The most popular network connection was the Internet, representing two thirds of all corporations responding. LAN (55%) and mainframe (55%) connectivity also accounted for a majority of corporate learning resource center network connectivity. Special features such as a library of graphics, sounds, templates, animation, utilities, tool-kits, helpful hints, menus, and documented and labeled programming segments were limited in learning resource centers.

Selected cost considerations in the establishment and operation of a learning resource center were depicted in major cost categories. The approximate initial set-up cost was over $250,000 for two thirds of respondents, excluding salaries and building space cost. Annual budgets, excluding salaries, was also over $250,000 (72%). Estimated salary costs were over $150,000 for 71% of respondents, yet judging from the numbers of staff described earlier, the low figure resulted from this being the highest response available.

Only 22% service their own equipment, and maintenance agreements were used by 78% of corporate learning resource centers. Cost per hour of instruction was $18.50, but the low response rate may question this number. One corporation claimed that all their vendor training was a flat $100 per hour. All but one corporation responded that learning resource center instruction was as cost effective as other training.

The data analysis described in this chapter indicated an overall response rate coefficient of over 84%, analogous with the 84% of actual respondents to the study survey instrument. This demonstrates the robustness of the data and, thus, this study. In
addition to study robustness, all research purposes maintained an average range of 80% to over 88% response rate, evidencing the reliability and validity of each and all research purposes.
CHAPTER 5

DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

Discussion

**Extended Knowledge**

**General.** This study confirmed existing research, while at the same time expanding it. The scope was broader and more thorough in the four main research purposes and research questions than any other study observed. Unlike other study’s, the present study described the characteristics of the learning resource centers in the 25 most profitable U.S. industrial corporations. Participants of this study were provided information during the various contacts and survey-completion phases of this study, as well as individually awarded additional summary findings that permitted immediate enhancement of their learning resource centers and information sharing among their contemporaries.

**Procedural.** Prior to this study, procedures for studying, analyzing, or describing learning resource centers were meager at best, and in most cases, nonexistent. Methods, standards, and design procedures have been delineated in this study, providing a framework for future studies. Predominant sections or significant areas have also been qualified, including research questions. Data analysis techniques were implemented and may be replicated in subsequent studies.
Definitions. Many learning resource center administrators themselves actually inquired as to the definition or even groundwork for defining a learning resource center. This study provided a broad working definition, stating that a learning resource center is a specific location with access to resources, designed to allow training to take place. For this study, learning resource centers were normally considered self-paced or individualized learning provided via instructional technology systems (synonyms included learning center, learning library, learning laboratory, resource center, media center, skills center, training center, alternate delivery center, information center, and computer learning center).

Another major factor in defining learning resource centers was the technology types that were utilized and often described by training types or alternate delivery instruction. Therefore, a working definition was also given for alternate delivery instruction. Alternate (alternative) delivery instruction is all delivery instructional training, media, or methodologies that are technology based (precluding instructor-led or lecture-based training that has been united with sound amplification technology, which is unaccompanied by any other technology). Thus alternate delivery instruction normally excludes face-to-face training or training by a person with a microphone and speakers.

Instrumentational. Probably the most significant contribution of this study has been the development and testing of the survey instrument or questionnaire utilized for analyzing, describing, and quantifying meaningful learning resource center characteristics. Although others may have studied the corporate learning resource center, no documentation of such research was readily available in the literature; thus, no instrument
was found in the literature. Although it is probable that some sort of limited learning resource center survey has been utilized, no other documented and tested learning resource center survey instrument could be found in the literature. Although designed specifically for this study, this robustly tested instrument provides and mirrors the steps of anyone contemplating studying or implementing a learning resource center.

The revised instrument in Appendix G could be enhanced by additional longitudinal studies or merely provide a tested framework that could be further adapted to another specified analogous environment. This instrument could be used to validate future studies and should provide greater consistency in additional research. Individual sections or questions could be utilized for studies that expect only to study specific research purposes and questions or that only need to include limited questionnaire items. Specific steps, procedures, and participants used in the construction of this survey instrument may also prove useful to those attempting development of their own instrument or acquisition of other similar information types.

Synthetical. Few studies have provided a synthesis of individual data, because the vast majority obtained only sporadic individual learning resource center data or data from an individual corporation. No studies have performed similar study data analysis, and thus they were noncomparable. Therefore, there have been few mean scores from which to draw inferences or to conduct future studies. Also, few studies provided the general and specific detail accounted for in the history, status, personnel, administration, policies, alternate delivery, hardware, software, furniture, features, and cost considerations. This
specificity and generality contributed to the availability of learning resource center
information starting from conception and continuing through the post-implementation or
historical phase.

Additional Research

Theoretical. This is of particular concern to educators, but was least observed in
workforce studies. The trend will continue to depart from the theoretical as training
budgets are cut and specific outcome measures are required. Unfortunately, this departure
may limit entrepreneurial or innovative research or implementation. A valuable
contribution to all educators would be a study designed to discover the best source of
training type value-to-cost ratio. In other words, there is a need for a study designed to
measure or evaluate which training type is most cost effective. This might need to be
specified according to business purpose, course subject, and possibly even learning styles.

Cost per hour of instruction has been a normative measure used by training
departments to justify the value of training experiences. Although used in this study, and
arguably the foremost current measure, cost per hour of instruction explicitly says nothing
about the learning received or the tangible value received by the corporation or society.
How does one authoritatively quantify reading and writing skills in relationship to overall
financial impact unless they are clearly delineated by specific job analyses? How does one
calibrate or estimate the level of attainment by participants after they conclude an effective
communications course? Although businesses are typically defined in a profit or nonprofit
motif, marketers or advertisers would also need input into the measurement process or
instrument used. Similar valuation theories would undoubtedly be proposed, as have been previously set forth in softer sciences. Even amid such pontification and equivocation about the difficulties in measuring value of training type or training experience, this type of study would be of immeasurable worth to all trainers and educators.

Research designed to study the centralization and decentralization of learning resource centers within corporations and their effect on sites, personnel, and learners would be interesting to note, both positively and negatively. These effects could be compared with how learning resource centers fit into the overall education and training departments. Theoretically, this could indicate an effect proportionate to the indispensability or peripherality of learning resource centers within the entire education department; or minimally, this variable would have to be factored out through regression analysis.

Practical. This is of primary concern to learning resource center administrators because it endorses justifiable change immediately. A repeated study or measurement by the means of a longitudinal study would indicate additional trends emerging from the 25 most profitable U.S. learning resource centers. Cross-validation of the survey instrument utilized in this study with another population of those with learning resource centers, would also be worthwhile for those seeking additional confidence in instrumental validity and reliability. This could utilize preschools, elementary schools, middle schools, high schools, vocational schools, junior colleges, colleges, universities, or other corporate learning resource centers.
Creating an instrument with a scale that determines the effectiveness rating of learning or training type would be well received by learning resource center administrators. This type of additional practical research would entail a discussion of learning styles and could interject the research observed in many past studies of learning styles. A study that measures and compares the differences between unsuccessful corporate learning resource centers and the successful corporations of this completed study might be insightful. Unsuccessful corporations could be arbitrarily defined as those corporations falling below a certain predefined criterion.

Contingent upon the measure, these "unsuccessful" corporations may lack learning resource centers altogether or may trace the trends set by the research of larger or more successful corporate learning resource centers. The instrument utilized by the present study could be used with some additional questions to quantify specific dissimilarities anticipated. Questions such as Did this learning resource center or its research come from mimicking any other corporate learning resource center? Or If so, how did your company acquire this information?, may supplementally demonstrate the magnitude of significance that has been gained by practical corporate research.

Research Purposes and Questions

The research purposes and questions of this study were fulfilled by analyzing and describing the characteristics of the learning resource centers within the 25 most profitable U.S. industrial corporations. These purposes described and analyzed: (a) the history and status, (b) the organization and personnel, (c) the types and amount of alternate delivery
instruction deployed, and (d) selected cost considerations in establishing and maintaining a learning resource center. These purposes were further delineated into seven specific research questions.

Research question 1. The history and background of the 25 most profitable U.S. industrial corporations were varied. Although the oldest of these learning resource centers was established over 40 years ago, the average age of such centers is relatively young (10.2 years). The human resources department mandated the majority of learning resource centers, utilizing a needs analysis brought into fruition by internal design. The original purpose was primarily intended to provide one-stop information access and training to the primary target population, corporate employees.

Research question 2. The present status and condition of the learning resource centers in the 25 most profitable U.S. industrial corporations were also diverse. The original purpose and target population remained the same, yet there were additional opportunities and increased numbers were served. Learning resource centers were primarily located in training departments with an average of 16 rooms, most of which were larger than 500 square feet and designed to serve more than 1,000 learners. One corporation served 67,000 in 1995. Flexible hours of operation and cooperative endeavors permitted sharing of resources and partnering with higher education, communities, or other corporations. Quality control measures existed and were ordinarily utilized on a monthly basis.

Research question 3. Information acquired concerning the personnel, staff, or administrators of the learning resource centers in the 25 most profitable U.S. industrial
corporations indicated that most learning resource centers had more than 6 administrators; one corporation had 23 learning resource centers, with a total of 325 staff. Overall, primary staff duties successively included set-up and maintenance, monitoring, record keeping, facilitation, administration, counseling or advisement, filing, and some research.

Research question 4. Characteristics of the learning resource center procedures, policies, and organizational matters were also varied. Cataloging or library systems were primarily individualized by subject, with only 11% organized utilizing the Library of Congress cataloging system. Procedurally, scheduling and registration were primarily managed electronically on a first-come, first-served basis. Advisement and notification of offerings and policies were most often available through catalogs, newsletters, and lastly, electronic mail or other method. Check-out was managed in both log books and databases. Data keeping predominately was organized into a separate database for records, where many learning resource centers also permitted direct training record access.

Research question 5. The types and amount of alternate delivery included software and hardware utilized. Instructor-led training was still the primary training type utilized, with audio, videotape, computer-based training, lecture, satellite, text, interactive video, and other non-delineated successively utilized training types. Slides and records were no longer utilized. About half of the learning resource centers had fewer than 50 courses, and half had more, with 30% having more than 200 courses. Almost all self-paced training included job aids, manuals, or other supplemental materials.

External material acquisitions were primarily purchased, whereas internally they were developed. No hardware was leased or rented; all was purchased and primarily
maintained pace with current technology. Software primarily included commercial off-the-shelf (COTS) use, with some proprietary, and an increased reliance upon Microsoft Windows products. Learning resource center software and hardware utilization seemed indicative of company development or purchase practices.

Research question 6. Survey responses indicated a description of the characteristics of special connections, furniture, fixtures, or other features utilized. Network connectivity primarily included Internet, and slightly below that was local area network (LAN) and mainframe connectivity. Special furniture, fixtures, and features existed, such as special cabling and wiring; specifically designed cubicles, props, and job aids; fabric covered walls for noise reduction; multimedia equipment; special audiovisual projection systems, including overhead, slide, video, and computer projection systems; special printers, including graphic, poster, and dry erase board printers; easels, special chairs, desks, or tables; special guest offices for facilitators; dining rooms; two-way video conferencing; and special laboratories such as robotics labs, CAD/CAM labs, manufacturing labs, and idea labs for electronic brainstorming.

Research question 7. The final research question’s data responses revealed selected costs or economic considerations for the establishment and operation of a learning resource center in the 25 most profitable U. S. industrial corporations. Initial set-up costs, excluding the salaries and building space, were greater than $250,000. The annual budget, excluding the salaries, was greater than $100,000, and the estimated salary cost was more than $150,000 annually. Most corporations also viewed maintenance agreements as cost effective. The approximate cost per instructional hour was $18.50. Vendor delivered
training cost was an unaltered or flat rate of $100 per hour. Learning resource center instruction was overwhelmingly considered to be as cost effective as other training means.

Study Response Rates

All research purposes and the resultant research questions attained a very high validity coefficient rating based on the response/nonresponse rates. This approximate 84% response rate coefficient and approximate 16% nonresponse rate coefficient indicated a very strong overall study validity or reliability, based on the response/nonresponse rate percentiles.

Conclusions

Based on the findings of this study, the following conclusions seem warranted:

1. Learning resource centers are relatively young, and continue to evolve and transition from resource repositories to resource access centers.

2. Paper and other non-computer accessed training materials are rapidly being replaced by on-line and hypertext materials, which enable learners to print selected items at learner locations.

3. Learning resource centers are being flexibly tailored to individual schedules, learning styles, and learning and informational needs.

4. Corporate learning resource centers frequently provide general or basic skills training, remedial education, and usually specialize in training that reflects the business purpose or mission.
5. Learning resource centers provide self-paced instruction which is frequently combined with job aids, workbooks, or other supplementary materials.

6. Learning resource centers are becoming less location dependent, transitioning first to an employee office, then as a remote information and training access point, and ultimately to that of a mobile learner center with virtually unlimited accessibility.

7. Training and learning are becoming more independent activities. Trainers are becoming more passive in this process and learners are becoming more active. Trainers will primarily facilitate, grade, test, and select or develop courseware. Learners will follow predefined learning paths and have more responsibility for tracking their learning progress.

8. Training in learning resource centers is becoming more nontraditional, or technology driven by the combination of hardware and software (course) availability; however, traditional instructor-led teaching still is the predominant training type utilized. Next, the training type used most is computer based training; video tape; lecture and audio; satellite; interactive video, text-based, and other (self-paced); and least used are slides and records.

9. LAN and mainframe training are the largest remote network managed training provisioned within large corporations. The Internet training providers will begin to provide a large amount of training for smaller businesses, and as the quality of learning opportunities improves, larger more profitable corporations will also increase their Internet training utilization.

10. Entrepreneurial initiatives for training and learning will continue in the largest most profitable corporations where their budgets can afford to invest in new technologies.
11. More initiative is required to increase the limited partnerships and cooperative efforts that currently exist between business and higher education.

12. Downsizing and the rapid change in technology and training environments is continuing to incite many corporations to outsource training requirements to vendors.

13. Courseware that can be remotely accessed or downloaded efficiently will become the most reusable and cost effective. Courseware which automatically grades and stores learner progress should also increase.

14. Learning resource center instruction was considered cost effective and should continue to decrease in expense as technology (software and equipment) costs continue to decrease, and the quality and number of reusable courses abound. Operation and maintenance costs will also decrease as learner centers become more decentralized.

Implications, Future Insights, and Recommendations

Market Forces

The outsourcing trend has been observed as an integral part of learning resource centers and also instead of learning resource centers. Specialization trends are resulting in the growth of organizations that exclusively provide training rather than internally offered training experiences within corporations whose business mission is not training centric. Software training companies, systems training companies, and product training will always be made available. Marketplace forces are inciting various new technology-driven and cost-effective training types and methodology options.
**Redefining the Learning Resource Center**

The learning resource center should become an extension of life-long learning. Both child and geriatric centers polarize either extreme of the learning resource center spectrum. Although there are many child learning resource centers with a variety of purposes (e.g., day care, pre-kindergarten, handicapped, etc.), many geriatric centers that provide minimal training (e.g., nursing centers, therapy centers, etc.), continuing education or adult learning resource centers seems to bridge the gap and be the central educational or training focus of corporate learning resource centers.

Judging from the direction of education, training, and the progression and evolution of learning resource centers observed during the 7 years of this study, current trends indicate that a new paradigm shift may be emerging. Classroom instruction and technology have evolved into varied learning resource centers. Building on these trends and continuing as a result of existing learning resource centers, the learning of the future may become known as "learner centers" or certainly "learner centered." Learners will create and be assisted in the creation of their own learner centers, in their home, office, or other technology-supported location of their choosing.

Instructor-led or traditional classrooms are being redefined by technology and fiscal issues. Widely available and increasing in quality are alternate delivery training types such as taped lectures, satellite broadcasts, interactive laser disk course, CBT courseware, televised courses, and database repositories of information. As a result, education and training will become more learner centered or customer focused to vie for the learner's attention and funding. Internet access is redefining the availability of knowledge and
learning to all ages and cultures. On-line references, self-paced courseware, and self-paced checkout classes are currently becoming available in exponential fashion. All of this combines to permit cost-effective learner centers, where access and verification of course completion become the greatest concerns.

Vast differences will exist in the quality of training and learning experiences. These courses will be acquired from many sources and cultures around the world. The wide variety of courses and differences in quality will also exist from one courseware or information provider to the next.

Redefining the Role of Learners

Learners will be required to take a much more active role in their education and training, even past high school, college, or graduate school. Learning and the documentation of that learning will need to become a way of life in order to compete in an ever-changing workplace. Soliciting and acquiring training will increasingly become the responsibility of learners. Developing and marketing of the skills and the actual training acquired will become particularly helpful in navigating corporate structures and the politics of an organization.

Learners will become responsible for understanding and requesting assistance from educators, human resource professionals, managers, or supervisors for the purpose of developing a "current learner profile" or a current snapshot of the results of past learning experiences. This baseline function will be foundational in planning future learning experiences. Those learning experiences will then serve in the career-and personal-
development process for business and life-long actualization. These types of profiles may also provide contractual guidelines for continued employment and advancement. Tuck (1988) wrote, "We must develop a system of lifelong learning of high quality that will encourage our citizens to invest in themselves" (p. 77).

Current learner profiles, combined with future learner and corporate goals, will create the road map of learning experiences required to achieve short- and long-term learner outcomes or measures. Scrutinizing the effectiveness of learner centers will simply be the ability of each learner to adapt and succeed in an ever-changing marketplace. The new-skills of tomorrow are all built on the new skill's training of today. Learners must quickly learn to assimilate the skills of today for success tomorrow.

Whether corporations respond in a timely fashion with formalized systems to track and develop these "learner center" experiences will be another distinguishing characteristic of successful learners, employees, and corporations. Many corporations probably will, and yet some will not. Job and career mobility will certainly require learner tracking and record keeping. This will also require a greater understanding by learners of the importance and significance in the accuracy of transcript-type records, which have been maintained for years by colleges and universities.

Redefining the Role of Educators

Corporate educators' roles will also be redefined and will evolve from their being trainers of content to trainers of informational opportunities or educational access. The educator's role will become more passive and facilitative. This new role will increasingly be technology centered rather than instructor centered. Challenges will include the
different needs of learners such as personalization and the need and desire for increased feedback. Learning center trainers or educators may become known as learner center facilitators or learner center consultants. Learner center facilitators or consultants will give hints and techniques for the acquisition of new sources of information, training, and accreditation, among others.

Learning institutions and employers will have to shift either to recognizing the value of certifying entities within their individual disciplines or to creating their own measurement instruments to ascertain the quality of learning acquired by individual learners. It is hoped that schools, colleges, and all training entities will teach learning and learning acquisition techniques, tools, and synthesis of multiple learning opportunities and valuation. Certainly, accountability through means such as certification or measurement of a learner's progress will become a critical function of learner center facilitators.

Test creation, administration, or score gathering to insure learner ability after learner course completion will continue to rise. In fact, general training record keeping will increase and become more centralized and automated in a learner center environment. Learners will need to be taught and encouraged to take the responsibility to document learning experiences in these centralized corporate records.

Competency levels or course administration of selected available courses will become requirements for certain level employees. Facilitators will notify learners of new opportunities and will become critics and recommenders of quality learning opportunities. In these electronic mail notifications, special demonstrations, word of mouth, and signs, learner center facilitators or consultants will learn how better to motivate learners to new
learning experiences amid already busy schedules. Inspiration, encouragement, and stimulation of learners must all become activities of learning center facilitators or training consultants.

A shift away from norm-based measurement to objectives-based measurement will be required by individual learning experiences, but not necessitated within certification or degree-type programs. Quality control will center more on the quality of learning rather than the quality of facilities, courses, technology, or instructors. Motorola University, the corporate university for the Motorola Company, one of the 25 most profitable corporations studied, has already initiated consistent standards of evaluating effectiveness (Aubrey & Cohen, 1995). Donald Kirkpatrick, trainer at Motorola University, describes levels of effectiveness as not only participant satisfaction with the instructor, materials, or setting, but the mastery of learning objectives and assimilation of new knowledge. At this level, mastery learning is the goal. Eighty percent of carefully targeted learning objectives are mastered by all participants. In addition, the transfer of knowledge and skills to the job is monitored, and determinations are made as to the future of the employee, job, and training. Ray Waddoups, vice-president of Motorola University says, "Training is developed to support specific strategic objectives" (Aubrey & Cohen, 1995). Finally, demonstrated business results of training are the focus of learning goals. The lesson from Motorola and others is the continuous pursuit of developing life-long learners in a global economy.

Batt and Osterman (1993) asserted, as have others, that the United States will be challenged to mimic some of the training programs of other countries if it hopes to be
competitive. While major economic competitors have implemented comprehensive plans to train their workforce in order to remain abreast in an ever-changing technological age, the United States is only beginning to tackle this task. Because some states are experimenting with issues relevant to developing a national policy for workplace training, this may be the trend in the next few years (Batt & Osterman, 1993). A national workplace training policy would greatly impact the operation, definition, and existence of learning resource centers of all corporate training entities as programs determine the most equitable use of the limited dollars available.

Implications and Recommendations for Business and Higher Education

There are many implications and thus recommendations for both business and higher education learning resource centers as their combined learners approach the 21st century. Similar economic exigencies are facing higher education and corporate America. Dramatic change and fiscal accountability will be the stimulus requiring entrepreneurial initiatives in both higher education and corporate America. The prominence of these funding issues will continue to constrain additional innovation. Technology offerings and expansion will be the tools that can effectively deliver educational experiences to places where it was previously economically and technically not feasible or impossible.

Learning choices, availability, and competition will compel all learning institutions to share learning techniques and experiences. Changing learner profiles will thus affect the type and manner of training required. Learning or training institutions will have to increase
awareness and become increasingly involved in the business of tracking specific training audience changes.

Knowledge explosion and availability has created a perpetual requirement for new courseware, especially in the technical and informational domains. Corporate learning resource centers all cited that technical training such as specific technologies, software, business, and foundational skills were all central to corporate learning resource centers courseware.

Higher education entities must continue to offer varied and adaptable certification and accreditation opportunities. Partnering with business need not be indicative merely of stellar departments or universities, but must become normative for both corporate and university learning. This type of thinking must become central to the university mission and core of providing educational opportunities. Both must seek these confederations. Businesses will need smaller individualized certification programs or other examples of nontraditional programs. Certification must include concise and current technical, reading, writing, communication, finance, statistics, business, and other practical training that is segmented into discrete quantifiable learning experiences. Higher educators must continue to focus more on practical skills and include the historical or theoretical as helpful and not as ends in themselves. The university must continue its progress towards becoming more learner centered and not instructor centric. This should include individualizing curriculum and providing identical curriculum on numerous alternate deliver mediums or training types.
Higher educators must become providers of training in nontraditional ways. Prodigious classroom instruction should be recorded into media libraries that can be leased, checked out, or beamed via satellite. University walls must be broken down from the inside out. For example, courseware could be developed by senior professors which is designed for a delivery media which is intended to be used repetitively by other facilitators, such as graduate students or corporate trainers. These courses could also be transmitted by various technology types to corporate sites or learners' homes. All of these courses need to provide college credit and lead to degree or other certifications. Testing could be a natural method for insuring the quality of learning received.

Universities must provide courseware and nontraditional training so that corporate outsourcing decisions can include them. Colleges need to develop courses on alternate delivery media that can be sold or leased to corporations and their learning resource center administrators. Colleges must prepare themselves with the courseware, the procedures and processes to effectively market and capture these additional opportunities. Corporations should invite colleges to bid on providing training which has been traditionally outsourced to business training vendors.

All alternate delivery instruction must become the mainstream of university life. Libraries must continue to evolve into learner centers, not microfilm or paper repositories of books, journals, magazines, and newspapers. More on-line learning terminals must be made available in the library and not just in the laboratory. A required core class should be offered inside the library that does nothing other than demonstrate and teach the many capabilities of on-line learning.
Distance learning opportunities must become the norm rather than an unconventional exception. Library resources must be brought on-line where many learners can profit from the vast library resources. Publishing materials must continue to dominate higher educational studies. Professors and graduate students should create continued publications that are stored on-line. Special study assignments should be encouraged to be turned in and stored on-line, thus making these learning opportunities available to learners. This might require innovation in grading practices, yet would be well worth the investment in the future of learning and training.

Dissertation studies need to be encouraged which draw upon and fill the needs of the corporation and adult learning. There is a need to continue cooperative programs such as internships and other contract type services which can serve as a natural infusion of information sharing in and out of the university. Adult education practices that are not limited to seminars and classes specifically designed to disseminate information access strategies to corporate education and training departments must be strongly encouraged.

Higher education clearly had the lead on corporations in the utilization of the Internet for educational use and research sharing with other colleges and universities. This gap has consistently narrowed or disappeared as the majority of corporate learning resource centers stated that this was now their connectivity of choice. Research sharing and partnership are now only a click of the mouse away. Universities need to partner with corporate learning resource centers to help study and propose mutually beneficial research rather than remain islands that duplicate individualized efforts. Both universities and corporations should take the lead in working cooperatively.
The growing workforce consists of and shares both higher education learners and business learners. Job mobility, technology increases, declining skill levels of U. S. citizens, increasing numbers of immigrants, growth in minorities (both are traditionally less educated), lack of basic current job skills, changing job requirements, diminishing training resources, and global competition all require education, training, and retraining of unprecedented scope and quality. Everyone must be a learner and a trainer. It will take the innovation, resources, partnership, and commitment of higher education, corporations, and learners at all levels to keep pace with the needs of the past and present, much less the future.
ENDNOTES

1The Internet is the largest interconnected network of computers in the world. It was started by the U.S. Department of Defense and expanded to colleges and universities, and to other governmental agencies. It is now a public network that has connectivity to almost every country and Internet Protocol (IP) connectable network in the world. It is becoming the de facto public communication and computer network for sharing resources and information around the globe. Libraries, museums, databases, companies, individuals, and others are now accessible anywhere telephone calls can be connected. The Internet nomenclature includes both wireline and wireless telecommunication interconnectivity to all networks, computers, and other electronic equipment connected either by dynamic or static link. Obviously, Internet connectivity has enormous educational and training implications.

2WEB, figuratively speaking, a spiderlike "web" network that links worldwide networks and user machines together for information and resource sharing. Often, a WEB site is a system access point to attract users. See n. 1.

3See "Section and Purpose 2: Organization and Personnel," for an extended discussion on the validity of this extrapolated average. Also see Appendixes G and H for the original and adjusted survey question (section B, question 1) as to the enhancement of potential validity and reliability issues.
Slides were actually listed by a respondent of this question, yet without specifying any accompanying percentage; therefore, none could be mentioned. Slide projectors were also listed among the equipment of another corporation's learning resource centers, yet this corporation did not select slides or note an accompanying percentage. Unless this was a survey completion error, this later corporation may still have older, non-used equipment that the learning resource center is responsible for storing, yet has no related courseware to utilize it.

Interactive video (IV) normally includes audio. It is most often found combined with computer-based training (CBT) and frequently allows learner response by the touch of a computer screen, click of a mouse, or the pressing of a requested key on the keyboard. It is normally differentiated from CBT by its moving video images (as found on video tape or laser disk technology), as opposed to still frames or graphics, normally found in CBT. Interactive video is typically associated with speech-quality audio, whereas it is conventional for CBT merely to have beeps or isolated sounds. Also, it is customary for CBT to allow only key-pressing or mouse-clicking interactivity with learners.

In this study, self-paced, self-study, and hands-on were the only other alternate delivery or training types specifically designed as Other training type.
APPENDIX A

SAMPLE COVER LETTER
Date

Company Name
Address
City, State ZIP

Dear Name,

As previously discussed by telephone, the attached survey concerns the characteristics of your Learning Center. Having been a Learning Center Administrator, I want to thank you in advance for taking the time amidst your busy schedule. I believe the process of completing this brief survey will benefit you and allow many issues to surface which may be utilized to enhance your own Learning Center.

To the best of your knowledge, please complete the survey, and return it in the self-addressed envelope provided, or FAX it to me at xxx-xxx-xxxx. If you do not feel that you are the best person to complete the survey, may I ask your assistance in passing it on to the person most knowledgeable, and also request that they return their name and title with the survey?

Please return the attached survey by November 13, 1995. If you have questions, you may call me at work at xxx-xxx-xxxx, or at home xxx-xxx-xxxx. Since this is the final stage of my doctoral work, your prompt response is greatly appreciated. Again, thank you for your participation.

Sincerely,

J. Ronald Nyberg, Jr.
Doctoral Candidate
APPENDIX B

SAMPLE FOLLOW-UP LETTER
Dear Name,

Approximately two weeks ago, I mailed you a survey about your Learning Center. As of today, I have not yet received back this survey. While I know you are busy, please take a few minutes to complete and return the survey in the pre-addressed envelope or fax it to xxx-xxx-xxxx.

If you have already mailed it, thank-you again for aiding me in the completion of my doctoral dissertation and adding to the body of knowledge. Enclosed is another survey in case the first one was lost in the mail. If you have any questions at all, please do not hesitate to call me at work (xxx-xxx-xxxx), or at home (xxx-xxx-xxxx).

Again, thank you for your time and commitment to learning and education. This research is dependent upon gracious people like you who are willing to share their knowledge and input.

Sincerely,

J. Ronald Nyberg, Jr.
Doctoral Candidate
APPENDIX C

SAMPLE COVER LETTER FOR FACE VALIDITY
Thank you for aiding me in my doctoral research which will add to the body of educational knowledge.

The purpose of this study is to describe the characteristics of the learning resource centers as observed within the 25 most profitable U.S. Industrial Corporations. Four areas are to be described and analyzed. They are as follows: (a) background and status, (b) organization and personnel, (c) types and amount of alternate instruction deployed, and (d), selected considerations in establishing and maintaining a learning resource center in the 25 most profitable U.S. industrial corporations.

Please check the attached survey for face validity and add any comments that you will feel will improve this learning resource center survey.

Face validity includes answering questions like the following:

- Do the questions seem to fulfill the purpose of the study?
- Are there questions on this survey that should not be there?
- Are there questions that should be included in this survey that presently are not?
- What questions might be clearer and easier to understand by the person completing this survey?
- What suggestions/questions do you have that might improve this survey or make it better fulfill its purpose?

Thanks again for your valuable input. Please return this survey with your remarks in this self-addressed envelope.
APPENDIX D

ASSOCIATE TECHNICAL DEGREE PROGRAM EVALUATION COMMITTEE
GTE TELEPHONE OPERATIONS

ASSOCIATE TECHNICAL DEGREE PROGRAM (ATDP)

EVALUATOR'S NAMES & TITLES

Mrs. Linda R. Graham
Director - Curriculum Development and Operations Support Training
(ATD Chairperson)

Mr. Al White
Director-Support Systems Standardization

Mr. James A. Spriggs
Vice President - General Manager

Mr. Larry G. Gaskin
Director - Network Provisioning

Mr. Wiley S. Hazel Jr.
Director - Engineering - Southwest Area

Mr. Jim Southworth
Staff Manager - Educational Technology

Mr. Howard L. Mitchell (Howie)
Director - Standardization Support/Area

Ms. Eileen A. Teufel
Staff Manager - Educational Technology

Mr. Jess Sexson
Director Network Operations Planning

Dr. Jan Kutilek
Administrator - Associate Degree Program Training Administration
APPENDIX E

SAMPLE COVER LETTER FOR PILOT STUDY
Dear Name,

As previously discussed with you, the attached survey concerns the characteristics of your Learning Center. I want to thank you in advance for taking the time to complete this survey amidst your busy schedule. I believe the process of completing this form will benefit you, hopefully because many issues will surface that may allow you to enhance your Learning Center, and if you request, I will send you a summary of the research findings.

Briefly, this is part of my Doctoral Research on the Characteristics of the Learning Resource Centers in the Most Profitable Corporations of the United States.

To the best of your knowledge, please complete the attached survey (Attachments are acceptable if desired), and FAX it to me at (xxx) xxx-xxxx.

If you have additional questions, you may call me at work (xxx) xxx-xxxx, or at home (xxx) xxx-xxxx. Thanks in advance for your participation.

Sincerely,

J. Ronald Nyberg, Jr.
Ph.D. Candidate (University of North Texas)
APPENDIX F

LEARNING RESOURCE CENTER SURVEY INSTRUMENT
LEARNING RESOURCE CENTER SURVEY

Please complete to the best of your knowledge. Check ALL appropriate spaces (of each question) and fill in all appropriate lines with legible printing. Attachments are acceptable if needed.

A. Background & Status (History & Condition)

1. Company Name?

2. Do you have a LRC? Yes No #.

3. If so, approximately how many years have you had it?

4. Are you planning for a learning center? Yes No #.

5. Located where? Training Department Work Site.

6. Which department started this center?

7. Approximately how many people is it designed to serve?
   <100 <500 <1000 <5000 >5000

   A Result of Needs Analysis Other.

9. How was it established? Internally designed.
   Outside Consultant or Vendor Designed Combined Approach.

10. Which department now controls it?

11. How many rooms does it have?

12. Approximate and average Room Size? <250 sq. ft. (10x25 or @16x16)
    <500 sq. ft. (25x20) <750 sq. ft. (25x30) >750 sq. ft.

13. Purpose Library or Central Storage for Hardware, Software, &/or Training Materials
    Training Resource Room Pre-requisite Training
    Complete Courseware Complete Curricula for degree or certification?

14. What was the original purpose?

15. What is the present purpose?

16. Does it have Cooperative Endeavors or Sharing of Resources?
    Other Companies Schools Community (Library...)

17. If so, what type and to what extent?

18. Target Population? Employees Others

19. Days of operation? Hours of operation

20. What type of quality control measures are in place? None General Survey of participants after any and all training Special survey of participants for each type of training Received Other Formalized System
   (Please elaborate or attach sample)

21. How often is this information actually utilized?
    Never Monthly Quarterly Semi-annually Annually
B. Organization & Personnel (Administration & Administrators)

1. Staff Associated with the individual LRC?  1 2-5 6-10 >10
   Facilitative  Administrative  Filing  Counseling/Advisement  Other
3. Which of these duties requires the most attention?
4. Library or Catalog System?  Library of Congress  Dewey Decimal  Other
   Individualized
5. If individualized or other, please elaborate

6. Scheduling/Registration Procedures?
   Appointment  First come first served  Electronic  Paper
7. Advisement of Training Opportunities?  None  Catalog  News Letter  
   Other
8. Does equipment &/or software disappear?  Yes  No
9. Check out procedures?  Log book  Database  Card Catalog  
   Manually Inputted  Scanner Processed
10. If database, accessed by?  Administrator  Learner
11. Data Keeping (Accountability)?  Computer Managed Instruction (CMI on individual courses)  
    Separate Database for all records  Direct Training Record Access

C. Types & Amount of Alternate Delivery (Equipment Utilized)

1. Percentage of Training included (Should total to 100%)?
   Interactive Video  Video Tape  Audio  Lecture  
   Computer Based Training  Instructor-Led Training  Satellite  Slides  
   Records  Text-Based  Other
2. If other, please explain
3. Which do you think is most effective?
4. Approximate number of courses?  <50  <200  >200
5. Does your self-paced training include workbooks, job aids, manuals, or other 
   supplemental materials?  Yes  No
   Purchased  Developed  Public Domain Libraries
7. Internal Material Acquisition?  Existing  Developed
8. Hardware Rented  Leased  Purchased
9. Hardware included?  (Numbers & Type- Inventory List may be attached)
10. Major software included? (Numbers & Type- Inventory may be attached)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

11. Special Furniture or Fixtures?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

12. Connectivity? Local Area Network (LAN)___ Mainframe___

None___ Internet___ Other (Specify)___

13. Other special features? (eg. Library of graphics, sounds, templates, animation, toolkits, utilities, helpful hints, menus, documented/labeled programming segments...)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

D. Cost Considerations for Establishment & Operation of an LRC

1. Approximate initial set-up cost for each LRC excluding salaries & building space?

   <10,000___ <50,000___ <150,000___ <250,000___ >250,000___

2. Approximate annual budget for each LRC excluding salaries?

   <10,000___ <25,000___ <50,000___ <100,000___ >100,000___

3. Estimated salary costs? <50,000___ <100,000___ <150,000___ >150,000___

4. Maintenance Agreements? Yes___ No___

5. Approximate cost per hour of instruction?

6. Is LRC instruction as cost effective as other means? Yes___ No___

E. Further Suggestions or Considerations

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

* Thanks so much for your participation in the enhancement of future learning centers and aiding in research for my doctoral dissertation...
APPENDIX G

ADJUSTED LEARNING RESOURCE CENTER SURVEY INSTRUMENT
ADJUSTED LEARNING RESOURCE CENTER SURVEY

Please complete to the best of your knowledge. Check ALL appropriate spaces (of each question) and fill in all appropriate lines with legible printing. Attachments are acceptable if needed.

A. Background & Status (History & Condition)

1. Company Name?

2. Do you have a LRC? Yes No #

3. If so, approximately how many years have you had it? __________

4. Are you planning for a learning center? Yes No #

5. Located where? Training Department___ Work Site___ Collocated (Both)___

6. Which department started this center? ________________________________

7. Approximately how many people is it designed to serve?

   <100 ___ <500 ___ <1000 ___ <5000 ___ <10000 ___ <20000 ___ >20000 ___

8. How did it come about? Evolved slowly ___ Administratively Mandated ___

   A Result of Needs Analysis ___ Other ___

9. How was it established? Internally designed ___

   Outside Consultant or Vendor Designed ___ Combined Approach ___

10. Which department now controls it? ________________________________

11. How many rooms does it have? ________________________________

12. Approximate average Room Size?

   <250 sq. ft. (10x25 or @16x16) ___

   <500 sq. ft. (25x20) ___ <750 sq. ft. (25x30) ___ >750 sq. ft. ___

13. Purpose

   Library or Central Storage for Hardware, Software, &/or Training Materials___

   Training Resource Room___ Pre-requisite Training___

   Complete Courseware___ Complete Curricula for degree or certification? ___

14. What was the original purpose? ________________________________

15. What is the present purpose? ________________________________

16. Does it have Cooperative Endeavors or Sharing of Resources?

   Other Companies ___ Schools ___ Community (Library...) ___ No ___

17. If so, what type and to what extent? ________________________________

18. Target Population? Employees ___ Others ___

19. Days of operation? __________ Hours of operation? __________

20. What type of quality control measures are in place? None___ General Survey of participants after any and all training___ Special survey of participants for each type of training Received___ Other: Formalized System___

   (Please elaborate or attach sample) ________________________________

21. How often is this information actually utilized?

   Never ___ Monthly ___ Quarterly ___ Semi-annually ___ Annually ___
B. Organization & Personnel (Administration & Administrators)

1. Staff Associated with the individual LRC? _____
3. Which of these duties requires the most attention? ____________________________
4. Library or Catalog System? Library of Congress _____ Dewey Decimal _____ Individualized/Other _____
5. If individualized or other, please elaborate _______________________________________
6. Scheduling/Registration Procedures?
   Appointment _____ First come first served _____ Electronic _____ Paper _____
7. Advisement of Training Opportunities? None _____ Catalog _____ News Letter _____ Other _____
8. Does equipment &/or software disappear? Yes _____ No _____
   Manually Inputted _____ Scanner Processed _____
10. If database, accessed by? Administrator _____ Learner _____ Both _____
11. Data Keeping (Accountability)? Computer Managed Instruction (CMI on individual courses) _____ Separate Database for all records _____ Direct Training Record Access _____

C. Types & Amount of Alternate Delivery (Equipment Utilized)

1. Percentage of Training Type included (Should total to 100%)?
   Interactive Video _____ Video Tape _____ Audio _____ Lecture _____
   Computer Based Training _____ Instructor-Led Training _____ Satellite _____ Slides _____
   Records _____ Text-Based _____ Other _____
2. If other, please explain ______________________________________________________
3. Which do you think is most effective? _______________________________ 
4. Approximate number of courses? <50 _____ <200 _____ >200 _____
5. Does your self-paced training include workbooks, job aids, manuals, or other supplemental materials? Yes _____ No _____
   Purchased _____ Developed _____ Public Domain Libraries _____
7. Internal Material Acquisition? Existing _____ Developed _____ Both _____
8. Is Hardware? Rented _____ Leased _____ Purchased _____
9. Major Hardware used? (Numbers & Type- Inventory List may be attached) ____________________________________________________________

_________________________________________________________________________
_________________________________________________________________________
10. Major software included? (Numbers & Type- Inventory may be attached) 

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

11. Special Furniture or Fixtures?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

12. Connectivity? Local Area Network (LAN) Mainframe
   None Internet Other (Specify) 

13. Other special features? (eg. Library of graphics, sounds, templates, animation, toolkits, utilities, helpful hints, menus, documented/labeled programming segments...) 

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

D. Cost Considerations for Establishment & Operation of an LRC 

1. Approximate initial set-up cost for each LRC excluding salaries & building space?
   <10,000  <50,000  <150,000  <250,000  >250,000

2. Approximate annual budget for each LRC excluding salaries?
   <10,000  <25,000  <50,000  <100,000  >100,000

3. Estimated salary costs?
   <50,000  <100,000  <150,000  <250,000  <500,000  >500,000

4. Maintenance Agreements? Yes  No

5. Approximate cost per hour of instruction?

6. Is LRC instruction as cost effective as other means? Yes  No  Unsure

7. If no, why?

E. Further Suggestions or Considerations

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

* Thanks so much for your participation in the enhancement of future learning centers and aiding in research for my doctoral dissertation...
APPENDIX H

SAMPLE QUALITY-CONTROL GENERAL SURVEY
1. Name of Program: ____________________________

2. Your objective for studying this program ____________________________________________

Please check the appropriate column representing your response.

<table>
<thead>
<tr>
<th>Statement</th>
<th>AGREE</th>
<th>MILDLY DISAGREE</th>
<th>DISAGREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. The program met my objective.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4. The information was clearly understood.</td>
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<td></td>
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<tr>
<td>5. Realistic examples were given to demonstrate key points.</td>
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<tr>
<td>6. The course is well organized as a self-paced program.</td>
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<td></td>
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<tr>
<td>7. The workbook exercises helped to reinforce program concepts.</td>
<td></td>
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<tr>
<td>8. The workbook will serve as a useful reference tool.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>9. What I gained from this program justified investing my time in it.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Do you think a better program on the topic can be offered?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. This program was worth the time to complete it.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12. Please describe how you will do things differently as a result of this program.

______________________________________________________________________________

______________________________________________________________________________

13. What additional kinds of self-paced/skill development programs would you recommend to the Learning Center?

______________________________________________________________________________

______________________________________________________________________________

14. Comments: ________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

Name: ____________________________ Mail Code: _________ Ext: __________

Department Number: ______________ Date: ______________


