

## Education Through the Ages: A Survey of Corporate Training Practices

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We've heard it for years: What goes around comes around. All good things come to those who wait. The more things change, the more they stay the same. Those who fail to heed the lessons of history are doomed to repeat it.

Education, like all activities that affect the ebb and flow of cultures, civilizations, corporations, and individuals, is forever shedding its skin and taking on the look of a new creature. In the final analysis though, the internal organs of the creature, its basic bodily functions, and its relationship to the world it inhabits change very little with each reincarnation. And while we like to believe that the creature has evolved greatly from its original, primitive form, in the final analysis, it isn't all that different.

For years, corporations have wrestled with this conundrum: is training a financial liability, a necessary evil for the advancement of the corporation's interests; or, is it a financial asset, an investment in the care and maintenance of the corporation's most expensive resource — its people?

Ever since the birth of industrial corporations in the last century and the recognition of training and education as tangible and (while not always welcome) necessary functions, the answer to both questions has at one time or another been a resounding *yes*. In recent years, however, societies and the corporations they create have undergone fundamental structural and operational changes. To accommodate them, and to remain relevant, training and education have metamorphosed apace.

The fact is, technical education and training programs have their roots in societies that began to debate their virtues nearly three millennia ago. At the dawn of human civilization, early societies grappled with the differences between and relative value of training and education. Throughout the ensuing centuries, the debate continued, and the result is the modern technical training organization. Corporations pride themselves on all the innovative things they accomplish in those organizations, but as we will find, it's all been done before — in some cases, long before.

### Education in Greece and Rome

Modern concepts of technical training are firmly rooted in the lessons of early human history. 2500 years ago, Greek and Roman philosophers set the stage for the development of an education model that enjoys widespread deployment today.

Socrates, Plato and Aristotle were the principal early Greek contributors to modern educational dogma. Socrates (469 - 399 BC), who contributed an educational technique that has come to be known as "the Socratic Method of Education," believed that learning is best achieved when self-discovery is an integral part of the process. In Socratic learning, the educator uses a set of carefully-crafted questions to guide the

student to a proper conclusion. This technique, which forces the use of deductive reasoning, not only teaches the student the subject at hand, but also how to learn.

Plato (420 - 348 BC), a student of Socrates, developed a complete educational doctrine in his *Republic* which addresses both primary and secondary educational models. In Plato's model, primary education consisted of writing, reading, public speaking, music, and gymnastics. Higher education incorporated mathematics, geometry, philosophy, and astronomy. It is interesting to note that Plato's model integrates all the elements that he considered necessary for citizens to confront the issues that face them in society. The same model could easily be applied to employees of the modern corporation.

Aristotle (384 - 322 BC), whom many historians consider the creator of modern scientific reasoning, believed that proper education of citizens is critically important and should therefore be the responsibility of the state. His curricular design, similar to that of Plato, comprised lessons in reading and writing, drawing, gymnastics, and music, followed by civics for good citizenship and moral and intellectual training to ensure a sense of social responsibility, self-accountability and good character. Modern corporations, take heed.

It is interesting to note that the Greeks disdained any sort of education that would lead to a wage-earning position — those skills were reserved for slaves. Aristotle believed that the teaching of hands-on skills and crafts should be eliminated from any curriculum directed at free people, as they “absorb and degrade the mind.”

For the most part, Rome adopted Greek educational teachings, but adapted them to their own needs. The Romans approached life more pragmatically than did the Greeks, and to that end they enriched the Greek educational model with legal and political components designed to effect economic and cultural improvements over time.

Like ancient Greece, Rome relied on artisans, laborers and craftspeople for infrastructure development throughout the empire. Those skills, critical to the success of the Roman Empire, were not taught in any form of school; they were passed from generation to generation through family apprenticeships that guaranteed employment for future generations.

## Education in the Middle Ages

The Middle Ages (300 - 1300 A.D.) saw a rise in the prominence and influence of Christianity, and saw education evolve under the direction of such notable luminaries as Augustine (354 - 430) and St. Thomas Aquinas (1225 - 1274). Augustine, a teacher of language and public speaking, combined aspects of Greek and Roman educational models with teachings of the Christian church. This occurred during a time when a broad schism was developing between the Roman Empire, with its worship of pagan gods, and the ever-more-influential but monotheistic Christian church.

Augustine, who is often credited with the creation of the term *liberal arts*, supported a curriculum that comprised seven lessons (each called a liberal art): grammar, rhetoric, dialectic, arithmetic, geometry, music, and astronomy. The first three subjects, known collectively as the *trivium*, became the basis for primary education; the latter four,

known as the *quadrivium*, formed the basis of secondary education at the university level.

Aquinas managed to accomplish what many believe to have been nearly impossible: he brought together church theology and the classical teachings of Aristotle to form a new intellectual tradition known as *scholasticism*. This technique, which forms the basis of modern educational principles, combined lectures with a question and debate process that forced students to grapple with the content of their own education.

During the 13th and 14th centuries, merchant and craft guilds — the predecessors of modern labor unions — developed among laborers with common interests as a way to protect themselves from low wages, low prices, and inferior practitioners of their crafts. By the middle of the 14th century, many of them had spawned education programs for their members. These existed in two forms: clergy-delivered elementary education for the children of guild members, and an apprentice indentureship program for the sons of guild journeyman. These programs were made available both as a “perk” for members, and to increase interest in the guild among outsiders. As a rule, guilds insisted on strict standards of competence for membership, and expulsion for inferior work was not uncommon.

As guilds developed and became more specialized, apprenticeship programs became more common. In fact, until well into the 19th century, the vast majority of people received no formal schooling, relying instead on occupational and trade training from some form of apprenticeship program. Most industrialized nations developed some form of apprenticeship program, but in the United States, the practice has largely died out. In fact, many educational specialists believe that the loss of these programs has had a profound detrimental impact on American industry.

## The Renaissance

From a training and education point of view, the Renaissance represented a revival of classical intellectual pursuits after the somewhat rigid practices of the Middle Ages. Two events characterized this period from an educational perspective. The first was the common use of local language and speech in education instead of Greek and Latin, which made education available to everyone. The second was the invention of the printing press and the sudden availability of the written word in quantity. By the middle of the 15th century, books such as Dante’s *Divine Comedy* and Boccaccio’s *Decameron*, printed in English and mass-produced, became available. For the most part, though, the wealthy remained the primary beneficiaries of books. For the masses, the so-called master-apprentice relationship remained the most commonly-used training technique.

It is a well-known fact that during the Middle Ages (sometimes called the Dark Ages, for reasons that will soon be clear), architects and engineers ceased to be recognized as valuable and highly-skilled professionals. Their responsibilities and functions were relegated to craftspeople who, while highly skilled, did not have the classical training required to undertake large, complex projects. This was a culturally slow period in human history, during which stonework and other complicated techniques declined in

favor of wood and plaster which was far easier to work with but significantly less enduring. Complex projects were relegated to the clergy, the only societal group that continued to value classical education and thought.

The late 15th century saw something of a revival of engineering skills when military requirements demanded them. Mathematics, engineering, and design capabilities were suddenly in great demand, and this led to a flourishing, a reawakening if you will, of political, cultural, social and scientific thought, led by a group of Renaissance and post-Renaissance luminaries that included Martin Luther, John Locke, Jean-Jacques Rousseau, and Johan Pestalozzi.

## Education in the Late Renaissance and Reformation

Martin Luther (1483 - 1546) is best known because he led the Protestant Reformation against the Church of Rome. He was also loudly critical of clergy-led educational practices, referring to them as “monkish tyranny.” He therefore started an equally profound secular reformation that led to the elimination of clergy-dominated education in favor of a model that balanced religious and secular forces. He also believed that education should be available to *everyone* in a society, including rich, poor, men, and women. To ensure that children learn a useful trade, he supported the notion of a two-hour school day, followed by “home schooling” in the practice of a proper trade. This model, proposed by Luther in 1524, led to the 19th century development of combined academic and trade schools.

A prolific writer and thinker of his time, John Locke (1632 - 1704) published a number of important papers on the theory of education. His *Essay Concerning Human Understanding* posited that sensual perception and functional experience were crucial factors in successful education. This combination of “inputs” later became known as empiricism.

*Some Thoughts on Education*, a second piece attributed to Locke, was actually written as a series of letters to a friend who asked for Locke’s advice on the proper way to educate his own son. This is an interesting essay that stipulates that logical thought and practical skills were central to success in life and work.

If Jean Jacques Rousseau’s (1712 - 1778) own life is any indication, experience and variety are the best teachers of all. Over the course of several years, he held a wide variety of jobs which helped him develop his theories of social interaction. He believed that experiences in early life were formative necessities, and that education should be based on the activities and experiences of childhood. Later, Rousseau published his *Social Contract*, a document that stipulated his beliefs about a government’s obligations to the people it serves. It helped kindle the French Revolution and was seminal in the development of America’s Declaration of Independence. And while Rousseau believed that learning a trade was important, he valued it for a different reason: while it clearly had practical value, it was a broadening experience that furthered one’s general education and knowledge base.

Often called the “father of manual training,” Johan Pestalozzi (1746 - 1827) believed in the concept of experiential learning. He believed that there were two principal learning

techniques: words to things, and things to words. He believed in the second of these, advocating what would later come to be known as hands-on training. The master-apprentice model was still in widespread use, but its days were numbered.

## Education in the Industrial Era

With the onset of the Industrial Revolution in the 19th century came a worldwide reduction in the effectiveness of the apprenticeship program. This general weakening in the system had been ongoing for some time. More and more, the training of apprentices was turned over to journeymen, and the father-child model eroded at a rapid pace. The one-to-one model became less common, as more efficient one-to-many models emerged on factory floors.

The automation of factory processes demanded fundamental changes in work flow, staffing, skills of employees, and management. More and more, employees were required in large numbers, but mass production techniques demanded that they be able to perform a small subset of tasks quickly and well. Much of this demand derived from work done by Charles Babbage, who believed that successful management could be broken into two basic functions. The first of these was to break large, complex tasks down into small, simple ones that could be performed by employees quickly and easily, with efficiency similar to what could be achieved with a machine. The second was to create a hierarchical management structure to control the large number of employees required in a typical 19th century production environment.

During the 18th century, many trade guilds formed technical societies designed to provide assistance and economic support to their members. One direct result of this in the 19th century was the formation of corporation schools, which were educational institutions created by businesses for their employees. The first of these was created by the railroad industry, and was designed to improve the efficiency of railroad engine maintenance. By the early 1900s, similar organizations existed in many large corporations, including Westinghouse, General Electric, Goodyear, and NCR.

## Into the 20th Century

By the time the 20th century came screaming around the corner, a controversy had developed in the public schools over the issue of technical training. Academic educators felt that the inclusion of technical training in the public school curriculum lowered the quality of education. On the other hand, public schools were criticized heavily because their curricula failed to reflect the realities of everyday life, and therefore did not prepare children for the rigors of the “real world.”

It took time, but eventually, trade schools began to emerge that commanded respect as academic institutions in their own right. At the end of the 19th century, several of these emerged, including the Manual Training School in St. Louis, the School of Mechanical Arts at MIT, and a similar facility in Chicago. The first high school for the trades opened its doors in Baltimore in 1884, followed by similar facilities in Toledo and Philadelphia. By 1884, high schools in Boston, Minneapolis, Cleveland, and a number of other cities had integrated technical trade curricula into mainstream education at public high schools, with great success.

As one might expect, both world wars had profound impacts on the development of technical training programs. The rudiments developed during World War I, but formal systems of training didn't emerge until World War II, when Job Instruction Training (JIT) developed as a recognized activity. It broke the teaching and learning process into a series of steps, and was fundamental to Deming's "Plan - Do - Study - Act" technique that he sold to Japan after the war.

Job Instruction Training was part of a larger initiative called Training Within Industry (TWI), a formal certification program for managers. Five years after its inception, nearly 2 million managers had been TWI-certified. TWI, in turn, led to modern Instructional Systems Design (ISD) programs, which comprise five phases: analyze, design, develop, implement, and control. ISD is central to most modern technical training programs.

## Enter the Computer

Sooner or later, it had to happen. Computers first hit the business scene in the late 1950s and early 1960s, and were primarily used to perform repetitive, boring, error-prone tasks normally done in a repetitive, boring and error-prone fashion by people. Early computer training was rudimentary, even primitive, and was developed by computer companies to teach operators how to run computers. True computer-based training as we know it today did not emerge in a reasonably-effective form until the early 1980s.

## A New Model Emerges

Today, the time-tested model of corporate classroom education, known alternatively as "platform training" or "leader-led instruction," is beginning to fray around the edges with the onslaught of change in the business world. The ability to take large numbers of employees off the job for extended periods of training is rapidly fading away. This is attributable to the shrinking workforce and the need to maximize employee time on the job, both of which derive from the need to perform at peak in an ever-more-competitive world.

Equally important is the relative "half-life" of useful information. The volume of information that employees are expected to receive, read, assimilate and act upon today is staggering, and grows at a rapid pace. As societies improve their ability to make information available electronically, whether through publicly-accessible means such as the worldwide Internet or private delivery schemes such as corporate intranets, the "value lifetime" of information learned in the traditional classroom setting is shortened. Unless techniques are developed to improve the "intellectual stickiness" of information conveyed in the classroom, its relative effectiveness as a training medium is severely reduced. This leads to the realization that other techniques of rapid knowledge transfer, often called Alternative Media, must be implemented.

In the early 1990s, corporate training departments undertook a study of technical training models. Their goal was to define the requirements for technical training

processes for corporations approaching the end of the millennium, given the changing nature of business, society, and competition in an intensely information-driven world. Their findings were interesting:

- Training and retraining will become a constant way of life in competitive organizations, and continuous improvement will be required for survival. The concept of a “Learning Organization” (from Peter Senge's *The Fifth Discipline*) is beginning to emerge as a competitive necessity.
- The focus will continue to shift from *training and the trainee* to *learning and the learner*. The shift is subtle but significant. Trainers live in classrooms and relate specifically to training; learners are *everywhere*.
- Changes in technology will blur the distinction between training and work. Interactive technologies and distance learning will transform the way information is presented and accessed for training. Performance Support Systems will redefine the concept of on-job training.
- Training will change to reflect changes in the organizations that it serves. Process time will be reduced so that cost-effective training can be available on demand and used in ways that measurably increase productivity.

The classroom environment is still the most widely-used educational medium. According to industry statistics, more than 70% of corporate technical education courses are offered as instructor-led classes, but that model is changing. Training organizations want to work with their universe of clients to help them understand that training and education is an ongoing and continuous process, not an interruptive exercise. To do this successfully, they must make training as universally available as possible, which means moving away from the classroom in some cases and taking advantage of alternative media. Classroom instruction is a highly effective learning environment, and most corporations will continue to use it. For certain situations, however, different techniques may be more effective.

## Toward Performance Support

One change that must take place is a move away from the concept of *training* toward the concept of *performance support*. This represents a dramatic shift in the basic approach to corporate education and training. Whereas training focuses on learning, Performance Support focuses on worker performance, the ultimate goal of any educational exercise. Training typically takes place before or after it is needed on the job, whereas Performance Support occurs on an as-needed basis. Furthermore, training tends to be an interruptive process, requiring separation from the job for a period of time and typically under the control of others (an instructor, for example).

Performance Support occurs on the job, in measured, effective doses, and is invoked by the learner when the learner needs it. This requirement has led to the development of just-in-time training models, and with the advent of effective and affordable computer-based training, broadband delivery technology down to the desktop level, interactive desktop video, and GUI-driven computer environments, this type of education is available to all employees.

There are clearly economic shifts underway that drive corporations toward alternative learning techniques, but equally influential are the changing expectations of the learner. Training must be available just in time, when and where students need it, in just the right “doses” to be immediately effective. Most students today work in media-rich environments, where they are accustomed to receiving multi-sensory input. In order to be effective, training programs must offer a similar diversity of media.

Equally critical is a recognition that the pool of available Subject Matter Experts (SMEs) in most corporations is shrinking. Historically, technical knowledge resources in the form of senior, experienced employees have provided a ready source of information for training program developers and newer employees. More and more frequently, though, workforce reductions from incented early retirement offerings and other attrition techniques have severely limited the numbers of SMEs available to serve either as knowledge sources, or as educators in technical training organizations.

“Part of what Alternative Media is all about is to not only put the information closer to the student, but to take a relatively smaller source pool of information (SME knowledge) and spread it effectively over a large number of people. In some ways, it's like the concept of a book — the data gets saved and distributed, and can be accessed at any time,” says Janet Correia, Technical Training Manager for Chevron Overseas Petroleum. Correia oversees a large training organization that provides a wide variety of alternative media training services to employees posted all over the globe.

“We want to put the training back on the job where it belongs, much like the apprenticeships of old. Unfortunately, we don't have the resources to do that. So we're doing the next best thing, by creating ‘virtual apprenticeships’ that use alternative electronic media to simulate the apprenticeship model.”

## Alternative Media Techniques

There are six principal forms of delivery media in use today. They include instructor-led curricula, audiotape programs, videotape programs, self-paced workbook exercises, computer-based training, and distance learning, a form of instructor-led training.

## Instructor-Led Training

In most traditional business environments, it can be argued that time is a constant and knowledge is variable. Today, however, knowledge is often a desired constant while time is the variable. When the audience to educate and inform is large and educationally heterogeneous, the training challenge is large. Ideally, all will ultimately acquire the same knowledge of the subject at hand — hence the concept of constant knowledge. Unfortunately, in a situation where it is logistically difficult to place students in a room at the same time to effect the knowledge transfer, ( a common and rapidly expanding business problem), time is clearly a variable and the classroom/instructor model may not be ideal.

In traditional business situations where time is constant and knowledge levels vary, instructor-led classes work extremely well. Instructor-mediated presentations are ideal

for conveying large quantities of detailed information that may require audience interactivity for comprehension. It can work well in both large (generic, easily understood material presented to a functionally, culturally, or educationally heterogeneous group) and small audiences, such as executive groups where the material to be presented is highly sensitive or extremely interactive, as in material presented and discussed during a strategy briefing.

Instructor-led sessions are particularly effective because they allow the instructor to effectively gauge the level of comprehension of the audience and modify the presentation in real time to maximize the intellectual absorption rate. On the other hand, instructor-led classes tend to be expensive and logistically difficult to coordinate, since they require the ongoing presence of a living, breathing body.

For situations where the desired knowledge is a constant and the available time is variable, other media may be more effective.

## Audio Programs

For situations that require the dissemination of broad-brush information that is high-level in nature, audio tapes can be effective and low cost, provided they are well-written and professionally-produced. Audio works especially well when a significant percentage of the target audience commutes, because they can listen to tapes in their cars. During that time, they represent a captive audience — *if* the tape is well-produced and holds their attention.

Audio can fall down for several reasons. If the information to be conveyed is overly complex or technical, or requires visual cues for maximum comprehension, is poorly produced or is overly long, audio's effectiveness starts to falter. On the other hand, audio presentations that are well-written and engineered evoke exactly the mental images that the writer wants to create. The cost of audio is dramatically lower than video (by a factor of 10-15 times!), because the data collection and post-production efforts are far less complex and time-consuming. Finally, audio is a medium that can be used anywhere, and by virtually anyone. No special equipment is required.

## Video Programs

It is well known that more than half of the human brain is devoted to vision — it's the single most important sense humans possess. Therefore, any time information can be conveyed in a visual fashion, it stands a greater chance of being assimilated by the viewer.

Video is most effective when the message to be conveyed is conceptual, or is of a nature that allows it to take advantage of the multiple sensory inputs that video provides. As a general rule, humans tend to be “multimedia devices;” therefore, multiple-media interfaces work well to convey information from “device to device.”

Video is also effective for large audiences. And while it is perhaps the most expensive medium of all, it is also among the most effective. A well-written and well-produced video is acceptable to most everyone, and can be viewed whenever time is available.

When larger audiences are involved, it is cost-effective, in spite of its relatively high up-front production cost. Furthermore, it can be viewed repeatedly for maximum effectiveness, and can be broadcast over closed circuit, cable, public access, corporate network, or commercial television. Like audio, video is a training medium that can be employed at any time with no special equipment, according to the constraints placed on the student by his or her own schedule.

### Self-Paced Workbooks

Like audio and video training programs, workbook exercises provide a form of “asynchronous learning.” Workbook material can be taken whenever the student has time for it; the issue is that this kind of learning requires a dedication on the part of the learner that isn’t necessarily there for the student watching a video — or if it is there, it’s in a different form. Workbooks require that the student engage with the material they present, and actually perform some proactive work. Video, on the other hand, especially good video, is like television. It requires virtually no interactivity, and can be a marvelously seductive learning environment when well-produced.

While workbooks aren’t always the best choice for standalone information transfer, they are very effective as accompaniments to other media.

### Computer-Based Training (CBT)

Computer-based training (CBT) can be quite good. It can also be quite bad, to the point that it can cause more damage than it corrects. For example, if the CBT is nothing more than an electronic page-turner, then it provides nothing more than a very expensive workbook. If, however, it forces the learner to interact with the information, to wrestle with it, then learning usually happens and the CBT can be considered effective.

Another downfall of CBT results because it requires a computer, and since there are at least two primary platforms (PC and Mac), the typical large audience requires the creation of a version that runs on both (forcing the creation of essentially two unique products). Unfortunately, even with products for both platforms, CBT is often less effective than other delivery platforms because of the relatively low penetration of computers, compared to the virtually universal availability of audio tape players and VCRs used in other delivery media.

### Distance Learning

Distance learning is a special form of instructor-led presentation. It is effective if the broadcast medium is high-quality; alternatively, on lower-end systems that deliver a picture that is not up to the quality level that most people associate with television, it can place additional responsibility upon the shoulders of the instructor, who must overcome the shortcomings of the delivery medium by engaging the students in the delivered material and forcing them to pay less attention to the delivery medium. For large, dispersed audiences, however, it is typically quite effective. Distance learning can be expensive, and must therefore be amortized over a reasonably large audience.

## In Conclusion

“Those who fail to heed the lessons of history are doomed to repeat it.” Prophetic words for today’s training organization. Let us consider the teaching of early educators for a moment, and note their influence on what we do today.

Thanks to Plato, we have created educational programs that are segmented into primary and secondary components which guarantee that fundamental learning foundations are put into place before secondary learning is undertaken. From Socrates, we incorporate the concept of discovery learning, and allow students to learn at their own pace through a variety of exercises that guide them to an appropriate outcome. And from Aristotle, we as corporations strive to be self-accountable and socially responsible. Modern technical training programs are at the heart of this behavior.

The Romans, building upon work initiated by the Greeks, fine-tuned the family apprenticeship to a point that it yielded generation after generation of fine craftspeople, thus ensuring the availability of a perpetual skillset. Even today, while not typically within a family structure, newer employees rely on the skills and knowledge of veteran employees to fine tune what they learn in the classroom.

Even though the Middle Ages are often considered to have been a time of social, cultural, and scientific decay, some good came from the period nevertheless. Augustine gave the world the concept of a liberal arts education, which continues today. St. Thomas Aquinas, writing about the importance of education, created the concept of scholasticism, and practiced the classroom technique of the question-and-answer session coupled with debate of a particular issue. From this period we also see the emergence of formal trade guilds, the predecessors of today’s unions.

The Renaissance yielded the printed word, and books became greatly more available than ever before. No longer were they hand-printed documents found only in monasteries and churches. The Renaissance also saw the emergence of the master-apprentice model, in which an individual apprenticed to a senior individual for the purpose of learning a trade. This practice continued in widespread form until the Industrial Revolution.

With the Reformation came Martin Luther, who combined classical learning inherited from the Greeks and Romans with home schooling. Classical learning, which translates today into education, provided the foundation required for critical thinking; home schooling, which manifested itself in the form of parent-to-child apprenticeships, added useful skills that translated into lifelong jobs. This model formed the basis for 19th century trade schools, the basics of which continue to be successful today.

Locke, Rousseau, and Pestalozzi continued the tradition of learning with their own views on the subject. Locke developed the concept of empiricism, which observes that experience, gathered by the senses, is crucially important to learning, while Rousseau preached that experiences gained in life count a great deal toward the development of the ideal worker. Pestalozzi believed that experiential learning, which formed the basis for hands-on training, is an integral component of any successful curriculum. Today,

hands-on programs, whether delivered in a classroom replete with equipment, the actual work environment, or via such new delivery technologies as virtual reality, are widely employed.

During the Industrial Era, Charles Babbage, best known for his research into early computer technology, developed the fundamental theories of work management, in which he explained that complex tasks are best managed when broken into a subset of smaller, simpler tasks. Those tasks can then be parceled out to a cadre of employee who work together to complete the larger task. He also described the concept of a pyramidal managerial hierarchy, central to modern corporate structures — although this is changing in favor of a flatter managerial model. During this period we also see the emergence of formal technical training programs in large corporations.

In the early years of the 20th century, we see trade schools opening, and the creation of formal job-related training programs such as the military's Job Instruction Training. With the arrival of the computer in the 1950s came an explosion in technical training, and the first glimmer of formalized alternative training media, such as CBT.

It is interesting to note that training followed a similar developmental path to that of computer technology. Original computer architectures called for massive, centralized mainframe systems that users accessed via dedicated circuits that ran to the host site. As the needs of the business and the capabilities of technology evolved, computer architectures changed. Today, the architecture of choice is a dynamic, largely distributed one, in which there is far more reliance on computer power that is distributed throughout the user community. The evolution from classroom to distance learning to PC-based, on-demand training modules is illustrative of this phenomenon. Where students used to have to travel to centralized training sites and were often absent from their work locations for extended periods, today there are alternatives. Students can customize training tracks to meet specific needs, and can get the training in a wide variety of media. Instead of centralized training locations, training is delivered directly to the student's work location via television, or may be provided online as part of an embedded training module within an application.

Does this plethora of educational options spell the end of instructor-led education? Is the classroom dead? Will all instruction soon be conducted through technologically-based delivery media, because we can? Not at all. It simply means that educators, and the organizations and students they serve, now have options. They can rely on a specific, individual delivery mechanism, such as video, audio, CBT, or an instructor; or, they can create educational solutions that employ combinations of these media. The key is a renewed focus on student learning style, rather than on instructor delivery technique. The end result is a learning environment that delivers just-in-time training to the student when it is required, in a form that best facilitates individual learning. In today's telecommunications marketplace, the ability to quickly and accurately prepare employees for the arrival of the gathering competitive barbarians can mean the difference between success and failure in a market that grows more competitive every day.

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