

Seven Trends in Corporate eLearning

A White Paper by

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Introduction

Corporate training managers know they live in times of great change. They are generally aware that much of this change is being driven by new digital technologies, but they often don't know what is coming in their field over the next five to ten years. These are confusing times, and to get left behind can mean the loss of competitive advantage. Marquadt and Kearsley (1999) have identified 14 ways technology has transformed (or is transforming) the workplace:

1. Technology changes the way work is done, whether it is production, coordination, or management work.
2. Technology enables a fuller integration of business functions.
3. Technology creates the possibility of truly global companies.
4. Technology forces basic changes in organizational structure.
5. Technology enables organizations to transform from bureaucratic to network and federated ways of operating and thinking.
6. Technology requires new skills and competencies on the part of all workers.
7. Technology impacts where workers work.
8. Technology provides more opportunities and power to customers.
9. Technology allows for the emergence of virtual organizations.
10. Technology affects reward systems of workers.
11. Technology transfers knowledge faster and more efficiently between workers and throughout the organization.
12. Technology affects how training is designed and delivered.
13. Technology affects how knowledge is managed.
14. Technology affects how organizations learn.

It is difficult to predict where information technologies are going long-term. But, here are seven technology trends that will likely strengthen over the next five to ten years and will have a significant impact on corporate training.

Trend One: Move away from classroom/course based training to multiple ways of learning

Perhaps the clearest trend is the move away from mostly classroom training to multiple methods of learning. While classroom based learning will remain, its role in training will be shared with technology-based learning, mobile learning, and on-the-job workplace learning. The challenge for learning managers will be to coordinate the input from all these various forms of learning.

For the past five to 10 years, corporations have been subjected to considerable hype about technology-based learning. Predictions that web based learning would take over 90% of corporate training have simply not panned out. Rather, classroom training and technology-based training now often coexist in the formulation known as blended learning. In spite of the disappointment of technology investors, this is not necessarily a bad thing for learners, as both classrooms and technology solutions have their advantages and disadvantages. By working together in the blended strategy, they can often support each other.

The use of computers in education has a long history (starting in the 1960s), but it is only now that technology-based learning is about to take off. While computer based training (CBT) has been developed on floppy disks and CD-ROMs since the 1980s, it required the power and bandwidth of today's networked learning technologies to really compete with the richness of social interaction and immediate feedback from instructor led classroom training.

Web-based learning (WBL), the latest educational technology, has many advantages over traditional classroom based training. These include:

- web based learning addresses the individual rather than the group
- learning can be at any time and at any place
- the web can have a far greater reach in terms of connecting to other learners and learning resources
- learning is at a pace decided by the learner rather than the group
- learning can take place on the job as time is available
- travel and time away from the job is avoided
- learning resources can be searched through online search engines
- instructors do not necessarily need to be paid on an ongoing basis
- does not require physical space
- changes to course materials can be made available immediately
- links directly to performance support

However, not all technology-based learning approaches are equal. Computer based training (CBT) was developed first on text based mainframe computers in the 1970s, and then on the new personal computers of the early 1980s. CBT in its earliest form consisted mainly of text on a page followed by some questions; there was little interactivity other than turning pages and checking

the answers to questions. This was of course due to the limitations of mainframe computing and the fact that the early personal computers had little power or memory. CBT was sold to corporations first on floppy disks and then in the 1990s on CD-ROMs. Today CBT is still the main form of technology-based learning used by corporate training departments, but it is being gradually replaced by web-based training. The advantages of web-based training over CBT are as follows:

- web based learning does not require the expense of media such as floppy disks or CD-ROMs
- changing web based learning materials is done quickly and easily without additional expense
- web based learning allows social interaction over a wide area
- web based learning allows be availability of a human instructor over the network
- web based learning, properly designed, uses a high degree of simulation and interactivity
- web based learning, unlike CBT, is easily adapted to performance support systems

Moving beyond web-based learning, mobile learning using laptops, tablets, PDAs and cell phones will likely increase in the near future, and will use stand-alone educational materials as well as connect to the Web. But, there are limitations to this trend. While laptops have become accepted for mobile learners, PDAs and cell phones suffer from a number of problems, including small screens, a screen aspect ratio that is different from desktop monitors, difficulties in typing with small buttons or the lack of buttons, restrictions on memory, and relatively low powered CPUs. Tablet computer seem to be an interesting compromise between laptops and PDAs/cellphones. Nevertheless, mobile computing will likely take over in workplaces where it is necessary to have immediate information at hand to solve problems.

Even if classroom based training and web-based training were highly efficient and effective, there is way too much information for the most people to know to complete their jobs and to keep abreast of changes in the world of work. Learning on-the-job from peers, from knowledge banks, and from just-in-time training delivered through mobile devices is the way of the near future.

Managing all the results of multiple ways of learning will require a highly flexible and intelligent learning management system. Each individual will have a different learning pattern that will need to be tracked in order to optimize the use of each worker's skills.

Trend Two: Move away from Grades and Certificates to Personal Portfolios

The implication of the first trend is that tracking skills and achievements will move from the issuance of standardized diplomas and certificates, to the maintenance of personal portfolios for each person. Because most people will have multiple careers, employers will want to know what the person knows *now* and not necessarily what pieces of paper he or she received 10 years ago. And, what a person will need to know in the future cannot be accurately predicted today – the pace of change is just too rapid. This means that curriculum planning should not be too precise, but exploratory, ready to move in the direction of emerging trends.

In fact, desired workplace skills of the future will include “forgetting” and “relearning”. The pace of change will require people who can put aside previous learning and think of new ways of doing things without too much discomfort.

In the near future, what a person knows will be described in terms of a “knowledge tree” with many branches (Levy, 2001). Each verified skill or intellectual achievement will be described in a *brevet*, and all the brevets that describe the individual’s knowledge will be organized into a map generated by software. Such a system is already working among a number of European universities.

Trend Three: Dramatic Changes in eLearning Technologies

We are only at the beginning of a technological revolution. We are at the same stage in the use of computers in education that the automobile industry was in when an engine was united with a buggy and termed a “horseless carriage” (the terms “wireless” is the modern equivalent of “horseless”).

The capacities and speed of computers and computer networks will continue to double every 18 months, as technologies such as molecular computing, nanotechnologies, and methods of dividing light into specific wavelength communication channels proliferate.

The introduction of artificial intelligence and neural networking will make eLearning software smarter and more responsive. New online learning programs will be both prescriptive and adaptive. Prescriptive programs will sense the strengths and weaknesses of the learner, and adjust the curriculum accordingly. A computer will get better at doing this as it gets to know you. In other words, the computer will also learn from experience. All this adds up to a huge leap in the quality of interactivity from eLearning software. Instead of page flipping being the primary hook to “engage” the learner, new software will respond according to a learner’s behaviours, especially responses to tests and performance tasks.

Computers will also become more unobtrusive. Most people do not think of their watch, a calculator or a car as a computer. This is because the computing function of these devices has become “invisible”. Similarly, there are a number of developments that will make the computing functions in training technologies also invisible. First, there is a move from the desktop computer to a diverse variety of locations for embedded computer chips. For example, most household devices in the near future will contain computer chips that will train their owners how use them. As well, the move of applications from desktop computers to web servers means that the power of computing will now reside outside of the individual desktop computer. This will allow a wide variety of small devices hooked to a network to perform amazing tasks and to gather information from a wide variety of sources, often by wireless transmission from large servers. The computing aspect of these devices will become invisible.

The implications of invisible computing for training are that training will become a more natural kind of learning rather than something that is viewed as a planned intervention by a training department, and that learning can happen at any time or any place. In fact, training will become

just one corporate information system that will become invisible. Computing devices for training will also deliver human resources information, business metrics, documents and corporate communications organized through web based electronic "portals".

All this will be driven by new breakthroughs in artificial intelligence applied to instructional methods for online learning. The computer will become a place to be challenged and receive meaningful feedback from a very patient tutor. Here are just some of the applications in AI (adapted from Jones, 2003) that will have an impact on eLearning in the near future:

Simulated Annealing – used in task assignment and scheduling

Adaptive Resonance Theory – used in smart Web search engines and data mining

Ant Colony Optimization – used for demonstrating “swarm intelligence”, and improving group learning

Neural Networks and the Backpropagation Algorithm – used in mimicking brain functions, and in complex educational gaming

Genetic Algorithms – used for demonstrations of complexity theory, computer aided design, problem solving, and educational games

Artificial Life algorithms – used in the study of biological and social systems

Rules-Based Systems – used in knowledge-based expert systems, generation of automatic programming of instructional strategies, and the simulation of common sense

Fuzzy Logic – used for Quality of Service (QoS) testing, and control of rules-based systems

Bigram Models (aka Markov Models) – used for speech, music and text recognition, automatic writing, spell checkers, and verification of authorship

Agent-based Software – used for Web research, search engines, scheduling, planning, negotiating, and notifying.

Autonomic computing – used to make computers self-configuring, self-healing, self-optimizing, and self-protecting

Semantic Web – used to make the content of the Web more meaningful so that it can be more easily searched and shared

Affective computing – computer software will sense your emotions and act accordingly. They may even show emotions in return. This will increase the realism of elearning simulations.

Trend Four: Move from document centric training to simulation and

tutoring

Much training, like schooling, is about the reading and memorization of documents or listening as someone gives a presentation, usually accompanied by a set of "notes". Yet, as any good preschool teacher knows, people learn best by "doing", not by listening to others or by just reading. Of course there is a place for documents and notes in the educational process, namely, placed in a library to be consulted for specific information when needed.

It is generally recognized that presentations to large groups, while occasionally entertaining, are generally a waste of time in terms of learning, but tutoring or an apprenticeship with a master teacher can be a very rich learning experience. Unfortunately, the document centric model has followed us to technology-based learning with the proliferation of web *pages* and PowerPoint *presentations*. But, with greatly increased power and memory of computers, the trend is slowly moving towards learning through simulation and using the computer as a master tutor. While the ideal learning situation might be to have a master teacher in a real learning situation always at hand, the reality is that most corporations cannot afford this kind of training. The next best thing is to try to use the computer to simulate real-life situations and to respond to the learner as an online tutor. The technology is there; the next few years will test the creativity of instructional designers to deliver such learning experiences on demand.

Trend Five: Move from group based training to personalized performance support in the workplace

Most people are taught in groups; most learning is an individual experience. Learning is defined as what sticks; it is what remains years later. What remains are those pieces of information and actions of others that impressed themselves upon us at the time because they were very relevant to us or because the circumstances were so engaging or unusual that we can't forget what happened or what was said.

Graded group learning was a late 18th century Prussian invention introduced to increase the efficiency and control of the schooling process. (It was developed, along with recess, sitting in rows, and raising your hand, as control devices in education). Individualized competency based education models have been suggested for many decades but have been rarely successfully implemented. This is because group learning is much easier for an instructor to manage than individualized learning.

The development of large-scale databases and intelligent computer programming finally makes possible the dream of individualized competency based learning. This means that learners can learn at their own pace, learn what is most relevant and necessary for them, and do not need to study those things they already know.

Perhaps most radical notion here is the idea on that learners can learn exactly at the time they need to know something -- *just-in-time learning*. For corporations this means that employees can learn to do something that the time it is required, or they can review something they have been already taught. This notion of *performance support* is one of the most exciting developments for businesses, as it holds out the promise of greatly increasing employees' productivity.

Trend Six: Move from expert centric knowledge delivery to collaborative knowledge capture and dissemination

The idea of learning from experts has a long history in our society. Companies are beginning to realize, however, that highly useful knowledge of the corporation resides not only with experts or with top-level managers but is spread throughout the whole organization. *Knowledge management* is now seen as a key to winning competitive advantage. In order to solve pressing problems of the near future, we will not only have to improve the skills and knowledge of individuals, but also the *collective intelligence* of groups. The development of “learning communities” and “communities of practice” are part of this trend.

Computers can be very useful in the assessment of the intellectual capital of an organization, the capture of the expertise that resides in every employee, and dissemination of this knowledge back to those who need it. Such knowledge management systems are now being developed and include functions like internal discussion groups and chat rooms, company-wide reference libraries, online suggestion boxes, internal glossaries and directories, personnel databases, archived newsletters, and groupwork applications. When valuable employees leave the company, their knowledge is not lost if it has been used to develop an expert system, or at the very least has been documented and made accessible to others. A well-developed web based knowledge management system should tie into both a web based training and performance support system in order to optimize the learning for all.

Trend Seven: Move from large proprietary applications to standardized interchangeable objects

Much has been written on the problem of "bloatware", those large-scale proprietary applications and suites that take up hundreds of megabytes of hard drive space and are difficult to implement and learn. The trend today is to small interchangeable software "objects" delivered over a standardized information grid. These objects can be delivered quickly in a modular fashion as needed from anywhere on the information grid, and played through a "thin client" on the user's computer. Today, the standardized information grid most commonly used is the World Wide Web.

For training managers this trend means the avoidance of being "locked in" to one system or developer. Object oriented training and performance systems should have many small modular learning objects that are easily changed and updated. Moreover, if such a system is truly web based, it should work with and interact with other "web appliances".

While this is a trend, development depends somewhat on international bodies agreeing on open performance and design standards for such “learning objects” (probably more accurately called “teaching objects” or “educational objects”), while avoiding the danger of slowing down innovation in this area.

There are already repositories of shareable educational objects, such as the one found at www.merlot.org. Merlot lists nine types of educational objects, including Simulations, Animations, Tutorials, Drill and Practice, Quizzes/Tests, Lectures/Presentations, Case Studies, Collections, and Reference Material. This list is in no way exhaustive, as instructional designers find new uses for educational materials on the Web.

Conclusions

Corporate training technologies are rapidly changing. The trend is away from classroom training to web based learning on the Internet and corporate intranets. Computers are becoming faster, smarter, smaller and invisible. Instructional design for the web is changing from simple page turning of documents to highly sophisticated artificial intelligence applications using simulation and computerized tutoring. Because intelligent programming and the use of large databases allow greatly increased personalization, online learning is moving from web based courses to just in time performance support systems. At the same time networking has allowed greater collaboration in the workforce, and a better utilization of the intellectual capital within an organization. From the chaos of innovation new standards of interoperability are improving our ability to track learning from many sources. These are exciting times in the field of corporate training.

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