The Use of Traditional Instructional Systems Design Models for eLearning

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Table of Contents

Glossary of Terms

Term	Definition
Asynchronous	Not all learners are learning simultaneously. Interaction with other learners or with information may have a time delay.
Behaviorist	Believes that "all learning is a change of the learner's ability to identify an operant stimulus and them produce an appropriate response. Learning these responses is the result of reinforcement of the desired behavior and extinguishing the undesirable behavior" (Schwegler, 2000, p.2).
Cognitivist	"Places greatest emphasis on the mental process of learning. Instruction is organized into pieces that fit the learner's capabilities" (Schwegler, 2000, p.2).
Constructivist	The learner forms "a hypothesis based on observation of varied cases" (Schwegler, 2000, p.2). Learners are given the tools and information to construct their own knowledge and anchor it to their existing knowledge.
Criterion-Referenced Tests	Measure how well learners perform relative to pre-determined performance levels, not in comparison to other learners.
Cybernetic System	A system that uses feedback to correct itself.
eLearning	Learning delivered via internet technology.
Holistic	Considering at the whole system rather than focusing on individual components.
Instructional Hierarchy	A chart or diagram that shows the skills and subordinate skills the learner is to master and the relationship between the skills.
ISD	Instructional Systems Design:
Knowledge Worker	A term coined by Peter Drucker to describe participants in an economy where information and its manipulation are the commodity and the activity. Contrast this with the industrial age worker who was primarily required to produce a tangible object. Examples of knowledge workers include—but are not limited to—marketing analysts, engineers, product developers, resource planners, researchers, and legal counselors. (Gotcha!, 2004)
Model	A model is a representation of an idea, concept, process, etc. either as it is or as it should be.
Positioning	Designing information so that learners understand and appreciate the importance of each piece of content and how each piece relates to the rest of the learning.

Term	Definition
Prerequisite Knowledge	What a learner must know before beginning a piece of instruction.
Reduction	Information or instruction is broken down into small components.
Remediation	Reviewing and reinforcing content that learners did not successfully master.
Scaffolding	A complex task is divided into smaller tasks, each task is modeled, learners are supported as they learn to do the tasks, and then responsibility is gradually shifted to the learner for task completion.
Sequencing	The order of succession or the arrangement of the content.
Synchronous	Communication occurs at the same time between individuals. Information is accesses instantly.
Transfer of Training	When a learner is able to apply what they have learned appropriately to the job, task, or situation.

List of Figures and Charts

Introduction

Instructional systems design (ISD) is a problem-solving process that has been applied to the creation of training since the 1940's. "ISD evolved from post-World War II in the United States military to find a more effective and manageable way to create training programs" (Kruse, 2004, p.1). During the last sixty or so years more than 100 instructional design models have emerged each based on one or more learning theories. (2004, p.1) Each instructional design model is rooted in what is called the ADDIE model. This fundamental model consists of the five steps found in almost all ISD models: analysis, design, development, implementation, and evaluation (ASTD, 1997, p.4). What will be discussed in this paper is whether or not technological advances and the related advances in learning and communication (such as eLearning and web-based performance support) have change the field to such an extent that the prevailing ADDIE-based ISD models are no longer valid (Hannafin, 1992, p.49).

In today's workplace an investment in targeted and high quality training is seen as a corporate advantage. As Drucker points out "The productivity of knowledge and knowledge workers will not be the only competitive factor in the world economy. It is, however, likely to become the decisive factor…" (1997, p.22). To deliver the focused and current training required in rapidly changing business environments, Internet technology has become ubiquitous as a delivery platform creating a need to identify effective ISD approaches appropriate to the technology.

This paper reviews three classic instructional design models to investigate whether traditional models can be effectively used to create eLearning. The models chosen are, according to Prestera (2002), among the most popular ISD models (p. 1). Each of the three models represents a different classification in Gustafson and Branch's taxonomy, discussed later in this paper. The three models are: Morrison, Ross and Kemp; Seels and Glasgow; and, Dick and Carey.

Instructional Design

Instructional systems design is considered to be both a science and an art. A "science because it is rooted in learning theories… and an art because the designing of instructional materials is a highly creative process" (Moore, Bates & Grundling, 2002, p.71). ISD synthesizes instructional practice, research, and theory into a methodology for learning development that is systematic (inputs produce outputs which, in turn, become inputs) and systemic since the components have a symbiotic relationship (Edmonds, Branch, and Mukherjee, 1994, p.56).

The goal of instructional design is to create successful learning experiences and to engender transfer of training. ISD provides a road map to guide designers and instructors through analysis, design, development, implementation, and evaluation to the goal. The ISD road map (the science) provides a route to many different destinations depending on the turns (the art) one chooses to take. At its most basic level, instructional design focuses on three fundamental concerns: identifying the goals; selecting the strategy; and, evaluating success. (Moore, Bates & Grundling, 2002, p.71).

As a profession, instructional designers continue to adhere to variations of the ADDIE approach despite changes in technology, society, and business. As Hannafin points out, "we have re-hosted traditional ISD via computer technology, but have not reassessed the basic foundations or assumptions of our models" (1992, p. 50). The question before us is do the models need to change. Reigeluth (1999) maintains that changes to instructional models are driven by changes to the larger systems in which the models operate. The larger systems he calls the "instructional system" (p. 16) might be a corporate training department, an educational system, etc.

Instructional Design Models

An instructional design model is a representation of a view on how people learn. It is also the guideline by which an instructional designer creates instruction. Models help us conceptualize a process or system. They simplify the complexities of real situations into sets of generic steps that can be applied in many contexts (Gustafson and Branch, 2002, p. 1).

Many instructional design models, when diagrammed, appear to be linear and rigid. In practice most are "iterative, moving backwards and forwards between the activities" (Moore, Bates & Grundling, 2002, p.79). Most are also flexible; leaving it to the experienced designer to decide how much detail is required at each step. This flexibility and iterativeness may explain why ISD has survived and flourished for so long largely unchanged.

Most model creators subscribe to one or more learning theories which shape their model. If the creator is a behaviourist, a cognitivist, or a constructivist the model will reflect that theoretical belief. As Gros et al describe it, "Instructional design models

have the ambition to provide a link between learning theories and the practice of building instructional systems" (1997, p.48).

Gustafson and Branch (2001, p.14) have developed a taxonomy of models based on specific characteristics. The taxonomy describes models as being classroom-oriented, product-oriented, or systems-oriented. Classroom-oriented models usually have an output of one or a few hours of instruction; product-oriented models have an output of an instructional package; and, systems-oriented models have an output of a course or curriculum. Classroom-oriented models assume an instructor, students, a classroom, and a piece of instruction that needs to be improved (Prestera, 2002, p.1). Product-oriented models focus on making production more efficient. Systems-oriented models aim to provide "a complete instructional system for managing learning needs" (2002, p.1).

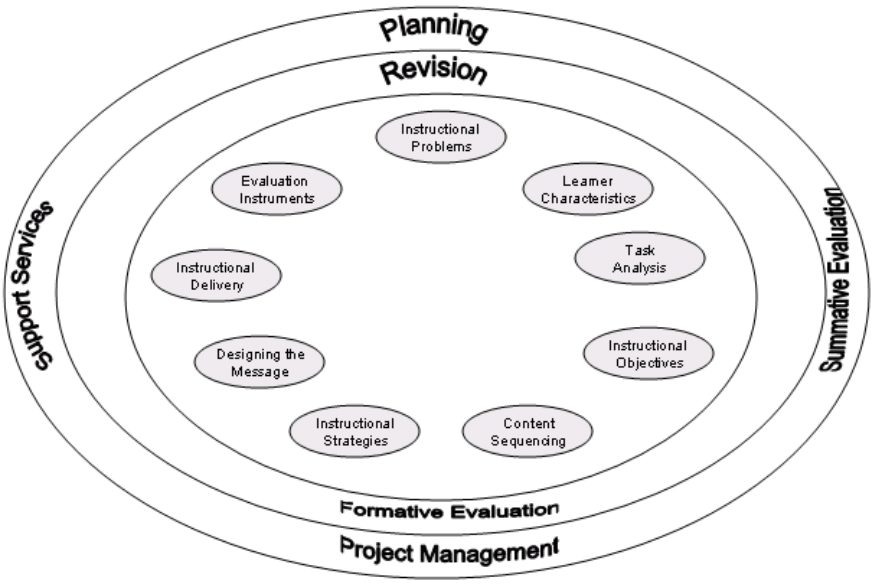
Three other key characteristics in the taxonomy are the level of instructional design skill required to use a model, the amount of front-end analysis, and the amount of formative evaluation (try out and revision)included in a model. If we first consider the amount of instructional design skill required, classroom-oriented models require a low level, product-oriented a high level, and systems-oriented a high to very high level of skill. Next considering the amount of front-end analysis, classroom-oriented models require a low level of analysis, product-oriented a low to medium level, and systems-oriented a very high level of analysis. Lastly, in terms of formative evaluation classroom-oriented models perform a low to medium level of evaluation, product-oriented a high level, and systems-oriented a medium to high level.

The three models discussed and compared in this paper each represent one of the orientations described in the Gustafson and Branch taxonomy.

Three Instructional Design Models

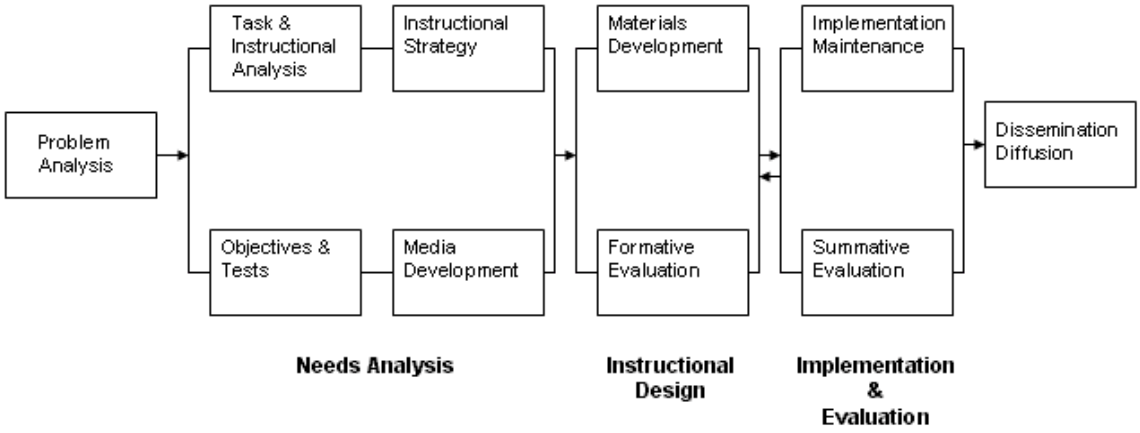
Hannifin states that it is "apparent that new design notions must evolve if we are to optimize the capability of emerging technologies for learning" (1992, p.55). One does not, however, want to give up the rigour provided by instructional design. Presented here are three instructional design models that will be considered in terms of their appropriateness for use in eLearning design: the Morrison, Ross, and Kemp model, the Seels and Glasgow model, and the Dick and Carey model. These three models are diagrammed in figures 1 through 3 below. Note that these models each contain the five ADDIE components: analysis, design, development, implementation, and evaluation although not all in the same order or as discrete steps unto themselves.

Figure 1: Morrison, Ross, and Kemp Model (Classroom-oriented)



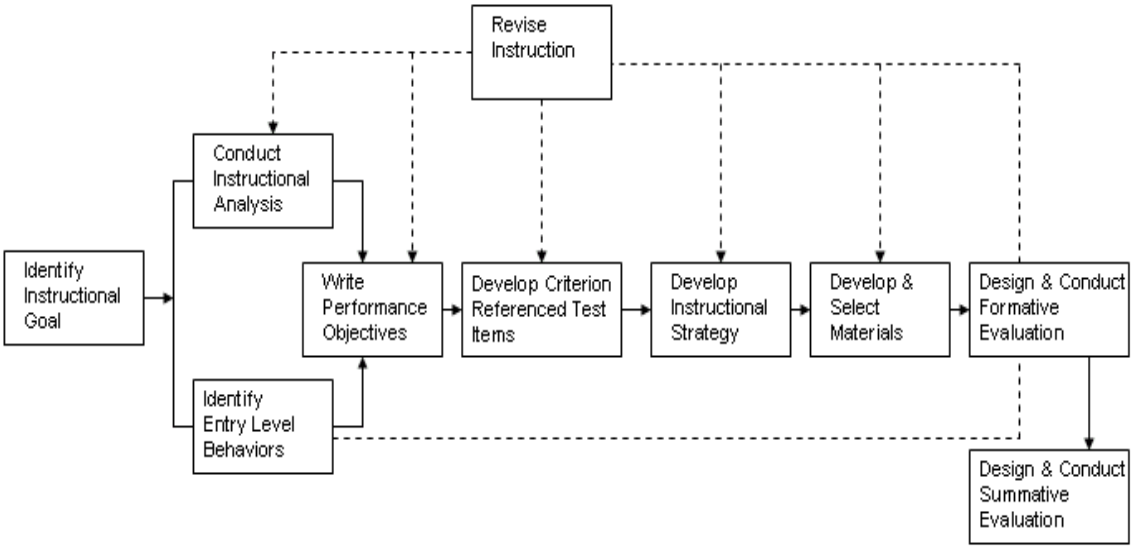
(Adapted from Kemp, 1985)

Figure 2: Seels and Glasgow Model (Product-oriented)



(Adapted from Seels & Glasgow, 1990)

Figure 3: Dick and Carey Model (Systems-oriented)



(Adapted from Dick and Carey, 1990)

Morrison, Ross and Kemp Model (Classroom-oriented)

The Morrison, Ross and Kemp model is classroom-oriented and describes a holistic approach to instructional design that considers all factors in the environment. This model prescribes a process that is iterative and subject to constant revision. This extremely flexible model is designed to focus on content and appeal to teachers (Prestera, 2002, p. 4).

The Morrison, Ross and Kemp model has three elements that differentiate it from some other models: instruction is considered from the perspective of the learner; the model takes a general systems view towards development (model components are independent of each other) with instructional design being presented as a continuous cycle; and, the model emphasizes management of the instructional design process. Using this model the instructional designer begins by asking six questions related to the: required level of learner readiness; instructional strategies and media that are be most appropriate for the content and the target population; level of learner support required; measurement of achievement; and strategies for formative and summative evaluation (Morrison, Ross, and Kemp, 2001, p. 4).

Next the designer addresses the nine elements of the model. These elements are independent of each other in that they do not need to be considered in order nor must one start with a particular element. The nine elements are: identify instructional problems and specify goals for designing an instructional program; example learner characteristics that will influence your instructional decisions; identify subject content and analyze task components related to stated goals and purposes; specify the instructional objectives; sequence content within each instructional unit for logical learning; design instructional strategies so that each learner can master the objectives; plan the instructional message and develop the instruction; develop evaluation

instruments to assess objectives; and, select resources to support instruction and learning activities (Morrison, Ross, and Kemp, 2001, p. 6). The model recognizes that not all nine elements are required for all projects (Remley, 2002, p. 5). Because of the lack of connectivity between elements and the ability to start at any place within the model, a designer can examine the entire scope of a project or the minutia just as effectively.

Using this classroom-oriented model, an individual with little instructional design skill could perform minimal front end analysis and develop a piece of instruction using few or no additional resources. The designer would select from existing instructional materials suited to a technically simple and non-distributed delivery media. They would perform little or no formative evaluation on the final materials (Gustafson and Branch 2001, p.14). A more experienced designer, or one with access to more resources, could also use this model in the design of a complex and widely distributed program.

Seels and Glasgow Model (Product-oriented)

As can be seen in figure 2, the Seels and Glasgow model is made up of three phases: needs analysis, instructional design, and implementation and evaluation. This division allows a project to be planned, resourced, and managed as three phases. Presetera explains that the Seels and Glasgow model leads to efficiency in project planning, resource allocation, and the control of the product development cycle while recognizing that instructional designers are often asked to either manage a project or work within an established project management framework (2002, p.7).

The first phase, needs analysis, includes the establishment of the instructional goals, requirements, and context. The second phase, instructional design, begins after phase one is complete and is made up of six steps: task analysis; instructional analysis; objectives and tests; formative evaluation, materials development, instructional strategy and delivery systems all of which are joined by feedback and interaction. The third phase, implementation and evaluation, includes the development and production of materials, delivery of the training, and summative evaluation. The steps and phases in this model can be applied in a linear fashion but they are often applied iteratively. In particular, “the steps in the instructional design phase are interdependent and concurrent and may involve iterative cycling” (Gustafson and Branch, 2001, p.43).

Product-oriented models are normally used to produce an instructional package. Product production requires a team and a significant resource commitment and so calls for strong project management to stay within time and budget. A team would include an experienced instructional designer to perform some front-end analysis, develop the materials (rather than select them), and perform a significant amount of formative evaluation. The end product is likely to be widely distributed using a moderately to highly technical delivery media (Gustafson and Branch, 2001).

Dick and Carey Systems Approach Model (Systems-oriented)

The systems-oriented Dick and Carey model details an iterative process that is applicable across a range of context areas. This model is perhaps the most well known of the systematic design models and is "the standard to which all other ID models (and alternative approaches to design and development of instruction) are compared" (Gustafson and Branch, 2002, p. 59).

The Systems Approach model is based on an instructional theory that says "there is a predictable and reliable link between a stimulus (instructional materials) and the response that it produces in a learner (learning of the materials)" (McGriff, 2001, p.2). The model views instruction as:

> a systematic process in which every component (i.e. teacher, students, materials, and learning environment) is crucial to successful learning… A system is technically a set of interrelated parts, all of which work together toward a defined goal. The parts of the system depend on each other for input and output, and the entire system uses feedback to determine if its desired goal has been reached. (Dick and Carey, 1990, p.3)

Each model component is critical. None can be skipped. Some steps can be completed concurrently but all must be completed. Because of its systematic and sequenced nature, this model allows for the standardization of project design efforts making them task specific. It also implies a project management framework to allow for planning of required resources (Andrews and Goodson, 1980, p. 4).

This model focuses the designer on the goal of the instruction by requiring a needs assessment and the documentation of clear and measurable learning objectives (Gustafson and Branch, 2002, p. 61). By viewing the development of instruction as a systematic process one considers the role of each component and, through formative and summative evaluation, identifies what corrections must be made to ensure the instructional goal is met.

The Systems Approach Model has nine components as shown in appendix A. Summative evaluation "is the culminating evaluation of the effectiveness of instruction, it generally is not a part of the design process" (Dick and Carey, 1990, p.6) In figure 3, the integrated nature of the steps is clearly shown along with the revision process, indicated by dotted lines.

One criticism of the model is that it presumes that "learning is based on mastering a set of behaviors which are predictable and therefore reliable… Behavior is not predictable" (McGriff, 2001, p.3). Despite this criticism the Dick and Carey model is widely respected and applied. Gustafson and Branch maintain that this model "reflects the fundamental design process used in many business, industry, government, and military training settings, as well as the influence of performance technology and the application of computers to instruction" (2002, p.62).

The output of this systems-oriented model is often an entire course or curriculum. To create this large and complex a product a team and a high level of resource commitment is required. The team will include an instructional design expert able to perform the extensive front-end analysis and formative evaluation required. Most if not all of the materials will be developed rather than selected and these materials will be widely distributed (Gustafson and Branch, 2001, p.14).

In determining whether the model is applicable to eLearning one should consider Dick and Carey's response to the application of their model to various media. They state that while model is most directly applicable to developing print-based instruction it is also able to meet the needs and conditions of any selected medium of instruction. Developers of eLearning could, for example, "use the instructional strategy statements to create story boards or screen displays" (1990, p.9). Dick and Carey stress that by using their Systems Approach model designers are guided to complete their analysis and decide what needs to be taught to whom and how before selecting a medium. They remind us that "Most research suggests that it is the analysis process, and not the delivery mode, that determines the success of the instruction" (1990, p. 9).

Summary

The three models, each having a different orientation, are robust, complete, and clear. Each model includes: analysis to establish what strategies would best suit the content, the context, and the learners; the establishment of instructional or performance objectives; the identification of the most appropriate media; the development of instructional strategies; formative and summative evaluation; and strong project management.

Chart 1: Summary of the Models

	Morrison, Ross & Kemp	Seels & Glasgow	Dick & Carey
Orientation	Classroom	Product	System
Approach	Holistic	Systematic	Systemic and Systematic
Primary Output*	A few hours of instruction	An instructional package	Course or curriculum
Goal	Improve a piece of content	Improve efficiency of production.	Create an instructional system.
Required Level of Instructional Design Skill	Low	Medium to High	Low, Medium, or High
Level of Front End Analysis	Minimal	Moderate	Extensive
Level of Formative Evaluation	Moderate	Moderate in overall model but extensive in the materials development phase.	Extensive throughout.
Project Management Focus	Strong	Strong. This model is organized into three separate project management phases.	Strong
Learner Focus	Strong	Moderate. Learner characteristics are taken into account during analysis phase.	Moderate. Learner characteristics are taken into account during analysis phase.

* This row shows the primary output on which the models are focused. Each model could be applied to the development of a small piece of instruction, an instructional package, or a course or curriculum.

Note: Created based on information from Dick and Carey's 1990 The systematic design of instruction; Gustafson, Branch and Maribe's 2002 Survey of instructional development models; Seels and Glasgow's 1990 Exercises in instructional Technology; and, Morrison, Ross and Kemp's 2001 Designing effective instruction.

Applying the Models to eLearning

Introduction

eLearning is the use of Internet technology to deliver learning experiences. In this context, instructional design is the process that keeps the focus on the learning rather than the technology. By ensuring that an instructional design process is the cornerstone of eLearning development one can: increase the consistency between learning components; ensure the effective structuring and presentation of content; remain centered on the learner experience; sustain quality and accelerated product development; and, apply the rigorous project management required in any technology-related project. (Siemens, 2002, p. 3)

The use of eLearning as a primary performance development strategy is increasing in corporations. "Attracted by promises of a more flexible, learner-centered product that can reach wider, more diverse audiences at reduced costs, today's training managers are implementing e-learning initiatives at an alarming rate" (Young and Young, 2002, p. 35). Many of these corporations are creating eLearning using their established instructional design models and practices (Northcott, 2000, p.1) with varying degrees of success. However, one must consider whether the problems that arise are as a result of the model used or are due to a lack of understanding and experience with eLearning on the part of the designers. The question is whether there is anything inherent in the models that would lead to poor eLearning.

Appropriateness of the Models for eLearning

All three models contain the elements necessary to design effective eLearning. While these models were all developed to create facilitated or self-study products to be delivered via non-Internet technologies (paper-based, multimedia, audio, video, etc.), each has strengths that could be exploited in the development of eLearning.

The same instructional design issues are valid for both traditional and eLearning: structure, content, motivation and feedback, interaction (communication), and involvement (activities) (Siragusa, 2000, p. 4). Each of these issues are considered below demonstrating that it is not a model that prescribes the resolution of the issue but rather choices and decisions made within steps of a model.

Structure.

When designing eLearning the depth and the breadth of content needs to be considered. Decisions must be made on what information should be presented first and what can be provided, at the learner's request, through techniques such as hyperlinks. In making such decisions one considers the content, context, and learner characteristics. These same considerations and decisions are made in relation to the positioning and sequencing of content when designing paper-based instruction.

Chart 2: Comparing Factors in the Models Related eLearning

	Morrison, Ross & Kemp	Seels & Glasgow	Dick & Carey
Ability to Apply Phases and Steps Iteratively	The design of the model allows for the iterative application of phases and steps	Within each of the three phases the steps can be applied iteratively. There is some flexibility for overlapping the phases.	Once the instructional goal has been established the other phases can be applied iteratively.
Focus on Instructional Strategy & Media Selection	This model allows for instructional strategies and media to be selected before the content is analyzed since one can start at any phase. However, one can choose to analyze the content first.	Selection of instructional strategy takes place in same project phase as analysis.	Media selection is strongly linked to instructional strategies and both are based on learning objectives, context, and content being addressed.
Structure: positioning and sequencing of content	All three models contain an instructional strategy step in which diverse options for positioning and sequencing can be considered.		
Content Design	All three models have steps or phases in which content design addressed.		
Motivation and Feedback	All three models support motivational and feedback approaches and mechanisms. The rigour of the three models may ensure that the required level of detail is available to make solid design decisions.		
Interaction and Involvement	The level of interaction and the degree of learner involvement are a design decisions that taken in the instructional strategy phase of each of the models. These decisions would then inform decisions related to the selection of instructional media.		

Note: Created based on information from Dick and Carey's 1990 The systematic design of instruction; Siragusa's 2000 Instructional design meets online learning in higher education; Seels and Glasgow's 1990 Exercises in instructional Technology; and, Morrison, Ross and Kemp's 2001 Designing effective instruction.

Positioning refers to designing information in a way that helps learners understand the importance of each piece of content and how each piece relates to the rest of the learning. Sequencing is the order of succession or the arrangement of content based on the instructional strategy.

All three models include steps in which content is analyzed and instructional strategies set. eLearning lets one employ a diversity of options for presenting and interacting with information. Using any of the models considered in this paper one could take advantage of these options by simply expanding the design approaches one considers in the instructional strategy step.

Content.

The same rigour must be applied to content design and presentation in eLearning as one applies when creating paper-based self-study. Often, in classroom-based learning, much of the content is in the heads of the facilitator not in the hands of the learner. The facilitator presents materials in a structured format watching for cues from the learners to indicate their understanding and responding to requests for clarification or further explanation. In asynchronous eLearning one cannot watch for clues and the learner cannot raise their hand.

> On the Internet, there is no way of seeing whether students are understanding what has been given to them… Content that is placed on the Internet has to be clear and concise and to provide students with all the conceivable materials that they may need and in alternative forms. (Siragusa, 2000, p. 5)

This design approach does not differ from traditional learning programs. If learning is well designed, based on any of the three models discussed in this paper, learners should have access to all the required information, examples, and activities presented in a clear and concise manner.

Motivation and Feedback.

Motivation is internal to the learner, not something that can be provided by a facilitator or a learning program. Edwards (1999) describes motivation as “the collection of accounts of choices, intensities, and feelings of acts” (p. 19) while Cantor (1992) defines motivation as “the inner drive that, from birth, causes us all to act” (p. 147). So, while one may not be able to instil motivation in a learner one can attempt to stimulate learner receptors and link new information to existing knowledge in order to encourage motivation.

> Learners may be more motivated to succeed in a learning program if regular and effective feedback is provided structured in a way to increase understanding. eLearning technologies make it easier to provide immediate feedback and remediation in the form of additional examples or the presentation of the same material in a different way. By capitalizing on technical capabilities, one can create eLearning that facilitates and encourages learners to interact with content at different levels. This may increase motivation (Siragusa, 2000, p.7).

Each of the three models can support any of the above-mentioned design approaches related to motivation and feedback. In fact, the rigour of the three models may ensure the detailed understanding of the content required to layer, scaffold, and provide effective remediation.

Interaction.

Designed interactivity or interaction involves learners with the content. It eLearning terms it is

> any program feature that requires the learner to do something… Poor quality interactivity = clicking the right arrow to continue and challenging true/false questions. Good interactivity = open questions, simulations, instructional games, tools and calculators. Remember, engage the mind not the mouse finger! (e-learningguru, 2004)

In both traditional learning and eLearning interactivity is what involves learners with the content and encourage cognition. As Kennedy describes it, interactivity is the "continuous dynamic interplay between instructional events, students' actions (functional interactivity) and their cognition (cognitive interactivity)" (2004, p.43).

Decisions related to the inclusion and design of interactivity would be made within the instructional strategy step of each model and would be informed by analysis. None of the three models would prevent the inclusion of significant interactivity in a learning program.

Involvement.

Siragusa (2000) defines involvement as involving learners in the instructional process by having them perform activities. Like motivation, only the learner can control their own level of involvement. However, well designed and engaging activities that have a clear and direct relationship to the real-life task being trained are more likely to encourage learner involvement. Once again, the design of activities (and so the encouragement of learner involvement) does not depend on the model chosen but rather on the instructional strategies employed by the designer.

Conclusion

The design of motivating, engaging, and effective eLearning that results in measurable transfer of training and optimizes organizational performance relies on the instructional strategies employed by the instructional designer, not on the overall model within which one works. Thus, it is not necessary to create a new ISD model or combine aspects of traditional models to support eLearning development.

Each of the models discussed contain the elements required for quality learning be it traditional or eLearning: analysis, objectives setting, media selection, instructional strategy setting, evaluation, and project management. While only one of the models (Morrison, Ross, and Kemp) is visually depicted as holistic, all three can be applied using an iterative approach with subject matter feedback (formative evaluation) informing and changing the technical and instructional design throughout the project.

Appendix A:

Components of Dick & Carey's Model

Component	Answers the Question(s)
Identify an Instructional Goal	What will the learner be able to do upon completion of the instruction?
Conduct an Instructional Analysis	What skills and subordinate skills are required to achieve the desired performance? (The outcome of this step is an instructional hierarchy.)
Identify Entry Behaviors and Characteristics	What skills must the learner have before entering the learning? (This is often called prerequisite knowledge. It is not everything the learner knows but what they must know to embark on the instruction being developed.) Are there any learner characteristics that should be considered in designing the instruction?
Write Performance Objectives	What, specifically, will learners be able to do at the end of the instruction? (Specific statements that include the skills, the condition under which the skill will be performed, and the criteria for successful performance.)
Develop Criterion- Referenced Test Items	What assessment (test) items will be used to test each objective?
Develop an Instructional Strategy	What strategy will be used to achieve the terminal objective? (Includes information presentation, activities, practice, feedback, testing, etc.)
Develop and/or Select Instruction	What materials does the designer produce? (This step is the creation of the materials or the selection of materials from those already created.)
Design and Conduct the Formative Evaluation	What data will be collected to evaluate the learning with an eye to improvement? What type(s) of formative evaluation will be undertaken? (This step included performing the evaluation.)
Revise Instruction	What changes need to be made based on the formative evaluation? (This step includes making the revisions.)

Note: Adapted from The "Systematic Design of Instruction" by Walter Dick and Lou Carey, 1990.

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