



Instructional design in elearning

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ONLINE AND DISTANCE EDUCATION

Instructional Design in Elearning

George Siemens

Introduction

Elearning is the marriage of technology and education, and most often, the instructional designer's greatest role is that of "bridging" concepts between the two worlds. This vital role ensures that a subject matter expert's (SME) concepts are properly developed by graphic designers and programmers. Unfortunately, the role of instructional design (ID) in elearning is often misunderstood - due to the perceived complexity of the process and to poor understanding of the pedagogical requirements of elearning. To a large degree, ID is the process whereby learning, not technology, is kept at the center of elearning development.

The *need* for instructional design is being noticed in elearning - both in corporate training departments and education institutions. It is one of the fastest growing fields (Find Jobs): "Instructional design is one of the largest categories of e-learning jobs, and search engines produce better results with this specific keyword than the general term e-learning. There also are historical data for the job category of instructional design."

This article explores ID in terms of: definitions, models, and usage. Like many models, ID is simply naming a process that many instructors and course developers already utilize. Often, when instructors first encounter an ID model (like ADDIE), the response is..."Oh, I do that already".

What is Instructional Design?

Many definitions exist for instructional design - all of them are an expression of underlying philosophies and view points of what is involved in the learning process. Distinguishing the underlying philosophy of learning (in terms of: How does learning occur? What factors influence learning? What is the role of memory? How does transfer occur? What types of learning are best explained by the theory? Learning Theory) can help instructors and designers select the design model most congruent with their education philosophies. The following is a listing of ID definitions:

- Instructional Design is the systematic process of translating general principles of learning and instruction into plans for instructional materials and learning. What is Instructional Design
- Instructional design is a systematic approach to planning and producing effective instructional materials. It is similar to lesson planning, but more elaborate and more detailed.
- Instructional Design is the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction. It is the entire process of analysis of learning needs and goals and the development of a delivery system to meet those needs. It includes development of instructional materials and activities; and tryout and evaluation of all instruction and learner activities. Definitions of ID
- In general, ID theory needs to move in the direction of flexibility and learner-empowerment if it is to allow ID to keep up with technological and institutional changes...."Like the chiropractor who realigns your spine, we might become healthier from a realignment of our theories. If we admit to and attempt to accommodate some of the uncertainty, indeterminism, and unpredictability that pervade our complex world, we will develop stronger theories and practices that will have more powerful (if not predictable) effects on human learning." What is ID Theory?
- Instructional design is the process by which instruction, computer-based or not, is created. Instructional design provides a framework for the creative process of design, and ensures the learners' needs are met. ID and Development
- Instructional design ("ID", also known as instructional systems design or "ISD") is a tested and proven methodology for developing instruction. It first gained popularity in World War II, where the Instructional design approach fared so well that it was quickly co-opted into corporate training. In the fifty years that followed, ID has become the standard for producing excellent training in both the military and corporate realms, as well as textbook authoring and development of computer-based learning material What is ID?

- Instructional design is a systematic approach to course development that ensures that specific learning goals are accomplished. It is an iterative process that requires ongoing evaluation and feedback. Instructional Design
- Instructional Design is the art and science of creating an instructional environment and materials that will bring the learner from the state of not being able to accomplish certain tasks to the state of being able to accomplish those tasks. Instructional Design is based on theoretical and practical research in the areas of cognition, educational psychology, and problem solving. What is ID

Instructional Design Models

Instructional design, very loosely defined, is a system or process of organizing learning resources to ensure learners achieve established learning outcomes. As such, it is essentially a framework for learning. From a designers perspective, various models can be followed in the instructional design process. It is important to note that, at best, a model is a representation of actual occurrences and, as such, should be utilized only to the extent that it is manageable for the particular situation or task. Put another way, perhaps one model is more effective for designing a math course, and another model is more effective for designing soft skill courses (like managing people, customer service, etc.).

Instructional Design Models offers an excellent visuals depicting various models. Here is an overview of some different models for instructional design:

- ADDIE - refers to Analyze, Design, Develop, Implement, Evaluate. This is possibly the best known design model, and is frequently used in academic circles.
- Algo-Heuristic - "The theory suggests that all cognitive activities can be analyzed into operations of an algorithmic, semi-algorithmic, heuristic, or semi-heuristic nature. Once discovered, these operations and their systems can serve as the basis for instructional strategies and methods. The theory specifies that students ought to be taught not only knowledge but the algorithms and heuristics of experts as well."
- Dick and Carey Model - "The Dick and Carey model prescribes a methodology for designing instruction based on a reductionist model of breaking instruction down into smaller components. Instruction is specifically targeted on the skills and knowledge to be taught and supplies the appropriate conditions for the learning of these outcomes."
- Robert Gagné's ID Model - "Gagné's approach to instructional design is considered a seminal model that has influenced many other design approaches and particularly the Dick & Carey systems approach. Gagné proposed that events of learning and categories of learning outcomes together provide a framework for an account of learning conditions. "
- Minimalism " The Minimalist theory of J.M. Carroll is a framework for the design of instruction, especially training materials for computer users. The theory suggests that (1) all learning tasks should be meaningful and self-contained activities, (2) learners should be given realistic projects as quickly as possible, (3) instruction should permit self-directed reasoning and improvising by increasing the number of active learning activities, (4) training materials and activities should provide for error recognition and recovery and, (5) there should be a close linkage between the training and actual system."
- Kemp, Morrison, and Ross Nine step instructional design model.
- Rapid Prototyping - "Generally, rapid prototyping models involve learners and/or subject matter experts (SMEs) interacting with prototypes and instructional designers in a continuous review/revision cycle. Developing a prototype is practically the first step, while front-end analysis is generally reduced or converted into an on-going, interactive process between subject-matter, objectives, and materials " Thiagi - Rapid ID
- Epathic Instructional Design - 5-step process: Observe, capture data, reflect and analyze, brainstorm for solutions, develop prototypes

Why Use Instructional Design?

With a foundation of what instructional design is, and various models for implementation, we will now focus on the WHY of ID in elearning. Many classroom activities don't leave a "trail" that can be viewed by others (at least not directly - successes of graduates of a program can be evaluated and the relevance of

courses assessed). Online learning is far more transparent. Classroom discussion is generally not archived (though certain lectures can be taped and shown to students)...whereas every aspect of elearning is transparent and can be used as a resources for subsequent courses.

Content, discussions, interactions, etc. can all be evaluated and reviewed by persons other than the instructor. As such, quality can be assessed more objectively in elearning. ID is a quality process. It seeks to ensure that critical concepts are explored through content presentation and learning activities.

Beyond quality and transparency issues, the greatest value ID offers is to students of online programs. The greatest objective of **ID is to serve the learning needs and success of students through effective presentation of content and fostering of interaction.**

Additional benefits instructional design offers elearning:

- "Distance learning courses are likely to fail if they are delivered as if they were traditional courses." (Smith, 1996)
- "Pedagogy must drive the choice of instructional technology, not the other way around." (Chizmar & Walbert, 1999)
- "Compared with a human instructor, technology is less adaptive. Once a plan of integration is implemented, it is less likely to change it according to student's reactions. This is why instructional design plays an important role in bridging pedagogy and technology. Subject contents have to be well organized and strategies for teaching via a chosen medium have to be well-thought-out. Instructional design can help educators making the best use of technology; therefore guarantee a successful integration." ID Approach for Integrating Pedagogy and Technology
- Provides consistency between various courses developed by various instructors/designers. The general look and process of content exploration is standardized.
- In a classroom, an instructor can adjust "on the fly"...if, during the design process, a concept was not communicated clearly, a classroom instructor can clarify. Online, this type of adjustment is usually not possible. The design process must anticipate and meet potential concerns/ambiguities...or put another way ID tries to do online what the instructor does in a classroom.
- ID focuses on the most effective way to present content
- ID begins with the learner and the learner experience
- Quality of course is ensured through ID - covers all the phases of good development
- ID gives structure to the student's process of working through course material
- Appropriate use of technology: "With e-learning and blended learning proving to be no more effective than traditional classroom methods, why are so few training professionals recognising this simple fact: Technology, no matter how advanced, cannot compensate for its misapplication. Here's why instructional design is - and always has been - the key to unlocking the true potential of available learning technologies." Leading edge training technologies
- Accelerate development. A current concern in elearning is development time. ID can speed up development time.
- Creates a transparent process - easier to track and utilize the experiences of development teams (a knowledge management issue)
- "Too much of the structure of educational technology is built upon the sand of relativism, rather than the rock of science. When winds of new paradigms blow and the sands of old paradigms shift; then the structure of educational technology slides toward the sea of pseudo-science and mythology. We stand firm against the shifting sands of new paradigms and "realities." We have drawn a line in the sand. We boldly reclaim the technology of instructional design that is built upon the rock of instructional science." Reclaiming ID

Conclusion

The growth and success of elearning is closely linked to the design of quality learning, enabled through the use of technology. Instructional designers play the pivotal role of bringing together these disparate

fields - for the benefit of students, instructors, and organizations. Many of the concerns of online learning drop out rates, learner resistance, and poor learner performance can be addressed through a structured design process. The resulting benefits - reduced design costs, consistent look and feel, transparency, quality control, standardization - make organizational investment in ID a simple decision.

Why ID? The Benefits of Instructional Design Models

by Nadeen Thompson,
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Defining Instructional Design (ID)

As I view this issue, you are an instructional designer if you have had training in and *consciously* use an instructional design model for lesson planning. If you're an educator, the steps in an instructional design model will look familiar. That's because you've *unconsciously* used steps in this process to design your own instruction many times.

Instructional design (ID) models grew out of the teaching profession and came to fruition during World War II when the nation had to be quickly trained and troops mobilized to run the equipment of war. A combination of face-to-face, hands-on, individualized, and group units of instruction were developed by the armed forces using ID models to effectively train massive numbers of troops. Today there are many ID models (one useful site to consult is Sherri Braxton-Lieber's at http://www.seas.gwu.edu/student/sbraxton/ISD/id_models.html). However, all of them share some basic features:

- Needs assessment
- Goal and objective identification
- Audience and setting analysis
- Content and delivery development
- Evaluation and redesign

Many ID models are depicted in little step-by-step rectangular boxes leading to the impression that you complete each one in the order shown. On the contrary, ID is a dynamic process with constant movement back and forth between the steps. For instance, evaluation is based on objectives but it also helps to clarify the objectives. If evaluation alters the objectives, it also alters the content, and both need to be re-addressed.

Why Use ID?

Design teams representing various fields of expertise (producers, instructors, editors, etc.) developed individualized packets of instruction during the war years. Today, teams who work over extended periods of time to do "anticipatory" and "participatory" planning also develop individualized or technology-enhanced instruction. Because these classes are not traditional, instructor-led, face-to-face classes, design teams must anticipate the needs of learners and design instruction that "builds in" clarity, resources, activities, feedback, and the like. Teams also need to choose an appropriate delivery mode (i.e. computers, television, video, etc.) which requires expertise from various fields along with participation in the planning process.

These teams use ID models to:

- Speed up the process: Time is money, especially when you have a team of three to four people working on the same project. The design steps save time by focusing the team

and serving as the foundation for project development and a roadmap through the process.

- Assist in communication: Team members need to share expertise, intent, calendars, and so forth. Instructors need to clarify their goals, objectives, content, and evaluation plans for producers and describe the level of audience expertise and their physical setting (equipment, software, support). Producers need to focus on the identified audience and objectives and suggest technology options. They need to include instructors in choosing appropriate technology and involve them in script writing, editing, computer course layout, etc.
- Cover all phases of good instructional design: Insure that the elements of instruction are all consciously addressed and all the pieces relate to and support each other. Insure that the design is complete and packaged to be transmitted to the clientele prior to instruction.

ID Models...Not Just for Teams

- ID models can be used in many settings and to varying degrees. Individual instructors creating their own traditional classroom material can benefit from consciously using an ID model. It speeds up the course planning process, helps *internal* communication (just transferring goals and objectives from thoughts to paper clarifies them and focuses design efforts), and insures that no phase of instructional design will be forgotten or shortchanged.
- An ID Model can be used to evaluate existing instruction. Use the model to assess a short lesson, workshop, or textbook chapter. Try to match the objectives of the instruction to the content and/or the evaluation.
- An ID model can also be a good tool for general planning. Try adapting it for planning your next vacation. Before you look at your budget or get into the content plans (i.e. location, reservations, etc.) ask your travel partner to write *on paper* the one overarching goal they have for this vacation: what does he or she want to get out of it? You do the same, exchange goals with your partner, and discuss. Then start planning the content of the vacation while keeping the goals in mind. You might be surprised at the results!

In Conclusion

Instructional design models can help both individuals and design teams work through the process of planning instruction. Consciously working back and forth through the steps of an ID model will add speed and clarity and insure that key instructional principles are addressed. Instructional design models can also be used to assess existing educational material and help in everyday planning.

Trends: Out with the Old, In with the New? By Amy Finn

Here's a prescription for assessing and integrating new learning technologies.

When I was a Girl Scout, we sang a song that went something like, "Make new friends, but keep the old. One is silver and the other gold." It's sort of like that with learning technologies.

There are tried and true learning methods, methodologies, and technologies. There are also new technologies that once evaluated make sense to incorporate into existing education and training programs. More important, new technologies may offer opportunities for learning we would not have

otherwise. However, before jumping on any bandwagon, here are some guidelines for integrating new technology into your programs.

- Keep the old; learn from the past. The education and training industry has a long and rich history. The physical classroom is not going to disappear anytime soon—no matter what anyone tells you. Keep the old.
- Make new friends; research new technologies. There is a myriad of new technologies emerging all the time. Learn about them. Take the time to find out about them and experiment with them. Make new friends.
- Continuously improve. Change is inevitable and pervasive. If you keep an open mind, you can blend what you have today that works, together with new learning technologies, to create an even more vibrant environment for your learners. One is silver and the other gold.

Learn from the past

Archeological discoveries bring to light proof that training in the physical classroom has been around for thousands of years. According to Samuel Noah Kramer's work *The Sumerians: Their History, Culture, and Character*, there is evidence that the ancient Sumerian civilization (circa 3000 -2500 B.C.) developed the first system of writing to create, capture, and preserve information, and delivered training to students in a physical classroom setting.

In addition to the physical classroom, educators and trainers have had access to a varied list of technological advances over the years. We have used technology to assist us with our mission to develop and deliver high quality, useful education and training to our various audiences. We have used the physical classroom where knowledge morphs into learning and students take information garnered in lessons back to their daily workplace. In addition, we have implemented other delivery modalities when they were required, based on business and learning needs.

Now we must do even more. We need to reexamine the purpose of the physical classroom. The classroom isn't going away, so how can we use it to best advantage? How can we make it an exciting place for all types of learning? How can we use it to teach learners of all ages and all learning styles? How can we augment it so that learning is continuous rather than event-based?

One answer is to make the classroom the experiential learning place it should be. Didactic learning must be mixed with problem-based learning, and both must embrace the means to self-enable learners. The classroom must become a place where we teach learners how to solve problems, find information, become confident about working independently, yet know when to seek subject matter expertise—either physically or virtually.

The use of new learning technologies can help us hold on to the positives of traditional learning while embracing and implementing new ideas. But, we need to incorporate new technologies for learning purposes when and where it makes sense to do so—not just because some new tool has come into vogue.

Make new friends

It seems as though every day we hear about the development of some new technology. Pick up any magazine, newspaper, journal, or go online and look around—new technologies are emerging faster than we can assimilate them into the existing mix of technologies. Blogs, Moblogs, Pod Casting, Wikis, VLogs, RSS...the list goes on. This is the new language of collaboration and communication, and all of these technologies will affect training and learning.

Dealing with new technologies—an industry perspective

I recently attended three major training industry conferences. Each offered a very different perspective on education, training, learning, and knowledge sharing, and each offered a different perspective on the use of technology in learning.

At one conference, there was very little focus on the use of technology in learning. The emphasis was more on existing learning methods and methodologies. At another conference, there was a moderate focus, with some emphasis on uses for new learning technologies but few discussions about implementation. At the third conference, there was heavy emphasis on new technologies and the ability to play with some of them, but there was just a hint of exactly how practitioners should incorporate these technologies into education and training offerings.

Indeed, the learning industry is sorting out how to deal with technological breakthroughs and what they will mean for learning. The bottom line is that there is a lot to be learned about technology and how it will affect learning. Practitioners need to stay ahead of the curve. We need to read about, experiment with, and put into production some of these new technological options. We need to take a proactive approach in investigating how technology will affect existing learning offerings and what additional value they add to comprehension, retention, completion, and the increased productivity of our learners.

The changing framework for learning

A major component of learning takes place informally. A recent IDC report, *Customer Needs and Strategies, Future-Proofing Learning Infrastructure*, finds that "only about one-third of learning occurs in a formal setting. The other two-thirds of all learning is 'informal' in nature and occurs spontaneously as a result of incidental experiences or as part of an intentional search for a specific piece of information." As learning professionals, we need to understand this trend. We need to determine how we can augment formal training by embracing and supporting informal learning.

Formal training can be synchronous, asynchronous, or blended. Typically, formal learning is subject matter expert or instructor-driven, scheduled, resides in a specific location, and is prepared or developed prior to delivery. Formal learning can be delivered in a variety of ways, including physical classroom, virtual online classroom, video conferencing, web conferencing, and so forth.

Informal learning offers people a variety of options to access information. Learners can search for information on their own, or information can be pushed to the learner. Informally, learning is delivered through water cooler discussions, peer-to-peer networks, chat rooms, via the Internet, journals, and so on.

Learning management systems (LMS), learning content management systems (LCMS), and other systems of this sort are used not only to help organization deliver formal learning but also to assist learners access information informally. They serve as a repository of information about the learner, delivery of content, and record the progress of learning through learning tracks and evaluations. Human capital management systems (HCM), critical to professional development and growth of professionals within an organization, help learners and managers track employees' professional development progress, including their learning, throughout their careers.

Embedded learning

Many practitioners in the learning industry are currently directing a new examination of embedded learning. Embedded learning is information that is available on a self-help basis, 24/7. It can be delivered to the workplace, or to mobile learners. Electronic performance support systems (EPSS) is a form of embedded learning. The point: Embedded learning offers learners the information they need when they need it.

New technologies help extend the concept of embedded learning further. Delivered through the Internet, such new applications as blogs, moblogs, vlogs, Wikis, and Pod Casting, enable learners to access information with greater ease than ever before.

Understanding new learning technologies

It's important to make new friends and become acquainted with new technologies for a variety of reasons. Understanding what they are all about can help practitioners envision when, how, and where to incorporate them into our businesses. The table below provides a condensed, high-level overview of some of these newer technologies.

Technology	Definition	Application
Blog	Weblog (blog), web-based publication consisting primarily of periodic articles	Accessible to large audiences, diaries, communication and collaboration (blogstorming)
Moblog	Blend of words mobile and weblog (mobile weblog)	Content posted to Internet from mobile or portable devices, instant access to real time information
Wiki	Web application that allows users to add content (as on an internet forum) and edit content	Easy way to develop private and/or public knowledge bases; sharing vast amounts of information simply and cost effectively
VLog	Weblog that uses video as primary presentation format	Distribute video content, audiovisual communication via internet
Pod Cast	Technologies that enable automatic distributing of audio and video programs over the internet; publish and subscribe models available	Enables independent producers to create and deliver self-published broadcasts
RSS	Real Simple Syndication is a way to track blogs	Updates to blogs are automatically sent to user computers; approximately 6 million people--5 percent of the U.S. online audience--use RSS

Using new technologies for learning

Because many of the technologies are easy to implement, inexpensive, and have low bandwidth requirements, their use is steadily increasing. Even so, what compelling reasons do practitioners have to use these technologies?

If the goal of learning professionals is to transfer knowledge to people, what better way to do that than by using a problem-based, experiential approach to learning. Rather than lectures and page turners, use new technology to form a learning scenario and offer people the tools they need to solve the problem.

For formal training, offer problem-based learning that has people work together physically or virtually to form learning communities. The learning network formed through this sort of experience and the ability to search for information will yield a better learning result. Direct them to create blogs, wikis, or other online sources where information may reside.

Create an internal blog or wiki for use in your training. Have people share lessons learned immediately during the learning experience, and keep the conversation going when formal training is complete. Create

a corporate wiki or use an EPSS to capture corporate knowledge, information, policies, and procedures in a single place. Direct professionals to search the corporate database for information they need to perform their jobs. Increase employee productivity by directing search needs to a few sources, rather than have employees spend time in non-directed, less productive searches.

In the spirit of making new friends, this approach will reduce the number of PowerPoint slides you present, and make the learning you deliver more interesting and vibrant. Your learners, in turn, will retain the information longer, and know where to look for answers the next time they encounter questions or problems. It's an enabling approach that helps learners gain confidence to solve the next problem or issue that they encounter.

Continuously improve

Our industry's long and rich history has much to be proud of. Over the years, we have delivered knowledge, information, and learning—assisting our organizations directly and indirectly. As we continue to try and measure the value of education and training, we are continuously reminded that no one in an organization can do without learning. However, change comes whether we want it to or not. The wealth of knowledge and information available to people today is almost unimaginable, and the methods by which people can access that knowledge and information is astounding. Ask yourself every day, What more can I learn? How can I better myself, my organization, and the way I provide learning experiences?

Instead, many ask, Does new technology mean that the physical classroom, web-based training, online virtual classrooms, and other learning technologies are the wave of the past? The answer is a resounding, No! It does mean, however, that learning professionals need to understand that the future is now. Work will occur in non-traditional ways by younger workers and we need to understand the power of new technologies, harness them for the purpose of learning, and begin to incorporate them in new, dynamic, and innovative ways into formal and informal learning. If we fail to understand the trends in emerging technologies and begin to integrate them into our learning programs today, we stand to lose an unprecedented opportunity. To be sure, it's important to welcome new technologies, which can become great friends to our existing methods, methodologies, and technologies. Emerging technology will no doubt augment, expand, and cause an evolution of learning.