Research on Instructional Systems Development and Instructional Technology

Dars investigation of the field of Intructional Systems Development and Instructional Technology

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My name is Dar Scally. I started this website as part of a senior project during the spring of 2012 while attending the University of Tampa. I had decided to pursue a masters degree in either Instructional Technology or Instructional Systems Development so for my project I performed research and presented my findings on this website.

I'm currently in my second semester at University of Maryland, Baltimore County working on a masters in ISD. As I work on my degree this website will change as I remove previous research to make room for my job aids, samples of my work, and other items relating to the work I'm doing in my degree program.

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What is Instructional Technology?

Instructional design encompasses the philosophy and methodology used to produce instructional systems for education and training. It involves the analysis of current levels of skills and desired end results in order to create an efficient model that will bridge the gap between the current knowledge of a set of learners and the desired knowledge and skills for those learners. Using established learning theory the instructional designer conducts a process of analysis of learning goals and systematically develops a plan of instruction to meet those goals. Sometimes the term Instructional Technologist is defined as the same as an Instructional Systems Designer or Developer. Sometimes there is a distinction between those terms, giving the following job descriptions: Instructional Designer: "An instructional designer is somebody who applies a systematic methodology based on instructional theory to create content for learning events." (www.eng.wayne.edu)

"An instructional designer is an individual who develops the methodology and delivery systems for presenting course content. (www.syberworks.com)

Instructional Technologist: "Instructional Technologists apply research in learning theory, psychology, and emergent technologies to solve instructional and performance problems." (http://www.bridgeport.edu)

What does an instructional technologist do?

Evaluate new technologies to improve academic performance.

Provide assistance to faculty in increasing and improving their use of technology to enhance their teaching.

Provide training to teachers and staff on new software and technologies.

Evaluate teaching programs for efficacy and propose changes as needed for improvement.

Create training materials for learners. Implement new technologies that will benefit teaching staff and learners.

(http://instructtech.wordpress.com/2008/10/16/what-does-an-instructional-technologist-do)

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ASTD, American Society for Training and Development

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EDUCAUSE

"EDUCAUSE is a nonprofit association whose mission is to advance higher education by promoting the intelligent use of information technology. EDUCAUSE helps those who lead, manage, and use information resources to shape strategic decisions at every level. A comprehensive range of resources and activities is available to all interested employees at EDUCAUSE member organizations, with special opportunities open to designated member representatives. EDUCAUSE programs include professional development activities, applied research, strategic policy advocacy, teaching and learning initiatives, online information services, print and electronic publications, special interest collaborative communities,

and awards for leadership and innovation. EDUCAUSE has offices in Louisville, Colorado, and washington, D.C. EDUCAUSE holds annual conferences as well as regional conferences and has been highly recommended as the conference to attend for Instructional Technology professionals.

Resources include:
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applied research
strategic policy advocacy
teaching and learning initiatives
online information services
print and electronic publications, including books, monographs, and the magazines EDUCAUSE Quarterly and
EDUCAUSE Review
special interest collaborative communities
awards for leadership and exemplary practices

Their membership represents more than 2,200 educational organizations including 250 corporations, colleges, and universities. There are currently over 17,000 active members.

For more Information about these organizations go to their websites

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Job Aid

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What is a job aid?

A job aid is a guide that supports the work or activity of the user by providing direction to assist in performance. Job aids can use charts, graphs, maps, checklists, flowcharts, decision tables or diagrams, or any combination of items. Job aids can be printed and laminated to keep by one's desk for reference as they work, or they can be posted on a website internally or externally for easy reference while working at the computer. They can be printed in flip books, written in print, or done in colorful illustrations. Job aids can use step-by-step directions, worksheets, directories, decision trees, checklists, and samples. Job aids are helpful, especially when performing a job that one has limited experience with, but even for experienced workers, it is handy to have a job aid to consult to ensure nothing is forgotten or overlooked. I've posted my job aid for ISD on webpages on this site. Use the links above to view each page.

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The Roots of Instructional Systems Development

Instructional systems development has a basis in theories that were proposed as far back as the 1940's. Ludwig von Bertalanffy proposed his general systems theory which basically stated that the "whole is more than the sum of its parts". This idea was incorporated in the learning theories that were developed later by Skinner, Bloom, and Mager.

B.F. Skinner- Behaviorism and Programmed Instruction 1940

Skinner refined the elements of behaviorism founded by John B Watson. He proposed operant conditioning which differs from classical conditioning in that it applies to voluntary behavior rather than reflexive behavior. Instructional systems development was influenced by this in that learning can be influenced by manipulation of the environment. Part of the development of a system of learning is to provide an optimum environment for learning. Skinner proposed programmed instruction using short frames of instruction, systematically programmed materials, self paced learning, and immediate feedback.

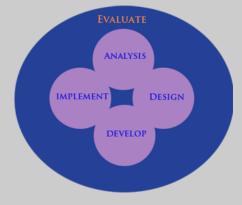
In 1956 Benjamen Bloom developed his taxonomy of intellectual behaviors in which he identified three types of learning activities, cognitive, affective, and psychomotor. These are the domains: Cognitive pertains to knowledge or mental skills, Affective deals with the emotional aspects of growth, and psychomotor deals with the physical skills.

Robert Mager proposed learning objectives in 1962. He divided the learning objectives into three parts. First is the observable action or task which needs to be one small task that isn't too complicated. Anything more complex would be broken down into separate tasks. The second component is a measureable standard for the task. It must be stated in terms that make it apparent if the task has been completed successfully. The third part is that the conditions of performance need to be stated. This would include the tools and materials that will be used to accomplish the task.

In 1962 Robert Glaser used the term "criterion-referenced measure" as an instrument to assess students at entry level and again later to determine if the learning experience has been successful, thereby testing the students and testing the system of instruction.

ADDIE

The ADDIE model is a popular guideline for the design of curriculum and instructional systems. It's an easy to remember acronym.



ANALYZE the performance environment in order to understand it and then describe the goals needed in order to correct any performance deficiencies (identify training requirements).

DESIGN a process to achieve your goals, that is — correct the performance deficiencies.

STUFFOR your initial discoveries and process into a product that will assist the learners into becoming

DEVELOP your initial discoveries and process into a product that will assist the learners into becoming performers (in training, this product is often called courseware).

IMPLEMENT by delivering the courseware to the learners.

EVALUATE the performers, courseware, and audit-trail throughout the four phases and in the working environment to ensure it is achieving the desired results.

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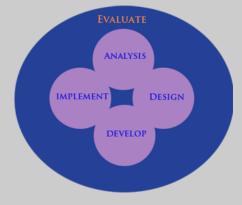
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Instructional Technology-Further Defined

What is Instructional Technology?

Instructional Technology is a term most frequently used in reference to the incorporation and efficient usage of technology solutions in the K-12 and higher education arena. When the duties of an instructional technologist are performed in a corporate environment the terminology is more likely to be corporate training, instructional curriculum development or training curriculum design. In the words of scholars in the field we get varying definitions of instructional technology:

Instructional technology is concerned with improving the effectiveness and efficiency of learning in educational contexts, regardless of the nature or substance of that learning....Solutions to instructional problems might entail social as well as machine technologies. (Cassidy, 1982, p. 1)

The systemic and systematic application of strategies and techniques derived from behavioral and physical sciences concepts and other knowledge to the solution of instructional problems. (Gentry, 1995, p. 7)

...the media born of the communications revolution which can be used for instructional purposes along side the teacher,textbook, and blackboard...[as well as]...a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communications, and employing a combination of human and nonhuman resources to bring about more effective instructions. (Commission on Instructional Technology, 1970, p. 19)

...the application of our scientific knowledge about human learning to the practical tasks of teaching and learning. (Heinich et al., 1993, p. 16)

...a complex, integrated process involving people, procedures, ideas, devices, and organizations for analyzing problems, and devising, implementing, evaluating, and managing solutions to those problems involved in all aspects of human learning. (AECT, 1977, p. 1)

Instructional technology is the theory and practice of design, development, utilization, management, and evaluation processes and resources for learning. (Seels & Richey, 1994, p. 9)

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Some of the Learning Theories used in Instructional Systems Development

Constructivism-Based on Vygotsky's Zone of Proximal Development and Bloom's Taxonomy.

The learner is at the center constructing knowledge. Each learner's previous knowledge along with past experiences and beliefs influence their interpretation of new information. Learner's need to put concepts and ideas into practice in order for them to master it. The constructivism approach is based on Vygotsky's Zone of Proximal Development and Bloom's Taxonomy.

Strategies used in Constructivism

- 1. Small group activities.
- 2. Learner developed instruction.
- 3. Reflection-Opportunity to develop, assess, and organize thoughts.
- 4. Other activities. The use of open ended questions, brainstorming alternative ideas, encouraging learners to do research, experiment, design models, collect and organize information, use strategies for problem solving, review and critique proposed solutions.

Robert Gagne

Nine steps to effective learning:

- 1. Gain attention. Use some kind of device to gain the attention of the learners. Tell a story, demonstrate something, Do or say something bold or shocking to draw attention to what you're going to say next.
- 2. Inform learners of the objective. Use casual language to relate to the learners and give them a clear understanding of the knowledge you are planning to impart to them, define what they might know now and what they will know by the end of their training.
- 3. Stimulate recall of previous knowledge. This makes use of Vygotsky's contributions to the field of education using scaffolding to build upon existing knowledge, adding more details, and allowing learners to advance on their own while providing support as needed.
- 4. In presenting the material break it down into smaller parts. It's easier to learn and retain smaller chunks of material at a time and relate the chunks later. Using the theories of Skinner and Bloom's taxonomy create small sequenced learning sessions of successive levels of difficulty.
- 5. Guide learning. Instruct learners how to go about learning the material.
- 6. Elicit performance. Provide opportunities for learners to periodically use their newly acquired skills. Demonstrate the objective. Use Bandura's social learning theory by modeling the desired skills and giving learners a chance to practice it themselves.
- 7. Feedback. Communicate with learners, advising them on what they're doing correctly and providing guidance for anything they're having trouble with.
- 8. Assessment. Use a testing method to determine if the learning goals have been met.
- 9. Retention. Provide more practice to reinforce the new knowledge. Review the lesson.

Julili Kellel AKCS Muuel ul Muulvallullal Desiyli

Four Steps

- 1. Attention: Use surprise of uncertainty to gain interest. Pose challenging problems or questions to engage curiosity. Suggested methods: Use stories, games requiring active participation, challenge learners assumed knowledge. Use variety of materials to present material; alternate lectures, videos, active group activities, incorporate a variety of learning styles. Stay in the border between boredom and over stimulation to maintain interest.
- 2. Relevance: Emphasize the relevance of what you are teaching. Relate it to the learner's own circumstances. Point out how the new knowledge will enhance existing knowledge, building new skills on skills already mastered. Explain what the value of the new knowledge will be, why it is useful material to learn. Accentuate the value of achievement. Use modeling by demonstrating, having guest speakers or videos. Have more advanced learners who accomplish tasks first provide tutoring to others. Provide some choice by allowing learners to use varied methods to perform their work or options for how they choose to organize it.
- 3. Confidence: Present objectives and prerequisites so that learners understand what is required and how their performance will be evaluated. Build skills gradually on acquired skills in a continuous progression. Give learners some control so that they are more connected to their own success and provide feedback frequently.
- 4. Satisfaction: There should be opportunities for learners to use their new knowledge. This can be in a simulated environment or a real situation. It allows learners to demonstrate new proficiencies and reinforce their accomplishments, building confidence. Be careful not to overuse extrinsic rewards.

Dave Meier-Rapid Instructional Design

Uses accelerated learning techniques to create an environment involving practice, experience, and feedback. Phases:

Preparation-goals and benefits, raise curiosity of learners, remove barriers

Presentation-real world, interactive presentations, relate to varied learning styles, problem solving activities

Practice-integration of new knowledge

Merrill's Component Display Theory

Content: Content ranges from facts to principle. Content is the material to be learned. Types of content are facts, concepts, procedures, and principles.

Performance: Remembering or memorizing information, using or applying that which has been learned, and finding, which is when the learner uses the new knowledge gained to develop new concepts.

Component display theory involves the use of a matrix identifying four primary presentation forms: rules, examples, recall, and practice, and secondary presentation forms: prerequisites, objectives, helps, mnemonics, and feedback. In every lesson there should be components of each of those presentation forms. This variety of presentation works with a wide variety of learners ensuring that each type of learner will respond to the type of presentation that works best for them.

Reigeluth's Elaboration Theory for Instructional Design

A sequencing approach dividing the material to be learned into small chunks that can be mastered in a sequence with each successive chunk building on the previous one. Present the most fundamental and basic information first. Then add more complex information in one area. Review and reveal the relationships, then proceed to add more detailed information. At each step start with the general, then zoom in to the more detailed material. Elaboration theory works best for teaching causal relationships, not for problem solving.

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