

Choosing Training Delivery Media

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Introduction

Today's training delivery media choices have been greatly expanded due to technology—in particular, computer-based training and multimedia authoring systems, intranet capabilities, recordable CDs, EPSS, and distance learning. In addition to the technology options, clients seem more open to replacing and/or supplementing the old standby of group-paced classroom training with other “in-person” teaching methods, such as structured job assignments, coaching, simulations, etc.

However, delivery methods for specific training events are often chosen by individual designers as they work independently on projects. Ideas, demands, and decisions about delivery media are often ad hoc, unexamined, and seemingly without consideration of practical business matters such as development and life cycle costs, feasibility, and fit within the overall training and development (T&D) “product line.” This often results in poor and occasionally completely inappropriate decisions, such as when an intranet delivery strategy is used when a large portion of the target audience doesn't have access to it.

The above is made worse when a designer invests too much significance in the selection of delivery media. This wastes time and effort that could be used more productively, such as on the design of the instructional *process*.

A more effective way to address delivery media decisions is in the context of a three level design model.

- At the system level (where an overall curriculum and infrastructure are defined), a delivery media menu is defined in advance for a given organization, curriculum, and/or training department based on the audience, content, and infrastructure requirements and preferences.
- At the training event level (an individual training course or product), the designer can confirm/validate/modify the delivery method from the initial menu defined during the system design for that particular project, based on the nature/content of the training and specific audience characteristics.
- Then, the actual “look and feel,” or user interface, is created as the instructional activities are developed.ⁱⁱ

ⁱⁱ Even further, if an organization has sufficient internal communication, teamwork, and discipline, criteria can be defined and used to standardize delivery media decisions. The intent of this standardization is to limit variability, reduce the cycle time for decision-making, and improve ease of use for learners. This doesn't mean only one delivery media is used. It does mean the overall menu is defined based on organizational capability—for example, it would define when and to what degree intranet delivery can be used for various target audience segments. It would define standard organization/structure for lessons, etc., and it would provide standard formats/templates at the “look and feel” level.

You can also engage target audience and management representative teams in the process. The job of these customer teams is to evaluate the potential cost/benefit of a given program based on business considerations, such as development and life cycle costs versus the value of the results delivered by the training. The designer still contributes his or her instructional expertise to the process, but final decisions are made within a framework that optimizes the overall training system, rather than one specific program. Media selection is one of the decisions the customer should be empowered and informed to make.

How does this approach differ from traditional ISD methods?

Allowing nontraining professionals to decide media can be difficult initially for many instructional designers to accept. It means we don't own the decision about delivery media; instead we must "lobby" for, rationalize, or defend (i.e., sell) our recommendations from a business ("cost/benefit") standpoint. It means we may have to live within constraints imposed by the corporation at large, such as when certain delivery methods are not on the menu of available options.

Maybe even more difficult for many ISD professionals is getting used to making these decisions in a preliminary fashion based on an approximate description of the training event. For example, when designing a comprehensive curriculum, you might have to specify delivery methods for 200 modules using only high-level analysis data about their content. Many of the modules may never be developed. We certainly shouldn't agonize over each module—in fact, we should be trying to "template" both the content flow and deployment method for all modules where appropriate to reduce development cycle time and cost. Yet, many designers dislike the limitations on their creativity that templates imply. The question is, which is better for the company and shareholders overall—getting the right mix of knowledge and skills to the performers quickly and efficiently, or ensuring that designers have job enrichment?ⁱⁱⁱ

Is there a risk to instructional integrity by giving up so much control of media selection? Probably not. Below are some of the key reasons why the risk is minimal.

- Media choice should be based on a number of factors, only one of which is instructional effectiveness. Typically, target audience size and geographical distribution, hardware platform availability, development cycle time requirements, budget, content stability, type of content, and audience expectations are more relevant than whether movement or color is "required for learning."
- A great deal of research comparing delivery media seems to end up concluding that there is "no significant difference" for learning effectiveness anyway. (I believe that is due to the next point.)

ⁱⁱⁱ As a designer, I can empathize with wanting a job challenge. The key is to make the challenge align with the business goals. The real challenge should be to get performers capable of performing the required tasks. If that is your goal, templates and modules are a benefit. The challenge to managers of ISD professionals is to shift the cultural value from outputs to outcomes.

- Instructional design principles can (and should) be applied to any program, regardless of delivery media. Within the limits of the media, the same content can usually be taught effectively using any one of several delivery media choices. Good design of the instructional *process* will compensate for a less than ideal choice of delivery media.
- At the curriculum or *system* design level, the designer has a perspective of the entire forest—the work, the workplace environment, and the training environments (which *may* be the workplace environment). This higher level perspective helps enable a designer to make better choices the same way an aerial view can help a road designer plot the preferred path of a highway.^{iv}
- Technology is blurring the distinction between media used for instruction and media used to support performance (e.g., job aids, EPSS). Companies are also trying to push more training to the workplace. Therefore, business leaders and practitioners really ought to have greater ownership of how the training and/or infoware are delivered/accessed and how they can be incorporated into the work processes.

Note: Sometimes there are “extra-rational” forces at work in media selection as well. For example, developers may want to get experience creating multimedia or Web-based programs because it is perceived to be good for their résumé. While the “extra-rational” factors can be “real-world,” they really don’t benefit the business. This article discusses an approach that would eliminate/minimize their effect.

But Doesn't the Instructional Designer Need to Make Media Decisions—Isn't That One of Their Primary Ways of "Adding Value"?

Media selection is like materials selection for an architect. Sure, there are things you need to know about masonry to select the right kind of brick for a given building, but architects do not need to be experts on every kind of building material. The architect is concerned with the suitability of the materials within the context of the overall design. Most bricks can be made into a wall, but depending on a wide range of factors, some bricks are a better selection than others. Some bricks (e.g., large ones) don't look good on a small building. Some might be harder to find in certain parts of the country. You may not want the exact same type as the next door neighbor. In fact, in most design processes (training included), there will be more than one “right” answer. Choices must be made based on a **disparate** set of considerations—the art of design is the art of making these “tradeoff” decisions.

Like the architect selecting materials, the training designer starts with some initial assumptions driven by global considerations. It is obvious that, while a thatch roof may be an acceptable design choice in some environments, it won't work well in Chicago. Yet, many training designers can be found advocating multimedia delivery when large portions of the audience don't have computers equipped with CD-ROM drives. Or, management advocates putting everything on the intranet, even if the content (e.g., negotiating sales agreements) requires interaction to be learned effectively.

^{iv} Of course, you need additional perspectives as well. The curriculum design level view helps the designers avoid losing the view of the forest and getting lost in the weeds. It is probably easier for an ISD professional to get lost in the weeds than a customer team member, because the customer probably isn't very interested in weeds!

Designers can add value by contributing their expertise for consideration by the customer teams. The real leverage for impact, from the perspective of the average ISD professional working on a project, is not media selection—it is the design of the instructional **process**.

Delivery Media within an Overall Design Methodology

As mentioned earlier, using a three level design model allows the design to be “sketched” and evaluated at a high level before investing the time and effort in more detailed design. This allows for a faster cycle time, more customer input, and even more designer control of the design decisions.

| Level | Description | Delivery Media Decisions |
|--|--|--|
| System (Macro) | Specification of an overall system of training, such as the training & development “product line” | Definition of the overall training delivery system and delivery media <i>menu</i> |
| Component/ Sub-system design (Mid-level) | Detailed design of a specific training program or deliverable, including the instructional process (i.e., objectives, content presentation, exercises, etc.) | Specification of the overall delivery media for the specific program or deliverable (within overall system guidelines) |
| Detailed/User Interface Level (Micro) | Design and development of a specific instructional activity, such as a simulation or a qualification test, or even a lecture | Creation of the “look and feel” and deliverables for a specific instructional activity (per standards for that particular delivery method, if defined) |

(A “training program or deliverable” is intended to be a generic label for any type of employee development activity, whether a formal classroom course; a specific job assignment; a self-paced workbook or reading; structured, on-the-job training; coaching/mentoring; etc.)

Training Delivery System and Menu Definition

When defining the training delivery system, the most important consideration is the distribution question. If the goal of the training provider is to deliver/install knowledge, skills, and/or information to the target audience, a key measure is how *much* of that audience can be reached within an acceptable *timeframe* with an acceptable degree of *reliability*. This is the impetus behind the popular movement to defer training to the “point of need.”^{vi}

^{vi} In fact, “point of need” can be misinterpreted to mean “right before the learner needs to use it.” But it should really only mean “soon enough so that the learner has it when they need it.” The difference is that some training may require skills development and application on the job for some time before the performer is fluent. Doctors cannot wait until they have a patient on the table before learning how to suture. It is a business decision as well as a training issue to decide how soon to begin training and what degree of fluency is acceptable before performing the job.

For example, classroom delivery has limits on how many people can be accommodated at once. To address more learners quickly, you need more instructors (and classrooms). Self-paced methods make it easier to deploy to more people more quickly, but there are risks to reliability, such as the dependence on supporting processes (e.g., managers to assign the program to the learner and to verify that it is completed).

Figure 1 shows the elements of the training/learning delivery system. Besides the learner, there are really three elements of the system.

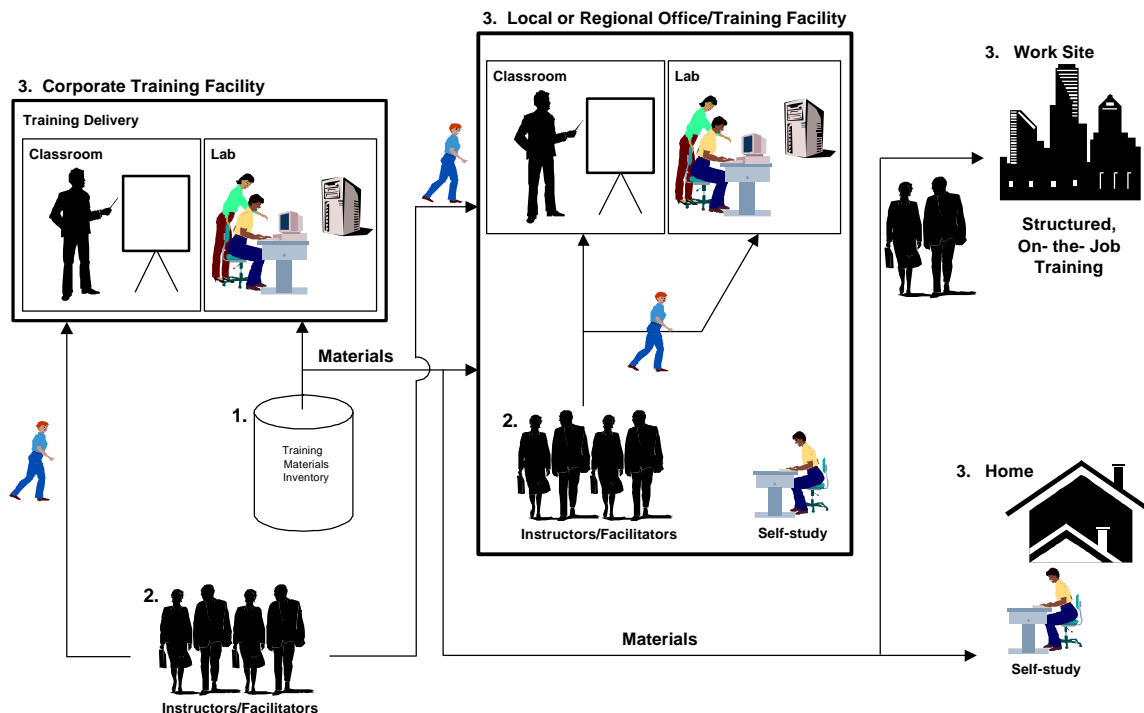


Figure 1: Training Delivery System

1. The first element is the **materials** that support the learning process, for example, the workbook, learner's guide, overheads, Web page, etc.
2. The second element is the **"facilitator,"** which may be an instructor, mentor, or even a help desk. The job of the facilitator is to monitor/manage/support the learning process. (Of course, with self-paced programs, the facilitator role is primarily provided by the materials/computer. But, even self-paced materials need some level of facilitation, even if it is just identifying someone who can answer questions if the learner gets stuck.)
3. The third element is the **facility**, which is the place where the learning event is occurring. (The facility can be the job site, the employee's home or desk, as well as a corporate training center.)

The point is that the designer needs to think through the training/learning delivery system and configure *all* of the elements (including, but not limited to, the delivery media) so that it will work in the specific setting for the specific audience for the specific content. There is no one right answer for every business or every piece of learning content.

Generally, common sense will provide enough guidance to allow most training professionals to convince their clients to configure an effective training delivery system and media menu.

- Is the target audience distributed in small pockets across a large area or concentrated in one or two large locations? This will help decide centralized versus distributed training.
- Is the content likely to change fairly frequently, requiring updates/refresher deliveries? This will direct you to media that can be updated/revised cost-effectively.
- Is the learning facility conducive to completing training? Will the employees be able to concentrate/focus on completing training without interruptions for “real work”? If not, the workplace is probably not a valid delivery site option.
- Will the supervisors/senior people be able and willing to provide necessary coaching/support? If not, you will need to plan for facilitators. Can people work in a self-directed manner or are they too new to the job or is their role too varied? Again, you may need facilitators.
- Are significant facilities (e.g., computer labs or a “mock store”) required for the training? Do they need to be centralized to generate sufficient utilization to justify the expense?
- What methods are being used today? Typically, target audience groups can only absorb a limited amount of change at one time. The more change, the more risk—and the more support needed.
- What technology platforms are available to target audience members? Do they have CD-ROM drives? Do they have access to the Internet? Do they have access to the company intranet? What type of connections and browsers do they use? You may want to lead the company by moving to distributed/computer-based delivery, but you need to be certain that there is at least a critical mass that can use the training.

Answers to the questions above should provide enough assumptions to define the default training delivery system and delivery media menu for the organization or project

Media Selection During Large-Scale Curriculum Design

If the organizational delivery system and delivery media menu are defined, the designer must select deployment methods at the Curriculum Architecture Design level that are feasible for the specific audience(s), work environment, and content. This “downselecting” process should begin with the project sponsor(s), which understand the audience, the business situation, and budget/resource limits.

Once the curriculum design process is underway, the designers should make every attempt to live within the boundaries set by the business leadership. (Of course, everything is up for negotiation as

long as you have appropriate rationale.) The role of the training professional is to ensure that all of the perspectives are considered and to contribute recommendations from a learning perspective.

But, instructional effectiveness is still only part of the story. Arguably a more important factor could be the likelihood of a given deployment method to yield consistent delivery and administration.

For example, self-study programs are less effective if expectations are not set by the supervisor when the program is begun, if help is unavailable for questions not addressed in the materials, if the audience does not learn well through reading and/or individual exercises, or if there is no reliable way to make and distribute updates to keep the materials current. Even if the program is shown to be effective in a controlled pilot setting, it will prove to be ineffective if released into a training delivery system in which there is insufficient delivery support and infrastructure.

For each module of training, a designer must specify the following parameters in order to define the delivery media/approach:

- The **learning environment**, which addresses how other people are involved in the training process (e.g., whether individuals work at their own pace or with a group, whether a coach/expert/facilitator is available during the learning process)
- The **depth of learning** (e.g., awareness, knowledge, skill, or task performance), which is a simpler version of Gagne’s and other taxonomies of learning^{vii}
- **Delivery media itself** (from the approved menu), which addresses the training materials or how the *content* and instructional *procedures*^{viii} is packaged to provide them to the learner (e.g., print, video, classroom, etc.)

The curriculum architecture may or may not include tools/information/“referenceware” used on the job. Either way, the designer should incorporate these tools/information/references^{ix} into the curriculum. Both training and tools are needed to enable performance of the job so tools/information/references should be somehow introduced and used in the training. They should ideally be “packaged” separately so that the learner can follow a learning sequence yet, once back on the job, can use the tool without the explanatory content getting in the way.

^{vii} There are a number of taxonomies that break the types and levels of learning into categories (for example, Gagne’s or Bloom’s). The problem with most of them is that, while they work for training professionals, they tend to be too complex for a target audience member or manager who is simply not interested. We have found this simple four-level model to work well with nontrainers. We simply make the translation to our ISD model (my favorite is Gagne’s) in our heads when “modularizing” training or creating objectives, exercises, etc.

^{viii} The difference between instructional content and instructional procedures is key—both need to be included in the design. Content is the information, knowledge, or skill that needs to be conveyed to the learner. The procedures are the instructions as to the steps the learner must go through to learn the content. It becomes most important when actually developing materials, but in the design/specification process it is also critical. If you expect the facilitators to be professional trainers, they will need more help in the area of content. If they are to be subject matter experts, they will need more support in the area of instructional procedures. If you don’t know, your materials will have to support both.

^{ix} A tool could be distinguished from training in that it is reusable, whereas training is typically consumable (used once to travel up the learning curve and then no longer necessary. By this definition, a job aid is a tool, even if it is developed by the training department.).

General principles or criteria can be defined to guide where various deployment methods are used. This process creates a “default” for certain training situations. Typically, the designer would create these defaults based on the delivery media menu, specific target audience characteristics, and their performance and learning requirements.

For example, suppose your team is working on defining training for technicians that have access to a central training facility. You might decide that the default for any troubleshooting skills training would be group-paced delivery with hands-on lab exercises for practice.

When defining modules in the curriculum architecture, you would start with the assumption of group-paced/lab and then consider whether there were specific factors that would tilt that module away from the default. Maybe the troubleshooting can more effectively be simulated using a computer program because it requires expensive and/or dangerous equipment. Or maybe you could avoid the group-paced training by providing an extensive troubleshooting guide. The design team can debate these alternatives intelligently and within a narrow range of alternatives.

Another example default would be a management directive that all training be delivered using distributed training methods (e.g., self-paced print or computer delivery) wherever possible. That could lead the team to default to video, CD-ROM, or print delivery. They might even use self-paced delivery for portions of skills training (such as negotiation), even though learning the skill requires interaction with others. In this instance, they would have “traded off” the potential loss in instructional effectiveness against the advantages of decentralizing the training.

In both of the above examples, the design team will evaluate the cost/benefit of the two approaches and make a business decision. Whichever way they go, it will be based on sound rationale and will fit with the elements of the overall training system, the learning environment, and the business constraints. And, once the module is actually developed, the evaluation data will show if the decision was the right one or not.

The importance of setting organizational standards/guidelines for delivery media and then defining media for individual training modules as part of a curriculum architecture is that it avoids an individual designer (or their client) picking a delivery method that just won't work in the environment. Also, it reduces the time spent defining the deliverable, which means it gets out to the customer faster. In addition, it contains experimentation on more exotic media to those projects that are deemed strategically necessary—they become focused experiments for clear business purposes.

Even When Designing a Specific Program, Media Is Not the Primary Determinant of Instructional Effectiveness

It makes sense to use a distribution system and delivery media menu that works for the organization. Yet, once you begin to design an individual training deliverable (training course, product, etc.), doesn't media selection become critical? Not necessarily. Research generally illustrates that, all other things being equal, media choice does not significantly determine whether learning happens. See the “No Significant Difference” Web page for dozens of citations that support this point (<http://www2.ncsu.edu/oit/nsdsplt5.htm>).

The reason for the above is not that media choice is unimportant, but that the real determinant of instructional effectiveness is the design of the instructional **process**. An effective instructional process should include, at *minimum*, a description of the desired performance, learner performance, and feedback. A more comprehensive design could include rules, facts, examples and non-examples, etc. The key, though, is learner performance and feedback. Even if all you are teaching is information, there will be more learning if the participants are quizzed, play Jeopardy, etc., to practice recalling the information than if they simply read or are told the information.

This is why people are excited about EPSS à la Gloria Gery^x and computer-based simulations à la Roger Schank^{xi}. In the case of an EPSS, the real job provides the application—the EPSS simply provides supporting information (such as desired performance, rules/theories/concepts). The EPSS does *not* even need to provide an instructional process because the learner has such a need to “get the answer.” The simulation approach, on the other hand, gives the learner an application *and* access to the information and feedback as needed to perform successfully. In this case, the simulation provides the instructional process *and* the content. The key in both cases is not that the learning process is computerized but that the learner is active and motivated to learn.

While EPSS or computer-based simulations are valid design solutions, it is not reasonable to assume they are inherently superior to training delivered using other media just because they are delivered via computer. Nothing prevents a designer from incorporating exercises into self-paced print training, video-based training, SME-led classroom training, or less sophisticated CBT programs. But, nothing may *require* them to, either (and their sponsor’s or culture’s expectations may actually be deterrents). And if the designer is enamored with a given media, he/she may be less likely to focus on the instructional *process*. Instead, he/she is more likely to spend effort on message design and technical considerations (such as how to create animation) rather than ensuring adequate learner application and feedback.

Designers should focus more on the learning process, and related instructional procedures, than on the specific content.

Again, using common sense, designers should be able to construct instructional processes that are capable and reliable. Depending on the answers to the questions below, a designer can “backward chain” an instructional process starting from the end point—the performance. Are you expecting people to

- Remember verbal information?
- Apply a concept or model (e.g., think of customers as technical or financial buyers)?
- Perform the steps of a process (e.g., setting up a computer)?

^x On the Web, see <http://pignc-isp.com/articles/cbt-epss/gery-think.htm> or see *Electronic Performance Support Systems*, Gloria Gery, Sept. 91, Gery Associates, ISBN: 0964622300

^{xi} Dr. Roger Schank has done a great deal of writing and research on learning in the fields of artificial intelligence, training, and education. He advocates using simulations or stories to engage the learner and to then use the learner’s interest as a means of leading them through a learning process (or, more accurately, letting the learner find the desired learning). To find out more on Dr. Schank’s approach and ideas, you could see the Web site for the Institute for Learning Sciences, which he leads at Northwestern University. The address is www.ils.nwu.edu. Of special note at the Web site is a “book”/information web titled “Engines for Education” that is very relevant to training professionals in the business world, as well as educators. Or, you could also reference other publications, such as “Learning with Roger Schank,” part of a special report on workplace learning published in *Training & Development*, October 1993.

- Make a discrimination (e.g., being able to tell if the part is “good” or defective)?
- Demonstrate/use behaviors/skills (such as addressing customer objections)?
- Perform a complete job task/produce a work output?

If the goal is a discrimination, then the training end point would be to give the learner some situations that would typically occur on the job and require them to make the appropriate discrimination (for example, evaluate a sample part and decide whether or not it meets the spec). Then, you can easily back out the key criteria, figure out a sufficient number of examples, provide information needed to understand the examples, and start off the entire process with an advance organizer describing the intended learning and why it is important. This is really basic ISD—most of the ISD textbooks I have read suggest creating the “tests” (or exercises) before building materials, and it works!

What you are really doing is designing an instructional *process* for the learner. The benefit of “backward chaining” is that you are less likely to include content that really doesn’t support the end purpose. The process needs to fit the constraints of the delivery media; however, the same process may work on several platforms—whether the examples are shown on video, print, or computer animation is secondary to figuring out which examples and how many of them are needed to teach the intended concept.

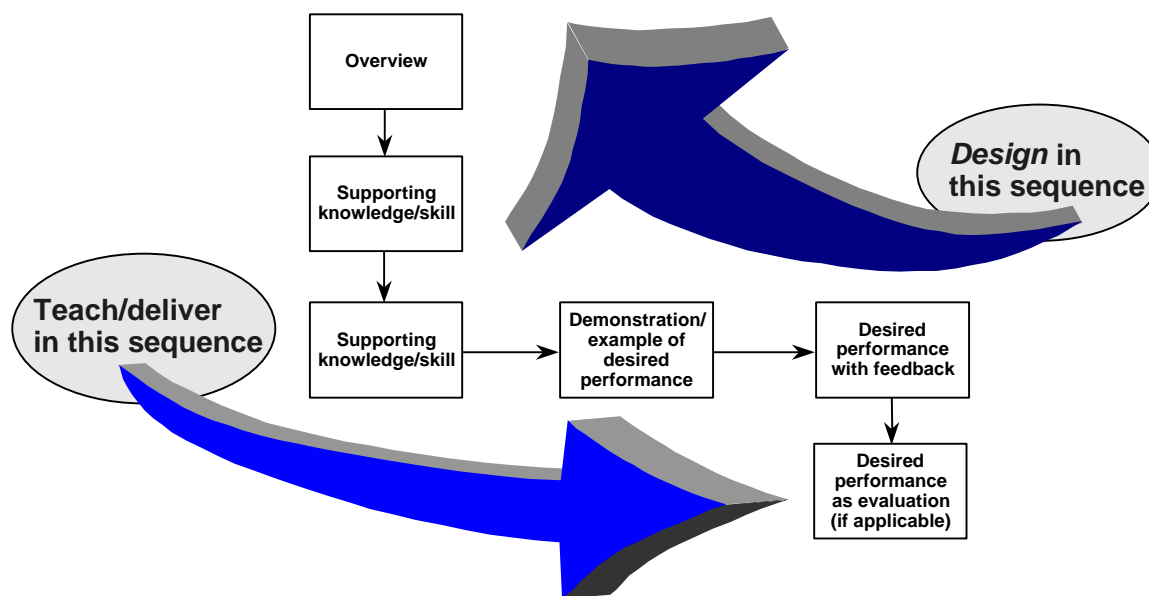


Figure 2: Backward Chaining in Midlevel Design

Of course, the learning requirements can be broken down and addressed separately if that improves the ability to reach the target audience. For example, skills that are applied in a “live” setting and/or where there is no “one right answer” typically require interaction with others to be effective. It would be difficult to teach negotiating without having practice scenarios and other participants to provide unexpected responses or demands. Yet, there are *components* of that skill, such as typical negotiating situations, strategies, examples and non-examples, etc., that *could* be taught using self-paced training or even job aids with supplementary supervisor-provided coaching. This approach at least minimizes the amount of group-paced delivery.

Designing the “User Interface”

The lowest level of design in this three-level model is “user interface” design in which such considerations as layout and formatting, use of icons, graphics, and text construction, etc., are applied to actually create materials. In fact, this step happens primarily in the development, not design phase. The delivery media will have already been selected; however, there is at least one key media-related design decision remaining—where to build-in the instructional process instructions or procedures.

The step-by-step procedures needed to guide the facilitator and/or learner through the instructional process need to be presented somewhere—a primary delivery media. For example, in group-paced training we often house the procedure in the overheads. If there is a video to be run, the overheads refer to it and contain tips/points for debriefing afterward. That way, the facilitator simply processes through the overheads which, in turn, point outside to other media where needed. A similar approach can be used for self-paced print (the participant workbook could house the procedures) or even structured, on-the-job training (the performance checklist can house the procedures).

A Web-style interface is more difficult because it would typically allow branching, which implies that there is no one instructional procedure. Actually, the designer needs to account for *many* instructional procedures—the links serve as the structure, and the actual steps are driven by need and interest. If it is critical that the learner actually access everything (rather than have the *opportunity* to access everything), a journal could suffice. However, a better solution is to create a “test/assessment/exercise/performance checklist” that the learner would complete using the Web-style training/information as a reference. Another old-school ISD principle is “if they can pass the test, they must have learned the right content.”

Even at the “user interface” level of design, using standard templates and conventions for each media type results in better, faster, and cheaper training materials development. There are several reasons to “limit the developer’s creativity” here as well.

- Using a standard approach will help users learn where to find the information they need. The entire purpose of heavily formatted documents is to make it easier for a reader to scan and find the important information more quickly. (If you can hold to an organizationwide standard, that’s even better.)
- Some approaches just work better than others do—standardizing allows the organization to find and improve them continuously.
- It is faster—every training deliverable has an upfront investment to design the look and feel and then “build” the template (analogous to setting up the font, tab, heading, etc., standards in a word-processing program). Why not reuse the investment and save the cycle time where you can?

Conclusion

Training delivery media are nothing more than the materials that can be used by an instructional designer as a means of documenting and presenting instructional procedures and content to achieve learning goals. Thanks to technology, there is a wide range of materials available to the instructional designer today.

The expanded media choices do provide an opportunity for the instructional designer to take on a broader mission than strictly training solutions. Ultimately, these raw materials can be used to create an overall performance environment that supports the worker with training, information, and even job aids/tools. The instructional designer can now be involved in performance support tool design, information delivery system design, and even general communication/message design.

But, we need to be careful not to make more of the media selection problem than is appropriate. We need to focus on the relevant business issues over and above instructional effectiveness when choosing delivery media. We need to make sure our instructional processes include learner application and feedback, regardless of the media selected. If we understand the intended results of the intervention and spend the bulk of our energy on designing the intervention to be effective for that result, our clients win, the learner wins, and we win.

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