E-Learning in the Human and Social Sciences: Instructional Design Comes First

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ABSTRACT

The main purpose of this paper is to shed light on some basic instructional design principles and models needed by e-learning developers.. The paper concludes that effective, efficient, and appealing e-learning requires careful application of sound ID principles.

Introduction:

IN recent years, e-learning has become a wide world phenomena in learning and training. Many advantages drive this: open learning environment independent of time and or place, self-directed study, collaborative learning, to name but a few.However, many e-learning endeavors are not more than information pumping, electronic paging, and lectures posted on the Web (Tan,2002,p.48, Ritchie and Hoffman,1997,p.135).As Merrienboer et.,al.,2004,p.13&21). Indicate: "many e-learning applications are of low pedagogical quality, and from a pedagogical perspective e-learning is a step backward rather than a step forward. This paper will discuss major approaches to ID and incorporating ID Principles into e-learning.

What is e-learning?

There exist many definitions for the term e-learning. It covers a wide applications and processes: Web-B/L ,CBL , VC ,DC , etc. and includes content delivery via : Internet, Intranet, ITV , Satellite ,CD-ROM ,etc. One definition defines it as any Learning mediated by an electronic medium(Driscoll,2002,p.330).However, In practice, the dominance of the Internet makes it the medium of choice(Tang&Hung,2002,p.48).

Why use e-learning?

Many advantages support the rush towards the use of e-learning: increased students population and scare resources makes it a low cost medium for governments and institutions, provides any time, any where learning ,hypermedia delivery (non-linear),self-directed learning, and providing communication and collaboration tools.

What is ID?

The meaning of ID depends on one,s own philosophy and theoretical background. However, tow major perspectives are often cited in literature. The first is the behavioral ID which means the systematic development of instructional specifications

using learning and instructional theories, the analyses of learning needs and goals and the development of a delivery system that meets those needs ,and the development of instructional materials and activities ,and tryout and evaluation of all instructional and learner activities. The second is the constructivist ID which is defined as the creation of educational environment that facilitates the construction of knowledge(Alessi&Trollip,2001,p.32).

Why use ID?

A number of characteristics support the use of both behavioral and constructivist ID as voiced by their proponents. Behavioral ID is said to have such advantages as : learner advocacy (learner centered**)** effective, efficient, and appealing instruction, team work coordination, diffusion and adoption, congruence among objectives, activities, and assessment, alternative delivery, pedagogy driven to use technology, a need driven , and both theoretical and empirical (eclectic**)**.On the other hand, constructivist ID provides for authentic learning experiences, collaborative activities, and self-control(Smith&Ragan,1999,p.8).

Philosophical Foundations:

Tow major philosophies underlies current ID applications. These are objectivism on which behavioral ID is based and rationalism which underlies constructivist ID.A brief explanation of each follows. The objectivist beliefs that reality exists objectively and independently of the individual .that there exists a common reality, and that knowledge is acquired through experience. Reductionism is often associated with objectivism where complex entities are reduced to their simple components. Rationalism (or constructivism) is more diverse .Literature divides it into three components as follows. First, there is the individual or cognitive constructivism which beliefs that knowledge is individually constructed, that knowledge results from a personal interpretation of experience and that learning is an active process. Second, is the social constructivism which beliefs that learning is collaborative (co-constructed) through social and cultural context with meaning negotiated from multiple perspectives. Third is the contemporary view of contextualism which emphasizes that learning should occur or be situated in realistic settings and that testing should be integrated into the task, not a separate activity. Following is a comparison of the main characteristics of these tow competing philosophies.

	Objectivism	Rationalism
Learning Theory	Behaviorism	Cognitivism
Learning Goals	Sharply focused	General
Learning Task	Academic	Authentic
Assessment	Criterion	Performance based
Curriculum	Discrete	Integrated
Motivation	Extrinsic	Intrinsic
Context	Unsupported	Supported

Content	Well-structured	ill-structured
Autonomy	Low	High
Role of teacher	Authoritative	Facilitator
Teaching method	Direct instruction (Transmission)	In-direct instruction (Transformative)

Theoretical Foundations:

   ID has often been described as an eclectic field, draws its principles from various theories. Briefly, the t learning theories most associated with ID and cited in literature are : behaviorism which emphasizes observable behavior, reinforcement principles, corrective and immediate feedback, paced practice: small tasks or steps, cognitivism which emphasizes unobservable constructs, and such processes concepts as attention, perception, encoding, memorizing, comprehending, retrieval, active learning, motivation, locus of control, mental models, metacognition, transfer of learning, and individual differences ,and constructivism which emphasizes Knowledge construction, collaborative learning, self-autonomy, active learning , authentic learning and assessment personal relevance, learner reflection, guided discovery, and multiple perspectives.

ID and e-learning: Which Orientation?

   No single theoretical base provides complete prescriptive principles for the entire design process. Reasoned and validated eclecticism has been a key strength of ID (Smith&Ragan,1999,p.vii), and majority of instructional designers prefer to merge various principles of all these paradigms into one integrated approach (Alessi &Trollip,2001,p.17).Next, is a brief overview of three models representing these paradigms.

Behaviorist ID

   The ADDIE model is chosen for the behavioral paradigm. It consists of five stages. These are: Analysis(needs, audience,& goals**),**Design(blueprint of instructional specifications),Development(production, tryout, formative evaluation- alfa / beta tests,& final product)Implementation(technical & instructional, support, CM,& evaluative data**),** and Evaluation(summative, revision,& recycle).

Behaviorist/ Cognitvist ID:

   The Nine Events of Instruction (Gagne,1985), can be classified as a behavioral/ cognitive model with more emphasis on cognitive theory. It consists of nine events (or activities). These events and the corresponding cognitive processes are as follows:
1. Gaining Attention (Reception)
2. Informing learner of the objectives (Expectancy, activating motivation)
3. Stimulating recall of prior learning (Retrieval)
4. Presenting the stimulus (Selective perception)
5. Prviding learning guidance (Semantic Encoding)
6. Eliciting performance (Responding)
7. Providing feedback (Reinforcement)
8. Assessing performance (Retrieval)

9. Enhancing retention and transfer

Cognitivist/constructivist ID:
   The Five Principles of Instruction suggested by Merrill(2001) can be classified as a cognitivist/constructivist model. It emphasizes a five stages learning cycle: problem, activation, demonstration, application, and integration. The five principles are as follows:
   1. Learning is facilitated when learners are engaged in solving real-world problems.
   2. Learning is facilitated when existing knowledge is activated as a foundation for new knowledge.
   3. Learning is facilitated when new knowledge is demonstrated to the learner.
   4. Learning is facilitated when new knowledge is applied by the learner.
   5. Learning is facilitated when new knowledge is integrated into the learner,s world.

ID Strategies:
   Each of the three ID paradigms has a meret in desgning learning experiences. Chosing one or the other, depends on the nature of learning tasks and learning outcomes. Specifically,   behavioral ID strategies are appropriate for lower order thinking skills, stable and well-defined content, mastery of content and discrete skills, promoting automatcity of prerequisite skills, remedy of weaknesses, and high motivated learners. On the other hand, cognitive ID strategies are more appropriate for problem solving with defined facts and rules and tasks requiring an increased level of processing. Finally, constructivist ID strategies are appropriate for ill-defined and complex content and tasks requiring high level of processing, learners with well developed meta-cognitive skills, and high (and low) motivated learners(Roblyer, et,a1997,pp.60-72).

Incorporating ID Principles into e- learning:
   The following section, presents a summary of some important ID principles and examples of strategies for incorporating them into the design of e-learning:

1.Motivating the learner: use ARCS motivational model (Keller,J.M.1983):
   Attention: use questions and human interest examples, ample learner interaction, relevant graphic , animation, color and sound, short text elements, novelty to reduce predictability, visual and auditory effects for sensory curiosity, conflicting information for cognitive curiosity, and consistent placement of screen items.
   Relevance: use content and examples of interest or importance ,use authentic experiences ,present concepts and applications in meaningful context, and match instruction with learning styles.
   Confidence: provide clear expectations, objectives and summary ,note taking access, online support, and positive expectation of success**.**
   Satisfaction: Provide learners with more navigation control, guidance, feedback, and self-check, and assessment that matches objective and self-check to increase students, satisfaction of completion and intrinsic rewards.

2.Requiring active involvement :determine the amount of interpersonal exchange to meet e-course objectives, provide non-linear navigation, clearly communicate rules of interaction ,ask students to compare, classify ,induce, deduce ,analyze errors, involve

students in discussion and demonstration, and use case studies ,portfolio and and research reports.

3. Encouraging learner control: encourage learners to assume more responsibility for their learning and use project and problem based instruction.

4.Encouraging collaborative learning :create a learning community (e-group projects via e-mail ,Web-boards, discussion groups ,e-mailing lists ,etc.),use Whiteboard for synchronous graphic sharing, and use social chat rooms for synchronous text communication.

 5.Informing learners of objectives: unless problem or discovery based learning is used ,include clear and measurable objectives, and focus on objectives: include only most relevant and supportive Web sites.

6.Activating prior leaning: direct learners to recall ,describe ,or apply knowledge from past experience, provide links to relevant experiences, use learners , profile to determine prerequisite, and relate learners to previous lessons or modules.

 7.Providing guidance and feedback: provide syllabus and timeline for assignment, timely and prompt feedback (e-mail, posting reminder to course Web Site, present instruction in small steps (chunking,), and focus attention on relevant   information.

8.Providing enrichment and remediation: provide related links to relevant topics, recycle back through original materials, provide additional practices and links, and alternate tests.

9.Scafolding: provide advance organizer, demonstrate and fade gradually, and provide guidance and feedback.

10.Testing and evaluation :use appropriate online or offline tests, objective or subjective tests, e-portfolio of artifacts, Course Management Systems (e.g.Web CT, Blackboard) to keep students informed(grade book),assessment techniques appropriate for learning tasks (Bloom Taxonomy), and varied and frequent self-tests to guide the learner and provide feedback.

11. Enhancing learning transfer and integration: provide opportunities to relate learning to real life settings, provide opportunities for reflection, and ask students to explore new ways to use their new knowledge and skills.

Summary and conclusion:
     E-learning system has many interrelated components. The major ones of these are: Technology, organization and management, and pedagogy (ID). This paper discussed the philosophical and theoretical foundations of ID, focusing on three major paradigms: behaviorism, cognitivism, and constructivism, showing when each is more applicable. It also summarized some ID principles and strategies to incorporate them in designing e-learning experiences. The writer concludes that in order to have effective, efficient, and appealing e-learning content and experiences, developers need to construct those experiences on well known ID models, strategies, and principles, as well as knowing when each is more appropriate for certain learning outcome. Lastly, e-learning is not the solution for all learning problems. It is most appropriate for

cognitive skills (knowing what), however, when psychomotor skills (knowing how), or attitudinal skills are targeted, blended learning will be needed(Driscol,2002).

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