# A Comprehensive Approach for Decision-Making in the Development of E-Learning Instruction in Private Sector Organizations

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*Literature indicates that there is limited research on the organizational decision processes to develop and deliver e-learning programs. In this paper, existing e-learning literature is analyzed in terms of macro level factors (national culture and organizational variables) and micro level factors (learner variables, instructional decisions, faculty development, and technical considerations) for instructional development. From the comparison of current e-learning development frameworks, we propose a comprehensive approach of e-learning development to be used by e-learning designers.*

Keywords: E-learning, Instructional Development Model, Instructional Development Decision

E-learning has become a major force in higher education as a delivery medium for learning. A Sloan Consortium (2003) national survey reported that online education was penetrating the institutions of higher education in both size and breadth of programs and courses. Further, Allen and Seaman (2003) have indicated that the majority of the faculty members in higher education perceived e-learning as providing equal or superior learning experiences. Another study reported that overall enrollment for online programs increased from 1.98 million in 2003 to 2.35 million in 2004 with an overall growth rate of 18.2% (NMC, 2005). 74.8% of schools offering online programs expect their enrollments for online programs and courses to increase (NMC, 2005). From this trend, it is clear that e-learning has become a more integral method for learning delivery in educational institutions.

While the proliferation of e-learning has been widely acknowledged by educators at all levels of educational institutions, some quality issues of e-learning were pointed out by researchers. These included the lack of effective administration of students' learning, the lack of learners' technical skills, and the lack of social interaction during the learning process (Muilenburg & Berge, 2001). For some, teaching an e-learning program was conceived as more complicated and demanding than teaching a traditional classroom based course because of the need to incorporate various fast changing technologies, the lack of the physical presence of the learners and instructors, the difficulty to elicit learner attention, and the requirements to re-engineer the pedagogy for e-learning (Morrison, 2003). For others, e-learning methods typically required more effort in managing changes, keeping track of students' learning progress, and replying to students' emails with questions and requests for learning support (Collis & Nijhuis, 2000).

In order to address the mixed interpretations about the effectiveness of e-learning, several past research studies sought to examine which instructional and learner factors influenced the overall learning outcomes of e-learning program (King, Harner, & Brown, 2000). However, the overarching frameworks and mechanisms influencing the learning outcomes of e-learning programs at organizational levels are less discussed in the literature.

*The Need for Comprehensive Instructional Development Model for E-learning*

Research studies indicate that the task of learning design needs an advanced level of competency because such design requires understanding and adapting theory-based learning models to apply to developing quality instructional programs (Kang, Lim, & Kim, 2004). Initially, instructional design can be viewed as a kind of apprenticeship that requires developing an understanding of learning principles and techniques and experiencing several good examples of developing teaching and learning programs (Lowe & Holton, 2005).

As organizations move toward a complicated instructional design architecture for e-learning development and distribution (such as use of learning object architecture to develop learning content), instructional designers are required to master different concepts, processes, and skill sets to design and develop reusable and scalable e-learning programs. For example, modularizing and chunking learning contents, metadata tagging, and content aggregation are such concepts and skills the learning designers need to acquire to create reusable e-learning contents. This means that one critical issue in developing e-learning programs within private sector organizations may be the steep

learning curve for instructional designers to master these new concepts and skill sets in a short period of time. In order to address these kinds of issues in designing e-learning programs, we will review existing literature about learning frameworks, instructional design systems, and methodologies of e-learning and propose a comprehensive approach for quality e-learning development that can be used by of e-learning designers at various levels.

**Research Questions**

The purpose of this research study was to review existing literature of e-learning models and learning frameworks and develop a comprehensive approach of e-learning development. The following research questions were developed to address the research purpose.

1. What kinds of models and frameworks of e-learning have been used among researchers to develop e-learning programs?
2. What are the key considerations to develop a comprehensive approach of e-learning development?
3. What key decision processes are involved to develop e-learning programs?

**Literature Review**

*Definition and Typology of E-learning*

Several definitions of e-learning are found in the literature. In a simplistic definition, e-learning is the delivery of a learning, training or education program by electronic means (Stockley, 2006). In a more technical definition, the term of e-learning covers a wide set of applications and processes, such as web-based learning, computer-based learning, virtual classrooms, and digital collaboration to deliver learning content via Internet, intranet, audio, video, satellite broadcast, interactive TV, CD-ROM, and more (Kaplan-Leiserson, 2004). The difference between e-learning and online learning is that e-learning typically refers to education delivered over a broad spectrum of learning and communication technologies where as online learning is heavily depend upon the Internet and Web for learning delivery (Neal & Miller, 2004).

The typology of e-learning can be established based on the proportion of content delivered electronically. Similar to the typology used by the New Media Consortium (NMC) (2004) for web-based instruction, we classify e-learning courses that deliver their course content between 1 to 29% online as "technology facilitated" e-learning courses. In this type courses, instructors utilize various learning technology to facilitate learning interactions and use a course management system for content delivery and learner management. Blended/hybrid e-learning courses deliver about 30-79% of content electronically. In the blended mode, substantial proportion of the content is delivered through synchronous or asynchronous learning tools while students may meet face-to-face as they need it for collaboration. Totally e-learning courses deliver more than 80% of course content electronically.

*Analyzing Macro and Micro Factors of E-learning Frameworks*

In order to develop a comprehensive approach of e-learning development, various factors and learning models influencing the development of e-learning were analyzed in terms of macro-level factors such as national level variables and micro-level factors such as organizational and course level variables.

*Macro-Level Factors*. Determination of appropriate e-learning models and framework first requires assessment of country level factors such as technical readiness for e-learning as a whole country. These factors include the country's educational systems and other IT factors such as IT infrastructure, IT access and usage, equal accessibility between rural and urban areas, and educational policies supporting the initiatives of e-learning (The Economic Intelligence Unit and IBM Corporation, 2003) plus socio-cultural readiness to adopt e-learning as a mainstream educational delivery method. For example, some cultures are characterized by a stronger need to have face-to-face interaction for learning than other cultures. Others, such as the Anglo-American culture, are viewed as having more cyber-cultural values and are more ready to interact without face-to-face contact (Reeder *et al*., 2004).

At the organizational level, organizational capability and readiness to adopt and implement e-learning as a primary delivery method is an important factor for analysis. At this level, institutional vision and belief to buy into the potential of technology to improve teaching and learning is the key issue. The level of cooperation and collaboration among various departments and disciplines and the degree to which a common language among constituents is used are also important factors for analysis (Clawar, 2004; Laster, 2004; Levine & Sun, 2003). Other organizational initiatives to maximize efficiencies in cost and scalability through learning object libraries, institutional teaching-learning portfolios, sharing of curricula with other institutions, and developing economies of scale in system implementation (such as system-wide site licenses, reusable learning repositories, etc.) are also important factors for screening (Bishop, 2003).

In order to improve scalability while keeping down the costs to develop and implement e-learning at the

organizational level, Young (2004) proposed three broad types of teaching models for e-learning.

1. The Single Teaching Model utilizes single-teacher-offering pedagogical method where teachers conduct all instructional process jobs from developing course syllabus to delivery and evaluation. In this model the teacher has full control of the course and has to be fully responsible for the success or failure of the course.
2. The Group Teaching Model utilizes three types of teaching methods: Cooperative (teaching an online course by a supportive community of teachers who help one another by allocating task responsibilities to develop, deliver, facilitate, and assess online learning for each teacher), Collaborative (sharing a similar structure of teaching with the cooperative method except the fact that the teachers work on teaching tasks all together and all have the same responsibility to operate a course successfully), and Co-teaching pedagogical methods (based on the subject matters expertise in each teaching topic, each teacher is responsible for teaching tasks and students' learning activities for certain learning periods).
3. The Cluster Courses Model, the third approach among the three teaching models, utilizes information sharing technology to connect and share instructional information, learning materials and resources, and learning content among a group of teachers and courses.

Clearly, a critical consideration in formulating e-learning strategy at the organizational level is choosing appropriate technology. This task includes establishing accessibility standards for disabilities and adopting technologies for which most users have access while gradually introducing options for more advanced technologies as user access increases (Clawar, 2004; Lefoe, Gunn, & Hedberg, 2002).

*Micro-Level Factors.* At the micro-level, decisions include what kinds of pedagogy may best address the learning issues for a targeted learner population; how to support teaching staffs for effective design, development, delivery, maintenance, and evaluation of e-learning programs; and what instructional and learner strategies should be developed to assess students' readiness, competency levels, and learning styles.

For pedagogical decisions, two approaches are possible and currently practiced in corporate settings to develop e-learning programs. The first approach is technology-led curriculum design based on the default system of a technology tool that provides a pedagogical framework along with templates to fill with content to be taught (Goodyear & Jones, 2003). The use of this kind of technology driven method tends to force users to use learning platforms for administration purpose such as use of content repositories, organization of content, tracking and reporting, and also for allowing interoperability, reusability, and shareability of learning content among teachers (Kenney *et al*., 2004). On the other hand, the pedagogically-led approach adopts a learning design approach by deciding learning goals and outcomes first then selecting learning content, learning models and activities, and learning management system to support the learning goals (Sims & Jones, 2002).

With regard to teaching staff development, several factors must be analyzed for effective decision making. Those are the degree to which an approach (a) fosters greater community among faculty, (b) prepares faculty to teach online more effectively, (c) recognizes and rewards faculty who teach online, and (d) provides active institutional support and recognition for faculty through commensurate funding, training, support for disciplinary research, and publication for online environments (Thompson, 2003).

For instructional decision and learner analysis, learning design needs to integrate effectively face to face and online components and the technology chosen must support these components (Hofmann, 2003; Lowe & Holton, 2005; Valiathan, 2002). It is also important to promote metacognitive reflection on the process of learning through clear learning goals and reasons for learning activities (Salmon, 2002; Swan, 2002; Taylor, 2002) and to provide timely feedback through multiple channels, as well as setting clear expectations for faculty response time for individual or group questions (Chickering & Ehrmann, 2003; Ragan & Terheggen, 2003).

*Models of Learning Design*

The Instructional Systems Design (ISD) process involves a systematic approach to solve instructional or human performance problems by employing several fundamental stages including analysis, design, development, implementation and evaluation. While there are numerous models of ISD used in educational settings, we reviewed four models (ADDIE, Kemp, Dick and Carey, and Lowe and Holton models). These were selected since they were considered more complete instructional design models, using the system approach for instructional design, development, and delivery. Using a system approach, any set of instructional components can work together to achieve specified instructional outcomes or goals.

First, the ADDIE model is a general instructional design model used by many instructional designers for instructional purposes. The ADDIE Model seems not to have been developed by a single researcher, but rather seems to have evolved informally through oral tradition and reference to a family of models that shared a common underlying structure for instructional design process (Molenda, Pershing & Reigeluth, 1996). The label ADDIE stands for the five instructional stages in analysis, design, development, implementation, and evaluation. In each phase of the model, instructional designers make decisions that are critical for ensuring the effectiveness of the

instructional experience.

Kemp's model is most useful for large-scale programs involving groups of people and multiple resources (Kemp, Morrison, & Ross, 1996). This model is systemic and nonlinear and allows designers to work in any instructional areas as deemed appropriate. The elements of the model are not connected with lines or arrows because the instructional model conveys flexible order in the way the nine elements are used. The reason for the oval form of the model is that interdependence exists among the nine elements (instructional problems, learner characteristics, task analysis, instructional objectives, content sequencing, instructional strategies, designing the message, instructional delivery, evaluation instruments) and permits flexibility in the selection, the order of their treatment, and back-and-forth activity among the nine elements.

The Dick and Carey model (Dick & Carey, 1990) is one of the best known models. Its approach to designing instruction is similar to that of software engineering, in which phases of instructional design are an iterative process that starts by identifying instructional goals and ends with summative evaluation. The Dick and Carey model prescribes a methodology for designing instruction based on a reductionist model of breaking instruction down into smaller components. This model includes the following phases for instructional design: (a) determine instructional goal, (b) analyze instructional goal, (c) analyze learners and contexts, (d) write performance objectives and develop assessment instruments, (e) identify strategy to achieve the terminal objective, (f) develop and select instruction using the strategy, (g) design and conduct formative evaluation, (h) revise instruction using data from the formative evaluation, and (i) conduct summative evaluation to judge the worth of the instruction.

The Lowe and Holton model (Lowe & Holton, 2005) provides a more holistic view of instructional design targeting adult learners. Using a systems approach composed of inputs, processes, and outputs of instruction, this model emphasizes that instructional design should calibrate the varying faces of instructional control, instructional support, and instructional strategy design based upon the differing levels of learning goals. For instructional control, three types of instructional control are utilized: program controlled, learner controlled, and adaptive controlled which is the combination between program and learner controlled. Other components of instructional design employed in this model include learner's self directedness (locus of control, metacognitive skills, motivation to learn), technical self-efficacy (such as using computer), and external support within the workplace environment.

**Proposed Approach of E-learning Development**

*Key Considerations for Effective E-learning Design*

From the review of several theories of instructional design and learning principles, we selected two guidelines to develop our proposed approach of e-learning design. First, for content development, we adopted the RAID criteria to guide the process of e-learning development. We select the RAID criteria because it may play a foundational role in developing e-learning content that meets the needs of today's rapidly changing learning environment in private and public sector organizations. The RAID criteria include four standards for content development which are: (a) *Reusable*-easily modified and used with different development tools; (b) *Accessible*-can be searched and made available as needed by both learners and content developers; (c) *Interoperable*-capable of operating across a wide variety of hardware, operating systems, and web browsers; and (d) *Durable*-does not require significant modifications for use with new versions of system software (Heims & Wagner, 2002).

Second, some learning design guidelines were also selected to develop meaningful e-learning programs for students. Among them, as many researchers indicate, learning must be applicable or transferable to learners' learning and/or task situations (Baldwin & Ford, 1988; Rouiller & Goldstein, 1993; Holton, Bates, & Ruona, 2000). This is because organizations tend to view visible performance outcomes and improvement as an ultimate goal of learning, whether defined as on-the-job performance or academic achievement. In designing e-learning programs, learning designers should reflect on the needs and perspectives of learners, instructors, employers, and the learning context in which the e-learning takes place. As another guideline, one should consider the levels of learning performance or expected learning outcomes that may result from an e-learning program because the intended levels of learning may vary among e-learning learners. For some learners, the level of learning may stay at knowledge and/or information acquisition domain. For others, the level may be extended up to application and transfer of individual learning to personal jobs or tasks. Base on the different levels of learning needs of e-learning learners, instructional designers should utilize different approaches for e-learning development.

*Content Structure and Delivery Mode*

For our proposed approach for e-learning development, learning content is categorized in terms of Bloom's taxonomy of learning (Bloom & Krathwohl, 1994) as well as Merrill's content attribute domains (1983). This implies that learning content needs to reflect the level of an instructional objective when it is used for instructional purpose (see Figure 1) as suggested by Lowe and Holton (2005). To consolidate Bloom's six levels into a simpler

scheme, we propose three incremental levels of learning that can be utilized for learners, instructors, and employers.

The first level is the *knowing* (syntactic) level that is characterized as the acquisition and comprehension of information and knowledge of specific content areas. The second level is the *competency* (semantic) level that includes four sub-intellectual activities (application, analysis, synthesis, and evaluation) that can occur throughout a learning process. At this level, the purpose is preparing competent learners who are ready to perform on the job or who can apply principles to complex cases in an academic setting. The third level is *performing on the job* (pragmatic), which brings actual performance outcomes through application, analysis, synthesis, and evaluation of the learned contents into a learner's jobs and tasks. Even though this level may or may not be undertaken during instructional processes, many organizations pursue this level of learning to extend the range of learning process into work situations so it can result in pragmatic learning. Therefore, the major instructional intention at this level is to develop instructional programs that learning is transferred into learners' jobs and tasks and facilitates the transfer process even after a learning.

Table 1. *Taxonomy of Learning Content*

| Performance Level | | Content Area | | | | | |
|---|---|---|---|---|---|---|---|
| | | Facts | Concept | Principles & Rules | Procedure | Problem Solving | Cognitive Strategy |
| Knowing (Syntactic) Level | Knowledge | x | x | x | x | x | x |
| | Comprehension | | x | x | x | x | x |
| Competency (Semantic) Level | Application | x | x | x | x | x | x |
| | Analysis | | x | x | x | x | x |
| | Synthesis | | | | | x | x |
| | Evaluation | | x | x | x | x | x |
| Performing (Pragmatic) Level | Application | x | x | x | x | x | x |
| | Analysis | | x | x | x | x | x |
| | Synthesis | | | | | x | x |
| | Evaluation | | x | x | x | x | x |

* X marked areas indicate if each content area occurs at what performance levels.

*A Comprehensive E-learning Design Approach*

According to Wiley (2002), unless learning theory is incorporated in e-learning development and implementation, learning will not be facilitated. From an extended review of related learning theories and models, four patterns of learning were identified for our proposed comprehensive e-learning design and development approach (see Figure 1). In utilizing the four patterns for e-learning design, the following instructional decisions must be considered before developing instructional content (see Table 2).

Table 2. *Instructional Decision Considerations*

| Instructional Decisions | Key Considerations |
|---|---|
| Levels of learning outcome | Knowing level vs. Performance level |
| Types of learning contents | Well-structured vs. Ill-structured |
| Foci of learning | Focused vs. Open |
| Independent vs. collaborative | Individual vs. Group |
| Learning connection | Synchronous vs. Asynchronous |
| Control of learning | Learner-centered vs. Instructor-centered |

In our proposed approach we incorporate two instructional decision making strategies to develop an e-learning instruction: macro and micro level learning strategy. In macro level strategy, selection of the major pattern of learning flow is made. For example, the simplest flow pattern may include only providing learning content along with pre- and post-tests as needed by learners. Current standards of learning objects take this stance as its learning sequence. The next level pattern may include several learning activities other than the presentation of learning objectives, content, and assessment activities. Possible learning activities in this level might contain simulations, case studies, guided practice, problem solving, reflection notes, etc. This phase incurs more application of learned

content and requires the learner's involvement with the learning content, activities, and instructor. The third pattern entails cooperative and collaborative learning activities with peers and instructor. Group discussions, team-based decision making, group case studies, and gaming are some of the representative learning activities. The fourth pattern involves more controlled and collaborative process of learning to result in performance oriented outcomes. Action learning, role play, and performance consulting are example learning activities in this level. Figure 1 illustrates these four patterns of macro level learning strategy.

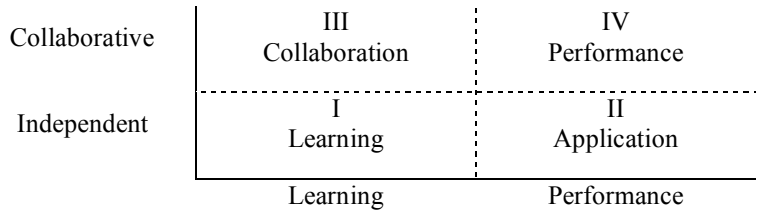


*Figure 1.* Four Patterns of Macro Level Learning Strategy

After deciding a macro level learning strategy for learning sequencing, the next step is selecting a micro level learning strategy and supporting learning methods. This task requires instructors to make major instructional decisions to blend diverse learning activities. Four decision points are involved to make an effective micro level learning strategy.

*Decision point 1.* This stage asks instructors to decide the level of learning. As explained, three levels are possible for instructional decision: the knowing, competency, and performing levels. Examples of learning methods at the knowing level include reading, direct instruction, demonstration, test, etc. At the competency and performing levels, possible learning methods are drill and practice, tutoring and mentoring, simulation, games, inquiry based learning, discovery learning, case-based learning, problem-based learning, cooperative learning, etc. Even though both competency and performing levels share the same kinds of learning methods, the performing level utilizes those learning methods in a more job related context and situation so easy transfer of learning may occur.

*Decision point 2.* In this stage, decisions are made as to who will lead the learning process (instructor-led, self-directed, or blended method).

*Decision point 3.* This stage includes decisions related to learning delivery methods: offline method (classroom, CBT), online method (synchronous, asynchronous), or blended mix of any of these methods.

*Decision point 4.* The last decision point determines if the learning will include collaborative learning activities or not. Some example decision steps of the whole development process are illustrated in Figure 2.

Learning topic 1: How to Build a Web Page

| **Decision point 1: Learning level/ Instruction methods** | **Decision point 2: Instructor/self-paced** | **Decision point 3: Delivery methods** | **Decision point 4: Collaboration** |
|---|---|---|---|
| Competency level/<br>Direct instruction<br>Drill and practice<br>Pre/post test | Instructor-led:<br>--> Direct instruction<br>Self-paced:<br>--> Drill/practice + test | Classroom – direct instruction<br>Synch - online practice in a virtual lab | Asynch - peer evaluation through collaborative virtual work space |

Learning topic 2: Conducting an ROI Evaluation

| **Decision point 1: Learning level/ Instruction methods** | **Decision point 2: Instructor/self-paced** | **Decision point 3: Delivery methods** | **Decision point 4: Collaboration** |
|---|---|---|---|
| Performing level/<br>Direct instruction<br>Pre/post test<br>Case-based learning | Self-directed | Online – self-paced instruction, pre/post test<br>Offline – case-based learning by CBT | Collaborative asynchronous online Q&A session |

*Figure 2.* Examples of Instructional Design Decision Process

**Conclusion and Implications for HRD**

In an effort to identify guidelines for e-learning development, we analyzed existing e-learning literature related to: macro and micro level factors in national cultures and organizational variables; learner and instructional decisions; faculty development; and technical considerations. Also, several instructional development models of e-learning were compared to create a comprehensive approach for e-learning development. We believe the proposed comprehensive approach of e-learning development can be used by a wide range of e-learning designers and instructors from various educational institutions. However, the proposed approach is also believed to be a valid learning development process for private sector organization since its focus is heavily placed on the aspect of learning application and transfer of training promoting organizational performance. One critical contribution of the proposed model is consolidating the levels of learning outcomes into three domains, which deemed simpler and more efficient for instructional designers to develop e-learning programs that reflect the fast changing paces of learning needs occurring in business environment.

Possible future research stemming from our study could include validating the efficiency and effectiveness of the proposed approach in terms of student learning at various settings and levels in educational institutions and the degree to which learning transfer and performance improvement is made at workplace organizations. Also, comparison of our proposed model with other types of instructional design models of e-learning is needed.

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