Handbook of Research on Engaging Digital Natives in Higher Education Settings

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Chapter 18
Web-Based Course Design Models

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ABSTRACT

This study presents the results obtained from a literature review on Web-based instructional design models in order to form a basis for Web-based course design practices. The pioneering studies in literature mainly focused on the components of Web-based instruction and how to direct learning processes in an interactive environment. The studies that proposed design models for Web-based courses were generally based on literature, so they did not sufficiently reflect how the components of a model would be implemented in design practices. In the relevant literature, studies based on authentic design cases are limited. These studies, in which design efforts and processes are described in narrative form, did not go beyond specific contexts and could not be regarded as models. Consequently, there is a need for more studies that provide guidance on how design instructions should be implemented so as to address and resolve the problems that may be encountered in this process.

INTRODUCTION

Today, many institutions, particularly higher-education institutions, organizations and companies organize Web-based courses and seminars, because such environments provide learning practices that eliminate time and place limitations, reduce education costs, support multimedia and are highly interactive.

Web-based instruction (WBI) presents many opportunities for the benefit of learners and teachers. Many learners who suspended their education or dropped out due to the limitations of the traditional delivery methods find the opportunity to continue their education via WBI, doing so in a way that is more suitable to their lifestyle, and thus join the community called the "new majority" (Ehrmann, 1990). However, the report by Ritchie and Hoffman (1997) stated that detailed analysis should be conducted in order to design teaching for the Web and perform teaching on the Web, and it should be examined how the

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potential of the Web can be used in accordance with the principles of instructional design. In fact, the Internet has long been used as a means to distribute and share information. Efforts and studies in regard to e-learning continue to attract attention worldwide. However, there is a noticeable insufficiency of research on how teaching can be carried out through the Internet or how it can be transferred to the Internet environment (Burke, 2005; Tuzun, 2001). Today, many instructors, particularly those working at higher-education institutions, are directed to move their existing courses to the Web environment. They are, however, forced to go through this transformation through trial-and-error due to a lack of sufficient research in the literature (Koontz, Li, & Compara, 2006; Lightfoot, 2000). Therefore, electronic contents that present the curriculum contents in hierarchical sequence, but aren't blended with the appropriate pedagogy, are produced.

According to Snyder (2009), new theories and models of instructional design are necessary in order to design teaching through use of the new technology and tools provided by the Internet. The study by Foshay and Bergeron (2000) revealed that there is a big difference between the distribution of information and the teaching of information through the Internet. Instructional designers need guidance on how to use these new tools and technologies effectively to develop learning and teaching in different environments (Koontz et al., 2006; Reigeluth, 1999). Additionally, the widespread use of Web-based environments considerably affects our stance in regard to learning strategies (Krämer, 2000).

Significance of the Study

Design models intended as means of guidance in the process of preparing WBI applications give educators and designer a clear pathway. Within the suitable WBI design model, blending the elements of technological and instructional design elements would allow a more effective implementation of the WBI application in a shorter time. In this study, results obtained from a literature review on the design of WBI applications were examined, and approaches, strategies and models proposed in related studies for providing a basis for WBI applications were presented.

Research Questions

The rapid developments in Web technologies and the increasing accessibility of information and communication technology (ICT) have made the potential use of these technologies in instruction a main subject of research. Today many instructors and instructional designers are asked to design online courses or transfer existing programs to distance education (DE). However, in the process of designing courses for the Web environment, educators and instructional designers have difficulty implementing defined pedagogical strategies, and are torn between technology and pedagogy. This yields learning environments in which outdated pedagogies are repeated in a new form, giving rise to the question of how pedagogic strategies should be transferred to DE in e-courses. In conclusion, current issues involve determining the components of instructional design and development processes for Web-based courses, and showing how these components can be integrated to guide Web-based learning practices.

BACKGROUND

Design and Model

Charles Eames (1907-1978), a well-known industrial and graphic designer, defined design as "a plan to arrange elements to reach a specific goal effectively" (Hevner & Chatterjee, 2010). In other words, design is a body of instructions based on information that is transformed into a form from which people can obtain benefit. To put it more simply, it concretizes the instruction

for doing something. When we get to the bottom of design, it is perceived as related to fields such as natural sciences, human and social sciences, social and behavioral sciences, human occupations and services, creative and applied arts, technology, and engineering (Friedmann, 2003). According to Cross (2001), in order to define design it is necessary to be involved in a theoretical discussion on how a scientific discipline is defined, how a discipline that is not scientifically supported would be understood and what design is as a design science or how design science is defined and understood. In that regard, it would be more appropriate to first describe the relationship between science, the theory and the model, after which one would define the design. Science produces theories, which are in turn models that explain conditions (what kinds of things?) or processes (how do they work?) (Faust, 2010). These form the basis for the scientific discourse in which some interrelated rules are formed by society. Design plans the pathways that aim to change the existing situation with the one that is desired or preferable (Simon, 1982). A model is a mental image used to understand a phenomenon that cannot be directly observed or experienced (Dorin, Demmin, & Gabel, 1990). A model is a set of ideas that facilitate an understanding of the realities that belong to the physical world without being the reality itself. Models that help conceptualize a process or a system simplify the complexity of real situations in clusters of general steps that can be applied in many contexts (Gustafson & Branch, 2002).

Comparing Design and Descriptive Theories

Design theories provide pathways to reach certain outcomes (Snyder, 2009). An important issue about design is the comparison of design that is based on practice in other words, implementation to theoretical behavior (Hooker, 2004). Design theory should organize information related to the practice of design. Descriptive theories help us understand how design would be done. However, it is not the same with respect to information on how design would be done.

There are significant differences between design theories and descriptive theories. Descriptive theories are product-oriented; they seek to define how a thing or a process works. However, design theories are goal-oriented, seeking to define the things that should be followed in order to reach a goal. According to Reigeluth (1999), design theories, as opposed to descriptive theories, are more practical and applicable for applied fields such as education. Similarly, Schrum (2005) states that studies of educational technologies should focus on defining certain instructional problems and identifying the most suitable technology applications for the solutions to these problems (cited in Snyder, 2009).

Instructional Design Theory and Model

Berger and Kam (1996) define instructional design as "the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction." While this is the process of analyzing learning needs and objectives, and developing the instructional system to meet those needs, it also includes the development of instructional activities and materials as well as the evaluation of all teacher and learner activities. According to Doğan (1997), instructional design is a process of choosing the suitable instructional environment (e.g., tools, materials, equipment, etc.), and strategies and methods to develop desired outcomes/behaviors in students with regard to a certain group of students and content. The term "instructional design" refers to a systematic, reflective process that transforms learning and teaching principals into certain plans for instructional materials, activities, informa-

tion resources and evaluation (Smith & Ragan, 2005). As stated by Mager (1984), the duty of an instructional designer is to find answers for the following questions:

1. Where will we reach? (What are the instructional goals?)
2. How do we reach that point? (What are the instructional strategy and the tool?)
3. How do we know we have reached that point? (How should the evaluation be? How should the instructional materials be evaluated and reorganized?)

Instructional design theories are those that provide clear guidance on the best ways to help individuals in their learning and development (Reigeluth, 1999). These theories guide the task of designing learning experiences. The objective of an instructional design theory is to achieve the emergence of the desired outcomes with the highest possibility. Unlike the theories in many fields, which are usually "descriptive," instructional design theories, similar to learning and curriculum theories, have different characteristics from their descriptive counterparts. Reigeluth (1999) explains the characteristics of design theories:

- They are design-oriented (i.e., they focus on achieving learning and development goals).
- They identify the situations where instructional methods (i.e., ways of supporting and facilitating learning) will and will not be used.
- Instructional methods can be separated into more detailed components.
- Design theory methods are probabilistic as opposed to deterministic.

Regarding instructional design models, they are visual representatives of instructional design processes, and well-recognized with names that are commonly known (e.g., ADDIE model, Dick and Carey model, Kemp model, ICARE model and ASSURE model) (Thompkins, 2007). An instructional design model is actually a point of view regarding how individuals learn. It is also a guide for the instruction that would be prepared by the instructional designer. In other words, it guides him/her on how the instruction should be organized.

Distance Education and Web-Based Technologies

Distance education (DE), or distance learning, is the process of performing the teaching and learning activities in environments where the teacher and the learner are in different physical places and times (Williams, Paprock, & Covington, 1999). While some of the DE definitions focus on learning being carried out asynchronously (Keegan, 1996), some emphasize learners and the teacher being in different times and places (Eastmond, 1998; Moore & Kearsley, 1996; Williams et al., 1999) while others point out supporting teaching and learning activities with various technical media devices (Locatis & Weisburg, 1997).

In the traditional face-to-face educational system, the instructor allocates a certain time to students in the learning environment, whereby the learners interact with each other and with the instructor and then receive instant feedback. At the same time, learning and teaching occur in a certain time and at a certain place. However, it is not quite possible for the learners to have such an interaction outside the classroom. DE has the potential of eliminating such limitations of face-to-face education.

DE emerged based on mail correspondence, in parallel with today's developing instructional technologies, and therefore it continues with many different tools that can be used over the Internet (e.g., Web pages, audio and video chat, video conference systems and virtual class software) and new ways of communication that society has adopted. Particularly due to the spread of computer use, DE

has recently gained great momentum due to the flexibility of the Internet that crosses boundaries and the interaction opportunities that it brings.

WBI can be defined as the instructional model in which instruction is carried out independently of time and place, and computers are used as a tool of teaching and presenting for research and communication purposes. The Web technology forms electronic environments whereby individuals and groups share elements such as text, sound, graphic and video by communicating via computers. Enabling the emergence of learning anywhere and anytime, WBI has brought flexibility and functionality to the DE system (Tipton, Kovalik, & Shoffner, 1998).

METHODOLOGY

The literature review, is a form of qualitative research, was pursued in this chapter. The primary aim of a literature review is to critically analyze and summarize research and non-research literature related to a specific topic (Hart, 1998). This study is based on a systematic literature review and follows the steps in literature analysis determined by Fraenkel and Wallen (2006):

- Determining the research problems,
- Formulating keywords or research statements that deal directly with research problems, and determining criteria for inclusion and exclusion,
- Searching the general references (indexes) to access the relevant primary resources,
- Evaluating the search results, identifying the relevant studies from other studies that suit the context of this study, analyzing them in detail and summarizing the results.

This chapter presents results obtained from a review of the literature on Web-based instructional design and the approaches, strategies and models proposed in the relevant studies. Within the scope of the study, the key phrases "Web-based instructional design" OR "online course-design model" OR "Web-based course" AND "design model" were searched via Web of Science (WoS), Ebrary, Ebscohost, Eric and Scopus. The study covers the period from 1995 to 2014 to understand changes in distance learning approaches and practices. The literature review included books, book chapters, essays and conference proceedings to have an opinion about different perspectives to the approaches and models in Web-based learning design. The primary criterion for the works to be selected for detailed review from all the research identified by the literature review was their inclusion of approaches, strategies or models for the design of Web-based courses. In this respect, the relevant nine studies that provide guidance on developing Web-based courses were selected *cross-sectionally* and examined in detail in accordance with the context of this study.

FINDINGS

Among the studies on the use of the Web technologies for instructional purposes and instructional design for implementation via the Web, Reeves and Reeves (1997), Ritchie and Hoffman (1997) and Duchastel (1996) are the pioneering examples in the literature.

Reeves and Reeves (1997) stated that, before conducting research on WBI, the dimensions of interactive learning over the Web should be identified. They added that there is then a need to develop, implement and evaluate the analysis of the critical dimensions of WBI. Based on that view, Reeves and Reeves (1997) developed a model for interactive WBI and learning system as a result of the studies they conducted on instructional technologies, cognitive domains and adult learning. The model consisted of ten components, which they called dimensions for learning environments on the Web. These dimensions were (1) pedagogical philosophy, (2) learning theory, (3) goal

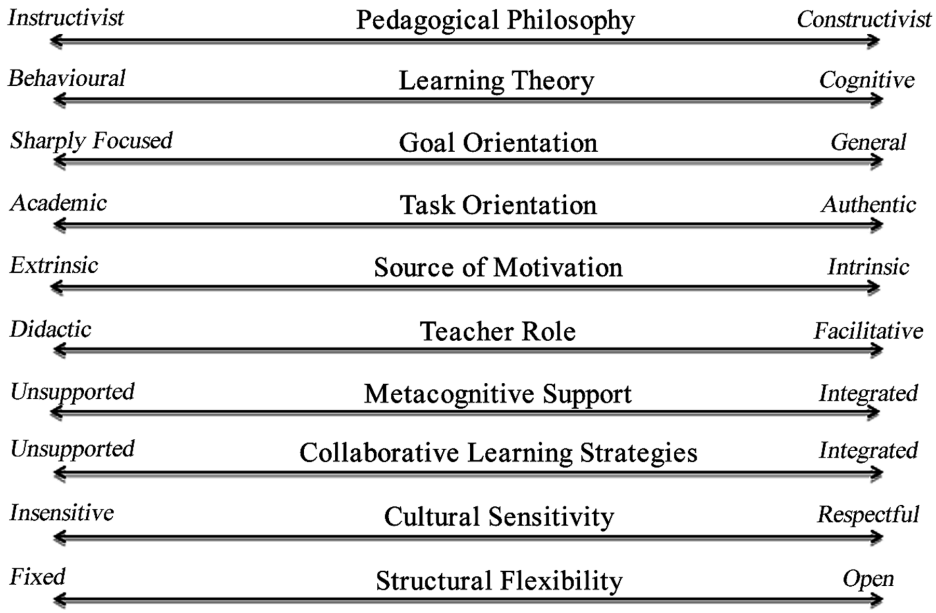
orientation, (4) task orientation, (5) motivational element, (6) teacher's role, (7) meta-cognitive support, (8) cooperative learning strategies, (9) cultural sensitivity and (10) structural flexibility. Each of these ten dimensions was considered as a process with two edges opposite to each other (see Figure 1).

Ritchie and Hoffman's (1997) WBI model adapts the principles of traditional instructional design to WBI. These principles are to motivate the learner; explain what is to be learned (informing about the goal); facilitate the learning in the process of remembering the prior knowledge; present the instructional materials and ensure the learner's active participation; guide the learner and providing feedback; and test, enhance or improve the process (Ritchie & Hoffman, 1997). These principles are similar to Gagne's nine-step events of instruction.

Duchastel's (1996) WBI model brought innovative changes to the traditional model of instruction. In the WBI model, various functions were emphasized. Being different from traditional instruction, these functions include carrying out the instruction within the goals set by the students instead of the contents that must be learned, evaluating the learners through authentic tasks as opposed to standardized tests, supporting group work as opposed to individual work, producing knowledge instead of communicating it, and creating global learning communities in place of programs limited to local interactions.

Although Reeves and Reeves (1997), Ritchie and Hoffman (1997), and Duchastel (1996) gathered the useful components for a successful WBI application within a framework, the models they proposed did not include information on what should be done during the WBI design process and when it should take place. For that reason it is difficult to describe these models as a design model. However, in the literature there are studies that are guiding in terms of redesigning or reorganizing an existing course in which the instruction is carried out traditionally to be provided through

Figure 1. Reeves and Reeves' (1997) WBI model. The figure was created from interactive learning dimensions for WBI identified by Reeves and Reeves (1997)



the WBI. Among such studies, those of Tuzun (2001), Neuhauser (2004), Alvarez, Blair, Monske and Wolf (2005), Power (2009), Zhou and Zhou (2009) and Balci (2010) are noteworthy.

Tuzun's study (2001) is one of the pioneering related to this issue. It presents a pathway to educators who want to transfer their courses to the Web-based format. In the study, the existing models of instructional design toward the WBI in the literature were examined, and, based on the limitations revealed, a model for transferring courses to the Web environment was proposed. The findings in the literature were categorized as to how to begin the transfer process; student and teacher support; issues of design; interpersonal interaction; and evaluation. The researcher, who was in the design team, worked on the transfer of an existing course titled "Instructional Technology Foundations I" with the code R511 taught in the Department of Instructional Systems Technology at Indiana University. He successfully applied this model in order to transfer the course R511 to the Web with the design team and then finalized the model by reflecting his experiences in the design process to his model. For that reason the justification for the model can be argued to be the findings in the literature related to this issue as well as the researcher's experience in Web-based course design. The proposed design model consists of nine phases and 39 sub-steps (see Table 1).

Although Tuzun (2001) recommended following the steps hierarchically in the model he proposed, the sub-steps in each phase can be skipped, depending on the course being designed, the environment in which it is taught as well as the characteristics of the instructor and the students. In that respect the model shows a flexible structure. Despite the fact that the model seems to have been designed for an institutional e-learning program, it also serves to guide to educators who

Table 1. The model Tuzun (2001) proposed for transferring existing courses to the Web-based environment

Phase One: Pre WBI Efforts
• Infuse the technology into the course prior to WBI. This may be in the form of word processing use, spreadsheet use, e-mail use, Web use, and etc. • Mirror closely the content, structure and requirements of the traditional program. There must be equity between on-site course and WBI course in terms of academic rigor. • Model the existing Web-based courses on the Internet. The existing Web-based courses may provide the designers ideas on this issue. • For departmental programs (such as a master's degree program), start with core courses and add other courses by time.
Phase Two: Create a Resource Center to Support Online Course Development Efforts.
• Create a permanent technical support / technical assistance team. • Create a permanent instructional design team. • Provide technology training such as on-campus and Web-based workshops to both faculty and their students. The technology used must be transparent to both faculty and students during the implementation of WBI. • Provide technology resources. Set up the required hardware infrastructure like Web server, mail server, real media server etc. and provide database management, Web design and graphics software. Provide facility for recording, digitizing, and editing audio and video files.
Phase Three: Make an Analysis
• Identify requirements. • Make a learner analysis. Possible data sources are learner introductions or self-reports done for prior courses, learner preferences expressed in prior course evaluations, and instructors' impressions of the salient characteristics of the course. • Analyze recommendations made by the stakeholders (designers, instructors, administrators, and etc.) of previous WBI courses offered in the institution (i.e., at the department, at the university, and etc.). • Analyze the course being converted. • Analyze the existing course management software (i.e., SiteScape, WebCT, BlackBoard, Oncourse, and etc.) and select the most appropriate one aligned with course content, and course activities. • Decide on pedagogy (Problem based, group work, and etc.).

continued on following page

Table 1. Continued

Phase Four: Identify Instructional Strategies. Provide Students Ways in which they can Practice the Knowledge from WBI Course in Meaningful Ways.
• Make the student an active participant in the learning process. • Support multiple learning styles. • Provide problem-solving activities.
Phase Five: Provide a Well Planned Administrative Structure.
• Provide secretarial personnel. • Provide clerical personnel. • Provide para-professional personnel.
Phase Six: Design and Develop the WBI.
• Design team members should have a shared vision of how this conversion project has to come together. • Organize the development efforts (Content materials, Instructional design documentation, Interface design documentation, Multimedia resources, Sample documentation, Project management documentation). • Organize the design and development team around the roles (Project manager, Technology manager, Documentation manager, Content manager, Regular member etc.). • Meet periodically with the client to make major decisions and to update them on the design progress. • Prepare a general template and use it for each of the course modules/weeks/structure. • Balance the residential content of the course by reducing/adding the content. • Create Web-based course Website (Homepage, Detailed course syllabus, Expectations from students, Deadlines, Grading criteria, Course objectives, Course procedures and policies, Course schedule, Links to course content, Resources etc.). • Supplement course content with multimedia components. • Be consistent throughout the Website in terms of format (i.e., same PowerPoint format) and phrasing. • Provide documentation to the course instructor.
Phase Seven: Eliminate Technological Barriers as much as Possible before the Beginning of the Actual WBI Course.
• Support and train the students for online courses. • Support and train the instructors.
Phase Eight: Assess the Students
• Put emphasis on application rather than content acquisition during the assessment. • Provide formative evaluation techniques. • Provide summative evaluation techniques. • Provide grades with password protection so that students can access only to their own grades. • Provide timely feedback on all kinds of assignments.
Phase Nine: Evaluate the WBI.
• Provide ongoing formative evaluation. Keep the features that are deemed useful, eliminate others or modify them. • Calculate potential savings by converting the courses to WBI mode, and Return on Investment (ROI).

want to teach their courses through DE or with Web support.

Neuhauser (2004) conducted a study on the applicability of the Capability Maturity Models (CMM), which was first incorporated in software development processes but was then used in management, human resources and technology areas to develop job performance of organizations to online course design processes. The maturity models were found to be useful in areas that require process and high-performance management. These models give individuals and organizations the opportunity to conduct self-evaluation based on certain criteria and to develop their operations/processes in various respects. Maturity models are typically structured in five steps. Each maturity level comprises a basis for operations/processes that are improved in order to reach the level with new competencies from the lower level.

According to Neuhauser (2004), the faculties that passed from face-to-face education to online learning tend to include technology gradually. While implementing online instruction, these faculties become willing to add media and its

components, and try to enhance the quality of courses. However, when it comes to which practice and step would be tried after another, this process becomes complex. Neuhauser (2004) argues that institutes, faculties and programs can produce more effective online course-design practices and applications as they use online structures, metrics and models. In that sense, online maturity models can be used as tools that support effective applications and enhance the quality of online course design. The Online Course Design Maturity Model (OCDMM), which Neuhauser (2004) proposed based on CMM developed for software consists of five maturity levels, each of which was formed using "the best practices" in the literature and had a certain purpose (see Table 2).

Table 2. Online course design maturity model (Neuhauser, 2004)

	Key Process Areas				
	Components and Appearance	**Individualized and Personal**	**Use of Technology**	**Socialization and Interactivity**	**Assessment**
Level 5: Integrated Best Practices	• Develops learning objects • Engaging • Effortless navigation • Intuitive • Processes integrated and linked • Multiple sensory input	• Resources supporting learning preferences • Interactive learning aids • Electronic mentors • Sensitive to cultural differences • Self-regulated learning • Learning objects matched to student needs & interests • Learning preference awareness	• Extensive generation and use of Web links and resources • Choices on path, practice, community • Provides integration of processes • Blogs	• Community of learners • Collaborative problem solving & critical thinking • Social presence • Alignment of learning preferences to practices	• Multiple assessments for student performance and course improvement • Feedback for effective self-learning • Multiple options for expressing knowledge • Learning preference
Level 4: Strategizing	• Learning objects to meet course goals • Well-structured content • Audio, video and/or animation • Multimedia • Attention getting	• Learner-instructor partnership • Learner-controlled links • Private e-mail faculty-student contact	Students filter, integrate, and disseminate knowledge from Web resources	• Student-generated discussion • Student facilitation of task & maintenance of groups • Collaborative tools used • Sensitive to student needs	• Versatility of projects • Peer review of work • Student-instructor readiness for online work
Level 3: Awakening	• Lectures integrated with links and discussion • PowerPoints & HTML	• Primarily instructor controlled • Private e-mail with students	• Discovery of Web resources • Faculty and students comfortable with use of technology	• Instructor-controlled discussions • Sensitive to student participation • Frequent contact	• Test pools • Papers from student to instructor • Student access to CMS
Level 2: Exploring	• Notes online • Blended course • Colors & fonts	Instructor controlled	• Search engines, library databases • E-mail	If used, discussions are instructor-led	Papers through e-mail
Level 1: Initial	• Syllabus • Course information • All text	Limited access, instructor controlled	E-mail; minimal use of CMS	E-mail	None online

1. **Initial:** Students in face-to-face education are given ease of communication through e-mail. They access information such as syllabus, course outcomes and teaching profile through content management systems (CMS), like Blackboard. However, most of the instruction (and assessment) is face-to-face.
2. **Exploring:** Looking for and exploring advanced ways of communication between the learner and the instructor. Students are provided with texts, further discussions and Web-based information through e-mail between face-to-face sessions.
3. **Awakening***:* Developing learning outcomes. The students and the instructor realize the opportunities of online instruction. Unlike the previous step, the instructors are mostly interested in forming online environments as opposed to transferring face-to-face activities to the online environment. The students and the instructor act more freely in the online environment. The instructor provides students with the guidance on what is expected from them in online courses, how to think in the online environment, how to write, how to manage time and how to use technology more easily.
4. **Strategizing***:* The instructors develop a philosophical approach from their role as the teacher toward a role of facilitating learning in the online environment. They start using Sharable Content Objects (SCOs), which are also referred to as learning objects. For higher-quality learning and student assessment, strategies toward multimedia, Web resources, student-faculty cooperation and group learning are determined. Unlike the previous step, the discussions are initiated by the students but not the instructor. The efforts to form an online community are observed. Learning is generally affected by social interactions, interpersonal relationships and communication.
5. **Integrating Best Practices***:* Technology is benefited at the maximum level by integrating the best practices in the other steps to form an instructional environment that is pedagogically effective, can be easily managed by the students, is open to differing learning styles and student needs, motivating, and sensitive to the time-and-place limitations of students and instructors.

According to Neuhauser (2004), the best practices alone aren't sufficient for an effective e-course, and the learning principles that are basically effective must be incorporated. By providing course designers with an increasing alignment among learning principles, technology, student and faculty goals, performance and changing needs, the OCDMM ensures an integrated system that enables developing courses with the best practices and presents the best practices in steps to the faculty members. Because the OCDMM has a hierarchical and kinesthetic structure, it provides a pathway to those new to the online learning worlds by identifying certain criteria for an effective e-course, doing so through the development of existing online courses. However, although it seems to be geared toward e-course design processes, the OCDMM actually focuses on e-course characteristics. Moreover, although which components should be possessed at which maturity level of an e-course is given in this model, the question of how these components would be organized has not been examined thoroughly.

Alvarez et al. (2005) stated that placing technology in the existing pedagogy requires an expertise that instructors usually lack. Moreover, it is pointed out that, despite the amount of guidance provided, the number and variety of workshops organized and sessions with broad participation, the instructors' use of the new knowledge they have gained is generally limited. Indicating that the problems were due to reasons such as workload, insufficient encouragement and rewards for technology-based learning but not adopting

student-centered pedagogies in which technology is potentially supportive, the researcher conducted a study in order to have an in-depth examination of instructors' concerns regarding online courses and to take a general snapshot of the difficulties experienced in the process. They also tested the applicability of a team model they had proposed in order to reduce the gap between technological support and pedagogical implementation in online course design. In that study, the design events experienced by two different design teams consisting of two doctoral students and two instructors applying the team model for an online course design within an instructional technology support program called "Digital Language and Literacy" at the English Department of Ohio State University, in accordance with seven instructional principles proposed by Chickering and Gamson (1987) for undergraduate programs, were examined in a questioning way based on narrative evidence. The team model gathers graduate students and instructors with an understanding, unlike the conventional guiding in online course design events. Given that approach, in which higher-education students are experienced in technical support and instructors are experienced in pedagogical strategies, learning communities are formed between students and instructors, thereby encouraging the processes of sharing and interaction between them. In the model, higher-education students act as a bridge and convey the experiences they have with an instructor to other instructors with whom they would work in the future. After the authentic design events, the researchers summarized the experiences and recommendations of the designers (students) and field experts (instructors) for educators and instructional designers in the design of their courses for the Web environment, as follows:

- What the instructor wants to achieve pedagogically and technologically should be determined, e.g., formal and informal needs analysis, and interviewing instructors to identify their knowledge of technology and attitudes toward technology.
- The instructional elements to be adopted (e.g., philosophy of education) while performing online instruction should be discussed with the instructor.
- Only the instructors' and graduate students' technological competencies should be evaluated. In that regard, a professional development plan, including the instructors' technology literacy, what they need to be online educators and their plans to reach this level, can be achieved through a document or a framework.
- The best technological education model that would enable the instructors to work independently when necessary should be determined. The instructors need multiple models and multiple access points, including traditional group workshops, office training with an advisor or online education model to develop their technology literacy.
- As in their revising pedagogical materials and strategies in the face-to-face environment, the instructors should learn from their mistakes. In this way presentations, communication and assessment strategies are reemphasized.
- Deficiencies should be admitted. Although it seems risky for the teacher to admit lack of knowledge, it has been found to be beneficial for students in terms of sharing responsibility for student achievement.
- Resources and facilities of the university should be evaluated in order to determine which kind of technical and instructional support would be suitable. Instructors should be provided with technological professional development depending on their teaching programs and workloads.
- The instructors should be given the opportunity to present the results of their online

instruction efforts, online course design efforts should be encouraged, and these innovations should be considered in terms of assignment, promotion and qualification, e.g., discussing the workload with respect to the campus and the discipline related to online instruction.

- The sustainability of online education should be ensured by both encouraging the instructors to use technology in their other courses and continuously take their opinions on technology and its pedagogical effects. While supporting and encouraging the team development model, at some point the instructors should decide on the digital tools that would best match the syllabus and the pedagogy "on their own."

To ensure the success of a model that is unique to academic units (such as the team model), the barrier between the instructor and the students should be removed. Moreover, within a hierarchy in which there is a traditional student-teacher relationship and the instructor has an advisory role, it is very difficult to bring graduate students and instructors together. The instructors may object to receiving support for online course design and reorganizing their student-teacher relationships for this. Additionally, the graduate students' command of the resources, their access to these resources and providing high-cost software and hardware are other important issues. Furthermore, the instructors and students should be supported in the context of the faculty and institute. Other issues that make it difficult to apply this model include the need for the faculty administration to develop assessment criteria in terms of the instructor (depending on the online learning environments) and allot the graduate students free working hours for online course design.

Power (2009) highlighted the lack of suitable design models that would provide guidance to the instructors to move from the paradigm of instruction at campus to the online learning paradigm. Arguing that a design model that is easily comprehensible and applicable should be adopted to implement online teaching in traditional educational institutions, the researcher also indicated that faculties do not usually spend much time giving existing courses in the online environment. Helping university instructors design their Web-based courses as an instructional designer, Power (2009) recorded his experiences on this issue in a journal for three years, arranged his design experiences in ten different case studies and compiled them in a book. Departing from real design events instead of publications that generally proposed theoretical models related to instructional design, Power (2009) included theoretically supportive elements after practices in his study. Focusing on "what design is" and "what it is like" in detailed case studies, he summarized his approach or model "instructor-centered application" for the redesign of existing courses in the online environment in six steps: 1) analysis (e.g., student needs analysis, program requirements, instructor requests, faculty's interests, etc.); 2) forming the modules (e.g., resource materials related to the course, readings, etc.); 3) developing the instructional activities (in-class activities); 4) developing learner support activities (individualized extra resources toward the purpose of formative assessment); 5) developing assessment tools (various measurement tools for final assessment); and 6) issues of on-going revisions (a request list for components to be developed later). Since the individual to design the existing course for the Web-based DE is considered to be the instructor of the course in the model, characteristically it requires close interaction between the subject matter expert (the instructor) and the instructional designer.

The SE-ID (Software Engineering-Instructional Design) model combines the software development steps and instructional design process for the

design of DE systems (Zhou & Zhou, 2009). The SE-ID model consists of five steps based on the waterfall model: (1) the analysis step, in which learner goals, characteristics and Web page contents are analyzed; (2) the design step, in which learning resources, media, guidance and alternative information are prepared; (3) the production (integration) step, in which development tools are chosen and media resources are gathered; (4) the debugging and evaluation step, in which technical tests and special evaluation, including learner evaluation, are implemented; and (5) the publishing processes.

In addition to Tuzun (2001), Neuhauser (2004), Alvarez et al. (2005), Zhou and Zhou (2009), and Power (2009); Balci (2010) focused on the program design process related to the preparation of WBI environments. According to Balci (2010), who argues that the preparation of Web-based DE programs is a time-consuming, troublesome process, in the design of e-learning environments the learners' high-order thinking skills should be developed, learners should be put into the center of the design and their active participation in the learning environment should be enabled. Moreover, goals that are consistent with those in traditional education should be adopted, learners' interaction with each other and the instructor of the course should be supported, and students, who likely come from different geographical regions, should be brought together around a virtual learning environment. There are six phases that Balci (2010) proposes for the design of e-learning programs: 1) the decision-making process; 2) the program-development process; 3) the preparation of management, support and technical structures; 4) program testing; 5) the implementation and updating of the e-learning program; and 6) the program management process. Beyond the design of a single course, the design of an overall e-learning program consisting of different courses was addressed in the study.

SOLUTIONS AND RECOMMENDATIONS

Within the scope of this study, the literature resources discussed toward Web-based course design are summarized in Table 3. In early studies regarding WBI, the focus was on how to direct learning processes in an interactive environment as opposed to how the design would be performed. The approaches that emerged by adapting the classical instructional design process to the Web environment do not reflect the information of how the design process would be implemented. The studies of Tuzun (2001) and Balci (2010) are directed toward the preparation of a DE program as opposed to a course, and they list the steps of the design process in general terms. Although these studies offer guidance for educators who want to

Table 3. Studies on Web-based course design

Authors	Research Areas
Reeves ve Reeves (1997), Ritchie and Hoffman (1997), Duchastel (1996)	Adapting WBI components and ID principles to the Web environment.
Tuzun (2001), Balcı (2010)	Stages of converting existing higher education curriculums into DE programs.
Neuhauser (2004)	Integration of DE media tools into existing courses.
Alvarez et al. (2005), Power (2009)	Converting process of existing course into online environment by means of collaboration with instructional designers and subject matter experts.
Zhou and Zhou (2009)	Online course design based on blending software development phases and instructional design components.

move their courses to the Internet environment, they do not include information on how the design steps would be implemented. Neither do they sufficiently address the problems that can be encountered in the process. Because Neuhauser's (2004) OCDMM model is generally oriented towards the integration of technology into existing courses as opposed to producing DE courses, it does not provide direct guidance for the design of Web-based courses. In their studies based on unique design experiences in authentic design events, Alvarez et al. (2005) and Power (2009) present the process of redesigning the existing courses, which were previously taught face-to-face, in the Web environment based on narrative evidence. However, the experiences in those studies cannot go beyond situational contexts to serve as models. In the SE-ID model proposed by Zhou and Zhou (2009), the classical software development steps are adapted to the design process of DE courses. In this model, the DE course preparation process consists of electronic page arrangements in which network technologies and instructional methods are combined. The downside of this model is that it focuses mostly on software design elements as opposed to pedagogical structures in the DE processes, and therefore it doesn't sufficiently address the process of integrating the network technologies with pedagogical structures.

The literature contains few studies to show that DE applications in which instruction is given in the Web environment are as effective as their traditional counterparts in many areas, including health sciences (Attardi & Rogers, 2015). Moreover, the most important concern related to the DE applications in which the student and the teacher are separated in the temporal and spatial sense still seems to be the interaction element. The social dimension of learning in online courses has not yet been addressed sufficiently (Moallem, 2003). When considered from a historical perspective, the increasing concern in the social dimension of learning actually coincides with the massive increase in the use of network learning environments (Nicol, Minty, & Sinclair, 2003). Despite the convenience of communication and sharing tools (e-mail, discussion groups, instant chat, forum, wiki, blogs, videoconference, whiteboard, etc.), which are increasingly diverse in DE systems, they aren't necessarily used. Studies show that the social aspects related to online learning are inescapably different from the face-to-face learning (Crook, 2002; Pincas, 2000). According to Nicol et al. (2003), in order for educators to fully benefit from the affordance of Web technologies they must gain more insight into the social context of these technologies in online learning. Additionally, it is important for practitioners to comprehend that, from the social viewpoint, e-learning and face-to-face learning are qualitatively different.

The literature contains design models that place the element of interaction related to online course design at the center of the process. Moallem (2003) produced a model oriented toward online course design based on an interaction model, which combines four types of support (community, peer, cognitive and emotional) in a specific activity context. Moallem's (2003) model, which approaches interaction from a social-constructivist understanding, presents an online collaborative learning-oriented design and a theoretical framework to form a development model. The researcher tested the design components within the scope of a graduate course called "Instructional Systems Design: Theories and Research," taught over the Internet. Significant outcomes were yielded as the result of the design, development and implementation process and the evaluation of that interactive online course. Accordingly, the study indicated that the course-design model was an effective factor in forming an online interactive environment. Additionally, it was concluded that pedagogical dimension as opposed to the technological dimension should be emphasized with respect to interactive and collaborative courses. The model confirmed that design factors and characteristics are mutually related. Additionally, the task structure and

organization, being an element that affects the nature and quality of student interaction, drew the most attention. It was indicated that, in learning situations where structuring knowledge through discussion and dialogue would be encouraged, collaborative learning tasks should be carefully designed and developed. The nature and type of the collaborative task were found to affect students' interaction quality. It was also emphasized that students who take online interactive courses need time in which to adapt to the new technology. Increasing individual tasks (responsibilities) and group activities was observed to be suitable for increasing the quality of interaction and encouraging student participation. However, the question of how novice students and educators would fit into the differences in the social dimensions of online learning and how such differences would affect learning should be examined.

Nicol et al. (2003) examined the effect of online tools used on the social aspects of learning as well as learners' interactions and communication with each other and the instructor. The matter of students who do not have prior experience with online learning, and the problems that emerge in the instructional process that is transferred from face-to-face to the online learning environment, were also addressed. Accordingly, the deficiency of aural and visual clues in the online environment, and the asynchronicity and dependence on written texts, lead the new interaction and discourse forms. In the online learning environments where social observation opportunities in learning are limited, it is difficult for the instructor to get feedback related to peer and learner-teacher interaction. Online learning gives the teacher less control over the social dimension of student learning in comparison with face-to-face learning. To enhance the level of participation to the online environment, some indicators of online interaction (e.g., participation in the discussion environment, number of messages, time stayed online, etc.) can be used. This situation brings forth the question of "which criteria (participation level or other criteria about contribution quality) should be used to evaluate participation." However, the interaction in the online environment has certain advantages. It is stated that online dialogue, particularly peer dialogue, which leaves a more apparent and permanent social impression, has a positive effect on student learning. The reviewability and reusability of dialogue increase learning and reduce the teacher's workload (Mayes, Dineen, McKendree, & Lee, 2002). Although they are criticized in terms of quality, online learning courses have certain advantage as compared to traditional environments, where feedback is provided in real time. The reflection process is longer in the online environment, and the interactions can be recorded for later examination.

Recently, Massive Open Online Courses (MOOCs) have become widely known as a relatively new form of online learning (Margaryan, Bianco, & Littlejohn, 2015). In fact, MOOCs are the evolving extension of the open online learning ecosystem to cover a spectrum of course design from open online course materials to the centralized and structured learning methods on privatized digital platforms (Veletsianos & Shepherdson, 2015). After MIT made all its course materials freely available online in 2001, MOOCs were created as a new phase of the use of the Internet in distance learning in 2008 (Fini, 2009). The MOOCs suggest a potential way of transferring online learning to higher education institutions (MacDonald & Ahern, 2015). They also provide a free online learning environment, which is open to everyone, and attract many more users than the traditional online learning. MOOCs based on open educational resources are a new way to access quality education with special benefit for people who live in remote or disadvantaged places. However, while they serve the purpose of filling the digital gap in the age of information thanks to their accessibility, they have also drawbacks towards individual side of mass education environments due to the low rates of course completion for a majority of the students. Accordingly, the course

completion levels in MOOC classes is very low compared to the traditional online learning despite rising interest in them (Alraimi, Zo, & Ciganek, 2015; Lee, Choi, & Kim, 2013). On average, less than 10% of the students in a MOOC complete the course (Jordan, 2014). Course completion rates may not be the best criterion to assess learning in MOOCs, but these low rates bring raise about their effectiveness. The rising interest of researchers in MOOCs is still focused on MOOCs and their use (Liyanagunawardena, Adams, & Williams, 2013). However, studies of networked learning and learning participation have shown that digital and online learning is complicated (Veletsianos & Shepherdson, 2015). To summarize, the low rates of course completion in MOOCs indicate that their course designs should be revised. Although MOOCs are a successful package in terms of content organization and the presentation of course materials, such as xMOOCs based on instructivist pedagogy and cMOOCs based on connectivist approach, most of them obviously have low-quality instructional design (Margaryan et al., 2015). Researchers do not pay enough attention to the pedagogical side of MOOCs. MOOCs eliminated physical barriers to learning, but the psychological barriers remain. They have a great potential to offer world-wide high-quality education in an online and structured form (Diver & Martinez, 2015). However, the pedagogical state of context-specific open courses should not be ignored, in order to evaluate of new opportunities and developments in MOOC practices in the most beneficial way. As well as the motivational, emotional and intellectual commitments of MOOC learners, a number of psychological difficulties related to the improvement and use of MOOCs along with the skills users need should also be discussed. Currently, the Web 2.0 technologies, particularly social networks, are important factors that help university students adapt to ICTs (Baran & Ata, 2013). Social networks spread and were widely accepted among university students. For this reason, using social networks in online learning very effectively increases interaction and collaboration between teachers and students. Integrating social networks into e-learning allows students and teachers to interact with each other, increases knowledge sharing and helps them control their own learning experiences (Rodrigues, Sabino &, Zhou, 2010). Similarly, the spread of mobile technologies, accessing distance learning systems on mobile platforms and specific qualities of these platforms require integration with distance learning systems.

Web-based learning not only forms a powerful base for DE experiences but is also a new paradigm of education in a broad spectrum ranging from new learning models to traditional learning paradigms (Chen, 2007; Condie & Livingston, 2007; Sun, Tsai, Finger, Chen, & Yeh, 2008). Today, due to the time-and-place limitations of traditional teaching methods, increasing numbers of academic institutions are transferring their instructional programs to the Web environment. However, in the process of structuring courses in the Web environment, designers and educators have difficulty reflecting their pedagogical strategies to the Web environment, and this situation usually means that electronic content is not adequately blended with the appropriate pedagogy. Many instructors who face the task of online course design are trapped between technology and pedagogy (Herrington, Oliver, & Herrington, 2007). This situation generally results in learning environments in which outdated pedagogies are simply repeated in a new form (i.e., with technology) (Conole, Dyke, Oliver, & Seale, 2004). This situation brings up the questions of how pedagogic structures would be transferred to DE or how they would fit into DE in producing e-courses. The present study has significant potential for Web-based course design practices. Within the scope of the study, the Web-based course design models in the literature were examined to form a basis for making existing courses Web-based and providing guidance

to instructional designers. However, it is not quite possible for studies that develop and test design theories or models to be successful with the first try. To achieve this goal, studies that test models and iterative processes are needed. Studies that focus on course design events, in which existing models are adopted, would help reveal the strengths and weaknesses of these models, present different ways to develop them and identify their advantages in different situations.

FUTURE RESEARCH DIRECTIONS

Although there are certain design guidelines to help the production of educational environments, how these guidelines will be concretized in the e-learning environment is an important issue (Herrington, Reeves, & Oliver, 2010). The online course design process includes many other processes and components that are also relevant to classical learning design. However, this brings about a series of situations which require using different approaches unique to online courses. As online learning improves, students and instructors use different tools and distribution systems (Alexander, 2006; Grosseck, 2009). In addition to the DE technologies' changing with rapid technological developments, personal traits and needs which are altered by the digital era make different instructional arrangements in the learning environment necessary. This situation increases the need for authentic studies focused on the development of new design models for changing learning design practices. Moreover, if design practices are combined with the needs and expectations of the generations that are called "digital natives," who grew up in close relationships with technology, think differently and have different social characteristics, technological skills and learning preferences, it will contribute to the improvement of the learning outcomes generated by both distance and face-to-face education.

CONCLUSION

A review of the literature revealed that the studies that propose design models for Web-based courses are generally based on the literature itself. The pioneering studies of WBI focused mainly on identifying the components of successful WBI and how to shape the learning processes in the interactive environment. Although these studies provide guidance on what should be done in the process of WBI design/development, they do not include information on how design instructions would be implemented. The studies based on authentic design events mostly describe the design process instead of proposing a model. Studies that recommend a design route or model for Web-based courses were created using classical software development processes to the DE course design. These studies cannot address the problems that can be encountered in this process, nor can they be solutions for such problems. For that reason there is a need for practice-oriented studies related to the preparation of Web-based courses. Consequently, although there are studies in the literature of how the process of Web-based instructional design should be conducted, there is a need for more studies that provide guidance on how design instructions should be implemented, that address the problems that may be encountered in this process, and that show how to resolve these problems.

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KEY TERMS AND DEFINITIONS

Design: A plan to arrange elements to reach a specific goal effectively. This is the planning of route maps that aim to replace the current situation with a preferable one.

Distance Education: Distance education or distance learning is the process of performing the teaching and learning activities in environments where the teacher and the learner are in different physical places and times.

Instructional Design: This is the process that includes the systematic development of instructional elements using teaching and learning theories to maintain the quality of education.

Instructional Design Model: The visual representations of the instructional design processes.

Instructional Design Theory: Instructional design theories provide guidelines for the ways to support learning and development better.

Model: Models are designs that are not real themselves, but facilitate a better understanding of phenomena in the physical world. Models facilitate the conceptualization of a process or system by simplifying the complexity of real situations and classifying them in groups of general steps that can be applied to many different contexts.

Massive Open Online Courses: An open access Web-based distance learning program that is designed for the participation of large numbers of geographically dispersed participants.

Web-Based Instruction: Web-based Instruction dictates that education is provided without temporal or spatial constraints, and that computers are used as tools for instruction for the purposes of research and communication.