



EMPLOYEE TRAINING *and* DEVELOPMENT

Technology-Based Training Methods Chapter 8



6th Edition
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Learning Objectives

- Explain how new technologies are influencing training
- Evaluate a web-based training site
- Explain how learning and transfer of training are enhanced by new training technologies
- Explain the strengths and limitations of e-learning, mobile learning training methods (such as iPads), and simulations
- Explain the different types of social media and the conditions conducive to their use for training

Learning Objectives

- Describe to a manager the different types of distance learning
- Recommend what should be included in an electronic performance support system
- Compare and contrast the strengths and weaknesses of traditional training methods versus those of technology-based training methods
- Identify and explain the benefits of learning management systems

Technology's Influence on Training and Learning

- New technologies have made it possible to:
 - Reduce costs associated with delivering training
 - Increase effectiveness of the learning environment
 - Help training contribute to business goals

Table 8.2 - New Technologies Used for Training

E-learning, Online Learning, Computer-Based Training (CBT), Web-Based Training

Training delivered using a computer or the web. Can include CDs or DVDs of text and/or video.

Webcasts/Webinars

Live web-based delivery of instruction to trainees in dispersed locations.

Podcasts

Web-based delivery of audio and video files.

Mobile Learning

Delivery of training through handheld mobile devices such as smartphones or tablet computers.

Blended Learning

Training is delivered using a combined technology and face-to-face instructional delivery approach, such as classroom and WBT.

Wikis

Websites that allow many users to create, edit, and update content and share knowledge

Distance Learning

Training delivered to trainees in other locations online, or through webcasts or virtual classroom often supported with communications tools such as chat, e-mail, and online discussions.

Table 8.2 cont. - New Technologies Used for Training

Social Media

Online and mobile technology used to create interactive communications allowing the creation and exchange of user-generated content. They include wikis, blogs, networks such as Facebook, MySpace, and LinkedIn, microsharing sites such as Twitter, and shared media such as YouTube.

Shared Workspaces (Example: Google Docs)

A space hosted on a web server where people can share information and documents.

RSS Feeds

Updated content sent to subscribers automatically instead of by e-mail.

Blogs (Example: WordPress)

A webpage where an author posts entries and readers can comment.

Chat Rooms and Discussion Boards

An electronic room or message board on which learners communicate. Communications between learners can occur at the same or different times. A facilitator or instructor can moderate the conversations, which may be grouped by topic.

Microblogs or Microsharing (Example: Twitter)

Software tools that enable communications in short bursts of text, links, and multimedia, either through stand-alone applications or through online communities or social networks.

Benefits of Technology

- Employees can gain control over when and where they receive training
- Employees can access knowledge and expert systems on an as-needed basis
- The learning environment can look, feel, and sound just like the work environment
- Employees can choose the type of media they want to use in a training program

Benefits of Technology

- Paperwork and time needed for administrative activities is reduced
- Employees' accomplishments during training can be monitored
- Traditional training methods can be delivered to trainees rather than requiring them to come to a central training location

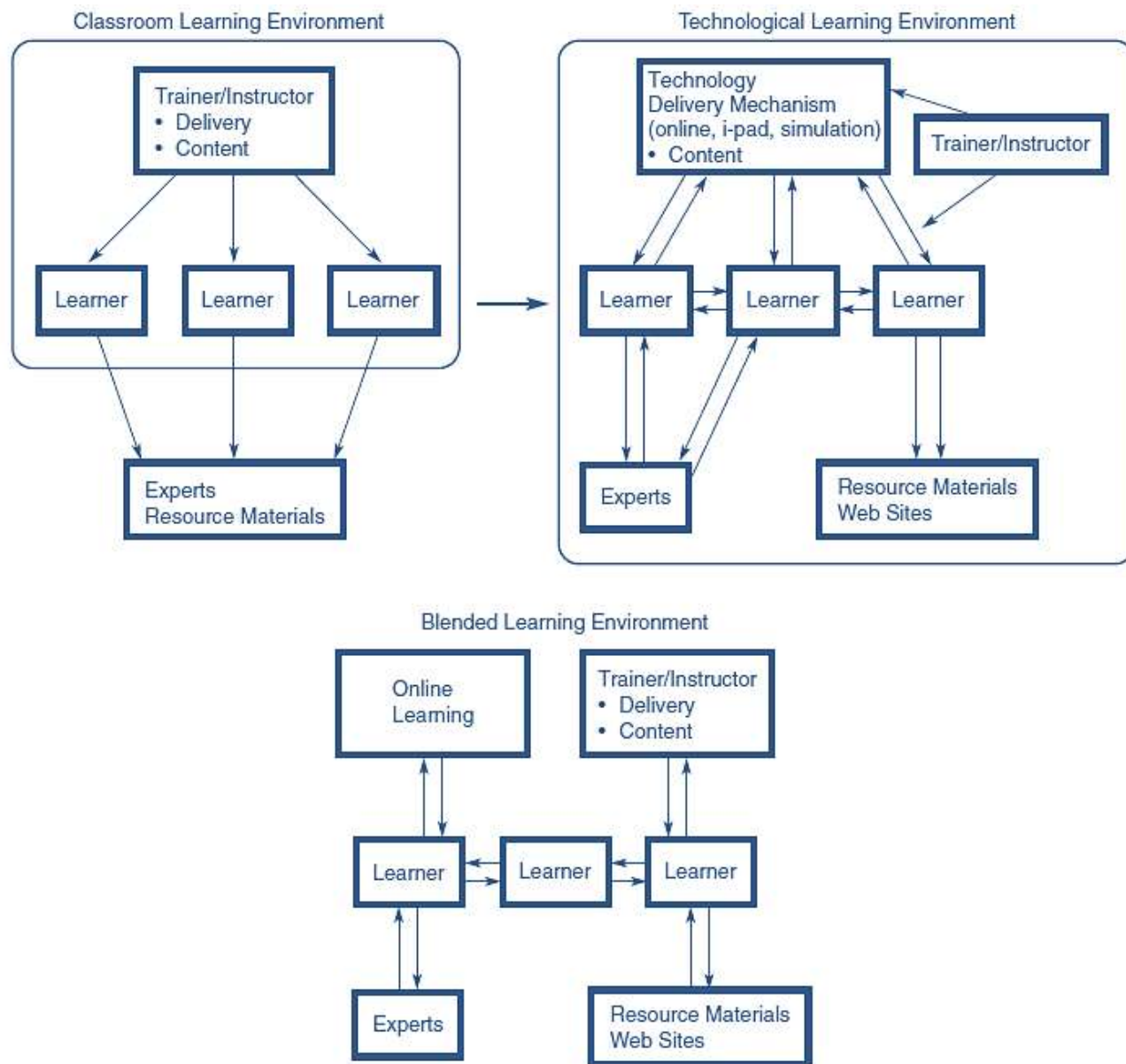
Technology and Collaboration

- **Digital collaboration:** Use of technology to enhance and extend employees' abilities to work together regardless of their geographic proximity
 - Requires a computer, tablet, or phone with a web browser or app, but collaborative

Technology and Collaboration

- Types
 - **Synchronous communication:** Trainers, experts, and learners interact with each other live and in real time, the same way they would in face-to-face classroom instruction
 - **Asynchronous communication:** Non-real-time interactions

Figure 8.2 - Types of Learning Environments



Computer-Based Training, Online Learning, Web-Based Training, E-learning

- Refers to instruction and delivery of training by computer through the Internet or the web
- Include and integrate into instruction text:
 - Interaction using simulations and games, and video
 - Collaboration using blogs, wikis, and social networks
 - Hyperlinks to additional resources
- In some types of CBT training:
 - Content is provided stand-alone using software or DVDs with no connection to the Internet
- Online learning, e-learning, and web-based training include delivery of instruction using the Internet or web

learning

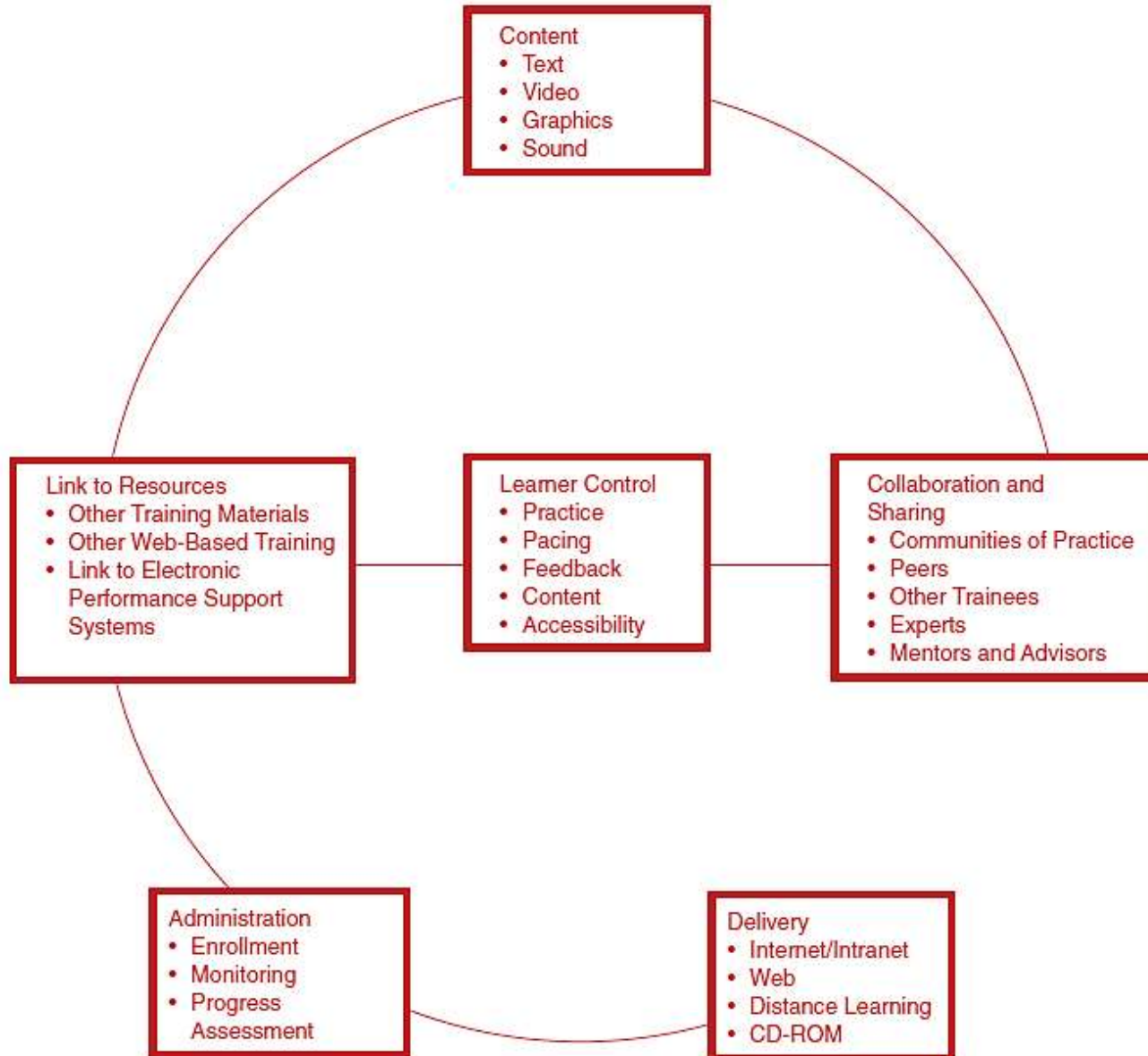


Table 8.3 - Advantages of E-learning

It supports the company's business strategy and objectives.

It is accessible at any time and any place.

The audience can include employees and managers, as well as vendors, customers, and clients.

Training can be delivered to geographically dispersed employees.

Training can be delivered faster and to more employees in a shorter period of time.

Updating is easy.

Practice, feedback, objectives, assessment, and other positive features of a learning environment can be built into the program. Learning is enhanced through the use of multiple media (sound, text, video, graphics, etc.) and trainee interaction.

Paperwork related to training management (enrollment, assessment, etc.) can be eliminated.

It can link learners to other content, experts, and peers.

Regarding the Effectiveness of Online Learning

- Online instruction is more effective than face-to-face classroom instruction for teaching declarative knowledge (cognitive knowledge assessed using written tests designed to measure whether trainees remember concepts presented in training).
- Web-based instruction and classroom instruction are equally effective in teaching procedural knowledge (the ability of learners to perform the skills taught in training).
- Learners are equally satisfied with web-based and classroom instruction.
- Web-based instruction appears to be more effective than classroom instruction (1) when learners are provided with control over content, sequence, and pace; (2) in long courses; and (3) when learners are able to practice the content and receive feedback.
- Web-based instruction and classroom instruction are equally effective when similar instructional methods are used (for example, both approaches use video, practice assignments, and learning tests).
- The employees who get the most from online learning are those who complete more of the available practice opportunities and take more time to complete the training.
- E-learning is not effective for all learners, especially those with low computer self-efficacy.

Table 8.5

- Tips for Developing Effective Online Learning

Needs assessment

Identify the connection between online learning and the needs of the business.
Get management to buy in.
Make sure that employees have access to technology and technology support.
Consult with information technology experts about system requirements.
Identify specific training needs (knowledge, skills, competencies, behaviors).
If needed, train learners on computer and Internet basics.

Creating a positive learning experience

Incorporate learning principles (practice, feedback, meaningful material, an appeal to active learner involvement, and an appeal to multiple senses).
Design the course for the available bandwidth (or increase the available bandwidth to suit the course needs).
Use games and simulations, which are attractive to learners.
Structure materials properly.
Allow trainees the opportunity to communicate and collaborate with each other and with the trainer, experts, or facilitators.
Make the program user-friendly: Learning modules should be kept short, the content should not overload trainees, and webpages should not be confusing.
Provide incentives for completing training.
Keep each instructional segment self-contained.
"Chunk" training modules.
Create smooth transitions between instructional segments.
Any audio, video, or animation should be useful to the learner; otherwise, it is a waste of time and bandwidth.
Provide the developer/producer with clear specifications regarding required file formats, maximum file sizes, window and image dimensions, navigation, screen fonts, and available bandwidth.
Provide writers and instructional designers with clear guidelines for the maximum number of words per screen, how many interactive exercises to include, and which exercises are best suited to the content.
Conduct a formative evaluation (pilot test) before large scale use of online learning.

Provide time and space under learner control

Provide learners with control, including the opportunity to skip sections or modules and the ability to pause, bookmark, review, and return to where they left off.
Give learners dedicated training time to participate in online learning.

Developing Effective Online Learning

- Needs assessment - Includes getting management to support online learning
 - **Bandwidth:** The number of bytes and bits (information) that can travel between computers per second
 - **Plug-ins:** Additional software that needs to be loaded on the computer to listen to sound, watch video, or perform other functions
- Creating a positive online learning experience
 - **Rapid prototyping:** An iterative process in which initial design ideas are proposed and provided in rough form in an online working prototype that is reviewed and refined by design team members
 - **Repurposing:** Directly translating an instructor-led, face-to-face training program to an online format

Table 8.6 - Principles for Creating a Positive Learning Experience

Instruction includes relevant visuals and words.

Text is aligned close to visuals.

Complex visuals are explained by audio or text, rather than by both text and audio that narrates the text.

Extraneous visuals, words, and sounds are omitted.

Learners are socially engaged through conversational language agents.

Key concepts are explained prior to the full process or task associated with the concepts.

Prompts are provided that encourage self-regulation.

Content is presented in short sequences over which learners have control.

Activities and exercises that mimic the context of the job are provided.

Explanations are provided for learner responses to quizzes and exercises.

Exercises are distributed within and among the module(s) rather than in a single place.

Developing Effective Online Learning

- **Learner control:** Giving trainees the option to learn actively through:
 - Self-pacing
 - Exercises
 - Exploring links to other material
 - Conversations with other trainees and experts

Providing Time and Space for Online Learning

- Given the work demands that employees face, trainees need incentives to complete online learning
 - Presenting cash awards and merchandise
 - Certifying programs to ensure that online courses are completed

Technology for Collaboration and Linking

- **Hyperlinks:** Links that allow a trainee to access other websites that include:
 - Printed materials
 - Communications links to experts, trainers, and other learners
- Learning with and creating a network with peers an important aspect for some employees
 - Prefer instructor-led face-to-face instruction over online learning

Social Media: Wikis, Blogs, Microblogs, and Social Networks

- Online and mobile technology used to create interactive communications allowing the creation and exchange of user-generated content

Social Media: Wikis, Blogs, Microblogs, and Social Networks

- Useful for:
 - Providing links to resources related to new learning content
 - Helping determine future training needs reinforcing and sustaining learning
 - Being used as a coaching and mentoring tool
 - Linking learners through a formal training event
 - Engaging Generation X and millennial employees
 - Providing content before a face-to-face learning event

Social Media: Blogs

- A webpage where an author posts entries and readers can comment
 - Personal blogs - Written by one person
 - Company blogs - Used for marketing and branding purposes
 - Topic blogs - Focus on a specific topic area
 - Video blogs and mobile device blog

Social Media: Wikis and Microblogs

- **Wiki:** A website that allows many users to create, edit, and update content and share knowledge
- **Microblog:** Software tools like Twitter
 - Enable communications in short bursts of text, links, and multimedia through:
 - Stand-alone applications, online communities or social networks
 - **Shared media:** Audio or video such as YouTube that can be accessed and shared with others

Table 8.7 - Factors to Consider in Deciding to Use Social Media for Training and Learning

- Are social networks already being used in the company?
- Does social networking fit into the company's learning strategy?
- Are employees geographically dispersed?
- Does the learning strategy support on-the-job learning?
- Is there is a need to foster collaboration?
- Are a significant number of employees from the millennial generation or Generation X?
- Are employees comfortable using social networks?
- Does the business require substantial teamwork?
- Does knowledge need to be shared quickly?
- Does the company value innovation?
- Does the culture support decentralized decision making?

Blended Learning

- Combines online learning, face-to-face instruction, and other methods for distributing learning content and instruction
 - Provides increased learner control
 - Allows for self-directedness
 - Requires learners to take more responsibility for their learning
 - More face-to-face social interaction
 - Ensures a dedicated learning environment

Table 8.8 – Types of Simulations

Type of Simulation	Description
Branching story	Trainees are presented with a situation and asked to make a choice or decision. Trainees progress through the simulation on the basis of their decisions.
Interactive spreadsheet	Trainees are given a set of business rules (usually finance-based) and asked to make decisions that will affect the business. The decisions are entered into a spreadsheet that shows how the decisions affect the business.
Game-based	Trainees play a video game on a computer.
Virtual lab	Trainees interact with a computer representation of the job for which they are being trained.

Simulations and Games

- **Avatars:** Computer depictions of humans that are used as:
 - Imaginary coaches
 - Coworkers
 - Customers in simulations

Simulations and Games

Advantages	Disadvantages
<ul style="list-style-type: none">• Eliminate need to travel to a central training location• Get trainees involved in learning, and are emotionally engaging• Provide a consistent message of what needs to be learned• Put employees in situations that would be dangerous in the real world• Result in positive outcomes as shorter training times and increased ROI	<ul style="list-style-type: none">• High development costs• Trainees may not be comfortable in learning situations that lack human contact

Virtual Reality

- A computer-based technology that provides trainees with a three-dimensional learning experience
- Advantages:
 - Allows trainees to practice dangerous tasks without putting themselves or others in danger
 - More memory available for learning
- Disadvantages:
 - Poor equipment that results in a reduced sense of presence
 - Poor presence may result in the trainee experiencing simulator sickness

Virtual Worlds

- Computer-based, simulated online three-dimensional representations of the real world where learning programs or experiences can be hosted
- Advantages
 - Imitates an actual workplace without any harm
 - Provides a place to meet with trainers, managers, or other employees who can serve as teachers
- Disadvantages
 - Lack of ease of use for first-time users
 - Potential risk of a difficult keyboard and mouse interface
 - High investment of time and money
 - Lack of evidence supporting effectiveness

Mobile Technology

- Consists of:
 - Wireless transmission systems - Wi-Fi and Bluetooth
 - Mobile devices - PDAs, smartphones
 - Software applications related to processing audio files, word processing, spreadsheets, Internet, e-mail, and instant messaging

Mobile Learning

- Training delivered using a mobile device such as a smartphone, netbook, notebook computer, or iPad
- Involves:
 - Formal learning - Include e-learning courses, podcasts, or videos on the mobile device
 - Informal learning - Engaging in communication and messaging via Twitter, blogs, or Facebook
- **Apps**: Applications designed specifically for smartphones and tablet computers

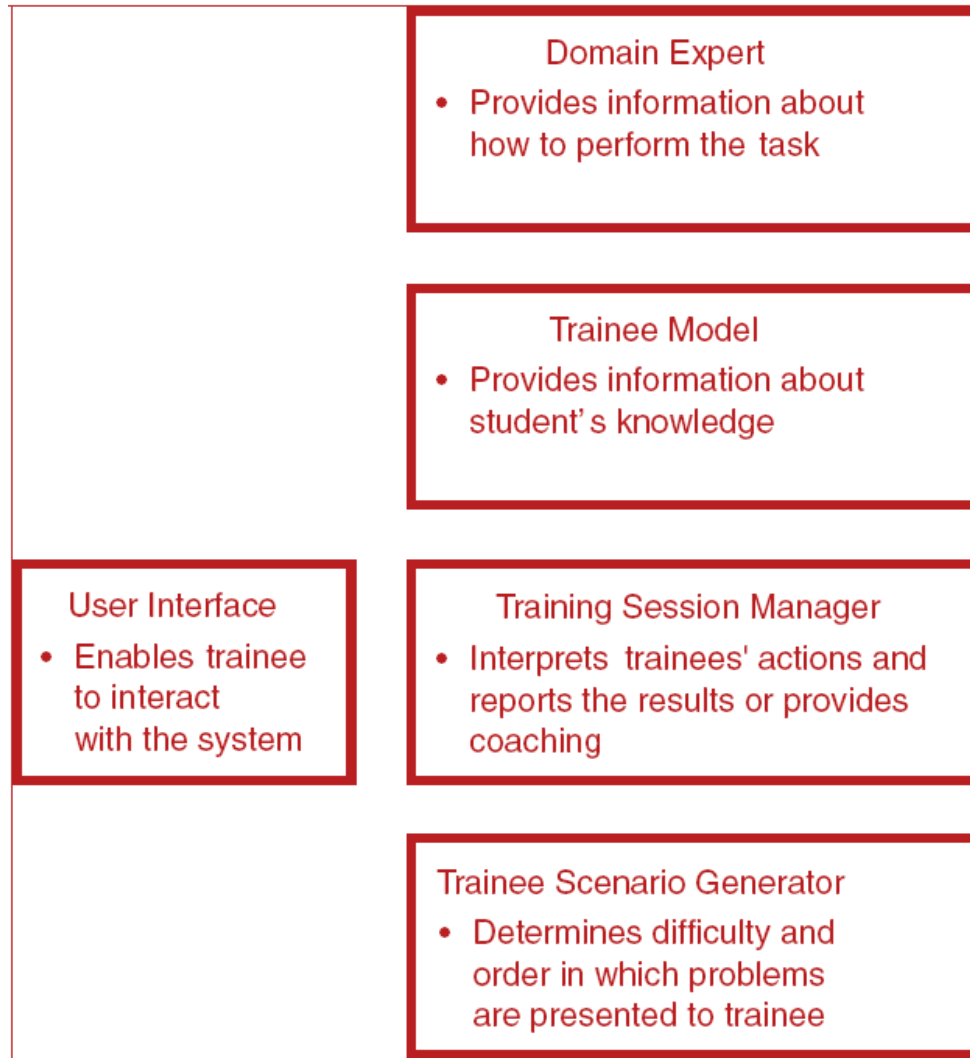
Intelligent Tutoring Systems (ITS)

- Instructional systems that use artificial intelligence
- Three types of ITS environments:
 - Tutoring - Increases trainee understanding of a content domain
 - Coaching - Provides trainees with flexibility to practice skills in artificial environments
 - Empowering - Refers to the student's ability to explore the content of the training program freely

Intelligent Tutoring Systems (ITS)

- Different from other technologies:
 - Has the ability to match instruction to individual student needs
 - Can communicate and respond to the student
 - Can model the trainee's learning process
 - Can decide, on basis of a trainee's previous performance, what information to provide
 - Can make decisions about trainee's level of understanding
 - Can complete a self-assessment resulting in a modification of its teaching process

Figure 8.4 - Components of Intelligent Tutoring Systems



Distance Learning

- Involves two types of technology:
 - **Teleconferencing:** Synchronous exchange of audio, video, and/or text between two or more individuals or groups at two or more locations
 - **Virtual classroom:** Using a computer and the Internet to distribute instructor-led training to geographically dispersed employees
- **Distance Learning:** Used by geographically dispersed companies to provide information about new products, policies, or procedures, as well as deliver skills training and expert lectures to field location

Distance Learning

- **Interactive distance learning (IDL):** Uses satellite technology to broadcast programs to different locations and allows trainees to respond to questions posed during the training program using a keypad
 - **Webcasting:** Involves instruction that is provided online through live broadcasts

Distance Learning

- Advantages
 - Company saves on travel costs
 - Allows employees in geographically dispersed sites to receive training from experts who would not otherwise be available to visit each location
- Disadvantages
 - Lack of interaction between the trainer and the audience
 - Technology failures
 - Unprepared trainers

Table 8.9 - Conditions When Training Support Technologies are Most Needed

- Performance of task is infrequent.
- The task is lengthy, difficult, and information intensive.
- The consequences of error are damaging.
- Performance relies on knowledge, procedures, or approaches that frequently change.
- There is high employee turnover.
- Little time is available for training, or there are few resources for training.
- Employees are expected to take full responsibility for learning and performing tasks.

Technologies for Training Support

- **Expert systems:** Technology (usually software) that organizes and applies the knowledge of human experts to specific problems
- Three elements:
 - Knowledge base
 - Decision-making capability
 - User interface

Technologies for Training Support

- **Electronic Performance Support Systems (EPSSs):**

- An electronic infrastructure that captures, stores, and distributes individual and corporate knowledge assets throughout an organization
 - To enable individuals to achieve required levels of performance in the fastest possible time and with a minimum of support from other people

Technologies for Training Support

- The typical EPSS includes:
 - An assistant to automate tasks and lighten the workload
 - A librarian to provide task-specific information
 - A teacher to guide the user through the process step by step
 - An advisor to provide expert advice

Learning Management Systems: Systems for Training Delivery, Support, and Administration

- A technology platform that can be used to automate the administration, development, and delivery of all of a company's training programs

Table 8.10 - Features of LMSs

Trainee management and reporting
Training event and resource
management

Track and report on trainee progress and activity. Organize courses and learning events in catalogs; manage and track course resources such as classrooms and instructors; support communications among administrators and students.

Online course delivery infrastructure
Authoring tools

Deliver online courses; register and track trainees. Create new courses; promote consistency in courses.

Skill assessment

Create, edit, distribute, and deliver assessment tests; review trainee achievements.

Professional development
management
Knowledge bases

Track and compare trainee learning against goals, based on the trainee's job or function. Integrate links to learning references that supplement online learning.

Personalization

Engage employees in learning through the use of target courses, references, and e-mails.

Why Develop an LMS?

- Important for human capital management
 - **Human capital management:** Integrates training with all aspects of the human resource function to determine how:
 - Training dollars are spent
 - Training expenses translate into business dollars for the company

Why Develop an LMS?

- Major reasons companies adopt an LMS:
 - Centralize management of learning activities
 - Track regulatory compliance
 - Measure training usage
 - Measure employee performance

Developing an LMS

- Senior management needs to be convinced that an LMS will:
 - Benefit employees
 - Improve business functions
 - Contribute to overall business strategies and goals
- The company must have an e-learning culture
- The online learning environment needs to be under the control of the learner

Table 8.11
Comparison of Technology-Based Training Methods

	Online E-learning Web Based Computer-Based	Computer-Based (No Internet)	Distance Learning	Intelligent Tutoring	Simulations Games Virtual Reality	Mobile Learning	Social Media
Learning Outcome							
Verbal information	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intellectual skills	Yes	Yes	Yes	Yes	Yes	Yes	No
Cognitive strategies	Yes	Yes	Yes	Yes	Yes	No	Yes
Attitudes	Maybe	No	No	No	Yes	No	No
Motor skills	No	No	No	Yes	Yes	No	No
Learning Environment							
Objective	High	High	High	High	High	High	Medium
Practice	High	High	Low	High	High	Low	Medium
Meaningfulness	High	High	Medium	High	High	Medium	Medium
Feedback	High	High	Low	High	High	Low	High
Interaction							
Learner content	High	High	Medium	High	High	Medium	High
Learner-Instructor	Medium	Low	Medium	High	Medium	Low	Medium
Learner-Learner	Medium	Low	Medium	Low	High	Low	High
Transfer of Training	High	Medium	Medium	High	High	Medium	Medium
Cost							
Development	High	High	Medium	High	High	Medium	Medium
Administrative	Low	Low	Low	Low	Low	Low	Medium
Effectiveness	High	Medium	Medium	?	High	?	?

Choosing New Technology Training Methods

- Advantages of these methods:
 - Cost savings due to training being accessible to employees at their home or office
 - Reduced number of trainers needed
 - Reduced costs associated with employees traveling to a central training location (e.g., airfare, food, and lodging)

Choosing New Technology Training Methods

- Should be considered when:
 - Sufficient budget and resources are provided
 - Trainees are geographically dispersed
 - Trainees are comfortable using technology
 - It is a part of the company's business strategy and suits its culture

Choosing New Technology Training Methods

- Employees have limited or no time for training
- Current training methods allow limited time for practice, feedback, and assessment
- Its use fits into the organizational culture or business strategy