

# Chapter 25

## Design Tools and Processes for Building E-Learning

Shalin Hai-Jew  
Kansas State University, USA

### ABSTRACT

*To harness information communications technologies (ICT) for adult e-learning, instructional designers and developers use a range of design tools to capture, analyze, document, and use critical information. Their design tools help them define the learning objectives, explore the learning domain, study embedded principles and values in the learning domain; define the projected learners and their needs (based on developmental levels, languages, cultural backgrounds, demographics, and others); define the specific project parameters (talent, timeline, resources, and budget); and identify suitable authoring tools and platform technologies. The culmination of the relevant information will optimally lead to a tailored pedagogical strategy and plan, and an effective development, alpha and beta testing, and deployment. This chapter defines the main tools used in instructional design—as a combination of methodologies and related technologies. Understanding these tools will help faculty and designers conceptualize instructional design more efficaciously and deploy the wide range of tools more strategically.*

### INTRODUCTION

The successful use of information communications technologies (ICT) for adult e-learning often involves an in-depth planning process. This pre-design process involves the collection of relevant information from the environment, pedagogical theories, the particular learning do-

main, the learning organization, the learners, the technologies, and the specific requirements of the project. Instructional designers need to identify the differences between expert and novice approaches in the domain field are also important, along with strategies for closing this analytical gap (Winterbottom & Blake, 2008). The research findings are used strategically to design and develop the electronic learning (e-learning) and the related artifacts (both front- and back-end ones).

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Design tools may be methodologies—ways to gather information and contents and to place information in particular sequencing and order. Design tools may be technologies harnessed for the purpose of creating a digital learning object or syllabus or curricular program.

Some of these tools are stand-alone. However, often, the design tools and processes for building e-learning are deeply integrated. For example, digital knowledge structures, taxonomies, and ontologies combine contents and relationships in an integrated way whether these are spatially-oriented contents, websites, digital repositories, or wikis. Two-dimensional flowcharts integrate both information and process. Prototypes are often built as interactive Web structures that simulate the navigation known as “wireframes” (which “materialize” concepts into interactive Web-based structures); these are often iterative and evolved based on preliminary feedback from developmental team members and even potential users (who participate in experiential walkthroughs, usability testing, and heuristic evaluations). Schematics represent contents albeit without images, although these may use simple color and typography on a particular screen (Newman & Landay, 2000). Design templates fully embody the design concepts and navigational structures. Brainstorming tools capture concepts and their interrelationships. Design tools may help designers capture information; conceptualize the data; brainstorm and prioritize design features; create digital contents, and deliver the online learning.

Instructional design is the development of instruction based on specified learning goals and objectives, created based on data and theoretical principles and usability. Instructional design, which lies between the ICT and adult e-learning, requires plenty of improvisation within an environment of constraints or limitations. How an e-learning experience may be designed depends on common e-learning practices in the larger environment and competitive courses or trainings. The laws and policies affecting intellectual

property, accessibility, learner privacy, and other aspects will add more environmental constraints. The applicable pedagogical theories related to that type of e-learning will add another layer of limitations. For example, the learning built for a virtual lab will be informed by a different set of pedagogical theories than the learning built for a socially focused immersive virtual world. The particular values, principles, and practices of a learning domain inform the design. The particular educational institution, company, non-profit organization, or government office or agency’s internal culture also add constraints to an e-learning design. Most specifically, the instructional design depends on the following factors: the targeted learners (their cultures, demographics, languages, learning preferences, and prior learning and work); modern technologies (authoring tools, learning / course management systems, socio-technical spaces, WWW and Internet technologies, and others), and defined project requirements. A design is defined by requirements and constraints. Figure 1: “Instructional Design in an Environment of Constraints” offers a graphic of this environment of constraints.

Digital design tools affect the range and types of ideas that may be captured, and with recent advances, annotations go well beyond the textual to audio, imagistic, and video types of idea captures. These enablements go well beyond pencil and paper designs, which are often limited in terms of navigational structure, design look-and-feel, interactivity, and complexity; however, some designs may start as traditional drafts and evolve into design captures using digital design tools. Also, the emphasis on virtual collaborations and virtual teaming may mean greater synergies between individuals from cross-domain fields. These efforts at assessing the situations and planning are to reduce risks, given the high costs of multimedia development and the permanence of sunk costs and endeavors. These are also to offer evidence for strong designs that may be cutting-

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