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ROLE OF COMPUTERS IN EDUCATION

ACQSHARA.U, PhD scholar, Dr. M.V. Sudhakaran

ABSTRACT

The use of technology in education is based on theoretical perspectives from varied disciplines such as Communication, psychology, sociology, philosophy, artificial intelligence and computer science also experiential knowledge from educational practice. Technology is used in education for designing instruction or training used to improve performance. Using of Technology in education not only increases the efficiency or effectiveness of current teaching practice, but it also aims at pedagogical change. Educational technology can be considered as a design that addresses fundamental issues of learning, teaching and social organization and therefore makes use of the full range of modern social science and life sciences methodology. The use of Education in technology provides a different insight issue related to learning such as the relation between learning type or learning level and appropriate pedagogic strategy, how affect and motivation may influence learning process and why metacognition and collaborative learning is important. The present paper outlines what is educational technology, the essence it has brought to education today, the implications of its usage and how the instructional perspective functions

Key words: Educational technology.

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Definition of Educational Technology

Educational Technology can be defined as 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 learning.

GOALS OF EDUCATIONAL TECHNOLOGY:

Using of Technology in education not only increases the efficiency or effectiveness of current teaching practice, but it also aims at pedagogical change. Educational technology can be considered as a design that addresses fundamental issues of learning, teaching and social organization and therefore makes use of the full range of modern social science and life sciences methodology.

The Goals of Educational Technology:

Technology provides powerful tools to a teacher to try out different designs, so that instead of theories of education, teacher is able to create a science of education. It is a design science of education that determines how different designs of learning environments contribute to learning, cooperation, motivation, etc.

The goals of Education technology are based on several perspectives:

FROM AN INSTRUCTIONAL DESIGN PERSPECTIVE:

The use of Education in technology provides a different insight issue related to learning such as the relation between learning type or learning level and appropriate pedagogic strategy, how affect and motivation may influence learning process and why metacognition and collaborative learning is important.

1.Learning (How to) 2. Pedagogy.

Learning Theory, Affect And Motivation, Learning Level and Learning type

Instructional design perspective

Educational theory, Instruc tional Pedagogic strategies and Instructional design theory.

3. Instructional Design methods

4. Tools & Methods

Educational Technologies, cognitive tools & Instruction design methods

Pedagogical design

FROM A FUNDAMENTAL RESEARCH PERSPECTIVE:

This perspective enables us to adopt a specific stance in Fundamental research and focus on small and well-defined problems such as under which conditions can multimedia animations be effective.

FROM AN INSTITUTIONAL PERSPECTIVE:

A field is implicitly defined by journals, conferences and study programs.

The Journal of Interactive Learning Approach published by the association for the Advancement of computing in Education included the following enumeration of interactive learning environments that gives an idea on the technical scope of the field.

- Authoring systems
- Cognitive tools for learning
- Computer assisted language learning
- Computer based assessment systems
- Computer based training
- Computer mediated communications
- Computer supported collaborative learning
- Distributed learning environments
- Electronic performance support systems
- Interactive learning environments
- Interactive multimedia systems
- Interactive simulations and games
- Intelligent agents on the internet
- Intelligent tutoring systems
- Microworlds
- Virtual reality-based learning systems

FROM A TECHNOLOGY PERSPECTIVE:

Each time a new technology appears soon after it may be hailed as a new solution to education by both researchers and practitioners.

TYPES OF EDUCATIONAL TECHNOLOGIES IN CLASSROOM:

There are many kinds of computer and non-computer technologies currently in use in traditional classrooms. Among these are:

- **Computer in the classroom:** Having a computer in the classroom is an asset to any teacher. With a computer in the classroom, teachers are able to demonstrate a new lesson, present new material, illustrate how to use new programs, and show new websites.
- **Class Websites:** Creating a webpage for a class is an innovative method oof imparting knowledge and instructions. Once a web page is designed, teachers can post homework assignments, student work, famous quotes, trivia games, and so much more.
- **Class Blogs and WIKIS:** There are some of a variety of Web 2.0 tools that are currently being implemented in the classroom. Blogs allow for students to maintain a running dialogue, like a journal, of thoughts, ideas, and assignments that also provide for student comment and reiterative reflection.

Wikis are more group focused to allow multiple members of the group to edit a single document and create a truly collaborative and carefully edited finished product.

- **Wireless classroom microphones:** Noisy classrooms are a daily occurrence, and with the help of microphones, students are able to hear their teachers clearer. Children learn better when they hear the teacher clearly.
- **Mobile devices:** Mobile devices such as clickers or smart phone can be used to enhance the experience in the classroom by providing the possibility for professors to get feedback.

THEORIES ON THE ROLE OF ICT IN EDUCATION:

COGNITIVE LOAD THEORY AND THE DESIGN OF INSTRUCTION:

Cognitive Load theory developed out of several empirical studies of learners, as they interacted with instructional materials. Sweller and his associates began to measure the effects of working memory load, and found that the format of instructional materials has a direct effect on the performance of the learners using those materials.

While the media debates of the 1990s focused on the influences of media on learning, cognitive load effects were documented in several journals. Rather than attempting to substantiate the use of media, these cognitive load learning effects provided an empirical basis for the use of instructional strategies. Mayer asked the instructional design community to reassess the media debate, to refocus their attention on what was most important-learning.

By the mid to late 1990s, Sweller and his associates had discovered several learning effects related to cognitive load and the design of instruction (e.g., the split attention effect, redundancy effect, and the worked- example effect). Later, other researchers like Richard Mayer and his associates soon developed a Cognitive Theory of Multimedia Learning.

In the past decade, cognitive load theory has begun to be internationally accepted and begun to revolutionize how practitioners of instructional design view instruction. Recently, human performance experts have even taken notice of cognitive load theory, and have begun to promote this theory base as the science of instruction, with instructional designers as the practitioners of this field.

Instructional Designers use various instructional strategies to reduce cognitive load. For example, they think that the onscreen text should not be more than 150 words or the text should be presented in small meaningful chunks. The designers also use auditory and visual methods to communicate the information to the learners.

LEARNING DESIGN:

The IMS Learning Design specification supports the use of a wide range of pedagogies in online learning. Rather than attempting to capture the specifics of many pedagogies, it does this by providing a generic and flexible language. This language is designed to enable many different pedagogies to be expressed. The approach has the advantage over alternatives in that the only set of learning design and runtime tools then need to be implemented in order to support the desired wide range of pedagogies. The language was originally developed at the Open University of the Netherlands, after

extensive examination and comparison of a wide range of pedagogical approaches and their associated learning activities, and several iterations of the developing language to obtain a good balance between generality and pedagogic expressiveness.

A criticism of Learning Design theory is that learning is an outcome. While instructional design theory focuses on outcomes, while properly accounting for a multi-variate context that can be predictive, it acknowledges that a guarantee of reliable learning outcomes is improbable. We can only design instruction. We cannot design learning (an outcome)

INSTRUCTIONAL DESIGN MODELS:

ADDIE Model

Perhaps the most common used for creating instructional materials is the ADDIE Model. This acronym stands for the 5 phases contained in the model:

- **Analyze:** Analyze learner characteristics, task to be learned, etc.
- **Design:** Develop learning objectives, choose an instructional approach.
- **Develop:** Create instructional or training materials.
- **Implement:** deliver or distribute the instructional materials.
- **Evaluate:** Make sure the materials achieved the desired goals.

Most of the current instructional design models are variations of the ADDIE model.

Rapid Prototyping:

A sometimes utilized adaptation to the ADDIE model is in a practice known as rapid prototyping.

However, rapid prototyping is somewhat simplistic type of model. At the heart of Instructional Design is the analytic phase. After conducting a thorough analysis, one can choose the model based on his/her findings. Proponents suggest that through an iterative process the verification of the design document saves time and money by catching problems while they are still easy to fix. This approach is not novel to the design of instruction, but appears in many design- related domains including software design, architecture, transportation planning, product development, message design, user experience design etc.

DICK AND CAREY:

Another well-known Instructional design model is **The Dick and Carey Systems Approach Model.** The model was originally published in 1978 by Walter Dick and Lou Carey in their book entitled The Systematic Design of Instruction.

Dick and Carey made a significant contribution to the Instructional design field by championing a systems view of instruction as opposed to viewing instruction as opposed to viewing instruction as a sum of isolated parts. The model addresses instruction as an entire system focusing on the interrelationship between context, content, learning and instruction. According to Dick and Carey, "Components such as the instructor, learners, materials, instructional activities, delivery system and learning and performance environments interact with each other and work together to bring about the

desired learning outcomes." The components of the systems approach model, also known as the Dick and Carey Model, are as follows:

- Identify Instructional goal
- Conduct Instructional Analysis
- Analyze learners and contexts
- Write Performance objectives
- Develop Assessment Instruments
- Develop Instructional Strategy
- Develop and select Instructional materials
- Design and conduct formative evaluation of Instruction.
- Revise Instruction
- Design and conduct summative evaluation.

With this model, components are executed iteratively and in parallel rather than linearly.

Instructional Development Learning systems (IDLS):

Another Instructional design model is the Instructional Development Learning System (IDLS). The model was originally published in 1970 by Peter J. Esseff, Ph.D. in their book entitled IDLS-Pro Trainer 1: How to Design, Develop, and validate Instructional materials

Peter and Mary Essef both received their doctorates in Educational Psychology from the Catholic University of America under the mentorship of Dr. Gabriel Ofiesh, a Founding father of the Military model. Esseff and Esseff contributed synthesizing design, "Instructional Development Learning System" (IDLS).

The components of the IDLS Model are:

- Design a task analysis
- Develop criterion Tests and Performance Measures
- Develop Interactive lnstructional materials
- Validate the Interactive Instructional materials

Other Models:

Some other useful models of Instructional design include the Smith/Ragan model,the Morrison model/Ross/Kemp model and the OAR model.

Learning theories such as behaviorism, constructivism, social learning and cognitivism help shape and define the outcome of instructional materials.

Role for Teachers in Virtual Education:

Lesson Organization:

A primary role of the instructor in an educational setting is to provide guidance in the learning process(Herring & Smaldino, 1997). Student-centred learning is a direction that is taking a strong hold in education today. In particular, it is important in a distance education setting to centre attention

on the student and to focus the instruction away from the teacher and toward the learners. After the initial planning and preparation for instruction is completed, it is time to concentrate on issues, associated with delivery of the instruction.

Instructional Methods:

Teaching methods should be chosen, based on the characteristics of the instructor, and of students, content, and delivery system(Herring & Smaldino, 1997). Due to the increased responsibility for learning placed on the student at a distance, methods that focus on the learners and in corporate interactivity, have been shown to be most successful (Shouder, 1993). Besides determining the appropriate instructional methods to be used in delivering the content, the instructor should also determine ways to involve the class at all instructional sites. With some adaptations, the same methods and techniques that are successful in a traditional classroom setting, usually work as well in distance instruction, especially if they encourage student interaction. The instructor is responsible for the learning environment, created in the traditional and distance classroom settings. The technology incorporated in distance learning, should be considered as a tool to enhance instruction and not as an end unto itself. It has been suggested that if a strategy works in a regular classroom, it will also work in distance education with some adjustment. It is important to consider a variety of techniques but an instructor must remember to think of strategies that engage learners in active rather than passive learning experiences.

Preparing for Remote resources:

When preparing to work with the students at a distance, it is necessary to consider the resources available, to students. This information will provide an instructor with the data necessary for creating equal educational opportunities for all students in the distance education class room. It is important for students to feel that they all have equal status in the class, regardless of where they are located. If this means creating new, and different ways of achieving the same tasks, then the instructor must engage 'in creating endeavours'. While many items deal with the mechanical side of the class room resources: There is a human side too which should not be lost sight of. The presence of a facilitator is often considered optional, but this person can be important for the success of the distance instruction (Herring&Smaldino, 1997). A facilitator is generally an adult who has been hired by an educational institution to be a local contact for students. Facilitators roles vary, depending on their capabilities. They may be on-site during instruction; they may be available prior to and following transmissions, or they may be responsible for hardware and software performance. No matter what the role of the facilitator, it is important to set up a time for discussion considering expectations of each member of the team prior to starting the course. This will help avoid misunderstandings once the course begins.

IMPLICATIONS:

While there may be a lot of other purposes of use of computers in the field of education. There tend to be certain implications as well. One potential implication of computers from educational point of view is the negligence of learning strategies. In future, technology may advance so much where learning becomes possible with little recollection from human memory. This can be detrimental to our unique capacity.

SUGGESTIONS FOR FURTHER RESEARCH:

I would suggest that the research can be made empirical and experimental in order to draw a contrast of human expectations and reality of computers in education.