21世纪教育技术学系列教材

教育技术学英语科技文献精读

主　编／张际平
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总 序

目前，我国在教育技术学科领域发展迅速，越来越多的各类高校都建立了教育技术学专业，通过20多年的建设，该专业已基本形成了从本科、硕士到博士的完整的培养体系。但是，随着新技术与信息通信技术不断发展并已渗透到了教育领域的各个方面，尤其是随之而来的各种新的教育思想与理念、方法与手段的涌现，教育技术学面临了极大的挑战。为了使该专业学生的培养适应这一变化，在课程的设置与相关教材的建设方面有所变化显得尤为重要。近些年来，国内各类高校都针对自己的实际需要，编写和出版了各种相关的教材，但这些教材通常缺乏系统性和前瞻性，许多教材的题材与内容都比较陈旧，很难适应教育技术学专业迅速发展的需要。华东师范大学教育信息技术学系作为我国最早设立教育技术学专业的院系之一，已积累了从本科生培养到博士生培养的大量经验，在如何兼顾教育技术学的宏观关系与学习理论、综合知识与实际能力的培养、培养目标设定与课程设置以及课程设置与教材建设之间的关系方面亦有许多可借鉴之处，为了将这些经验推广开来，我们萌生了编写一套教育技术学系列教材的想法。

近年来，引进国际一流大学的课程或教材已成为各大学不同学科专业建设的一个热点，教育技术学也不例外。但是，我们认为：引进课程或教材并不能替代或等同于自身课程的变革。学科发展的基础是专业，专业发展的基础是课程，而课程发展的核心是教材。教材的创新、系统化、前瞻性将决定课程体系的创新，也将支撑学科发展以及与知识相关的文化价值体系。为此，在全球教育与本土教育的互动、融合与发展中，必须培育课程创新与教材创新的

土壤。坚持引进与自我创新相结合的方式，积极参考享有国际声誉的同类教材，并结合我国的教育实践加以本土化的创新是构建一套与国际同步发展、又符合我国教育实践需求的教育技术学课程与教材体系的必由之路。此外，在这一理念指导下的课程与教材开发过程也是逐步培养一批具有国际学术前沿视野、本土创新意识的优秀教师队伍的过程。

本系列教材是我系积累多年教育技术学专业课程的教学实践、不断参照国内外同专业中优秀教材提炼而成的，涵盖了最新的教育理念、教与学的理论、教学设计、教学模式、研究方法、多媒体与网络教育应用、学习技术、教学技术等主要内容。从课程设置的系统性、先进性、前瞻性与有效性出发，重点考虑使学生在信息通信技术环境下掌握新的教育理念、教育技术的研究方法、基于技术的有效学习方式以及了解各种不同的新的教与学模式，如混合型教与学、研究与探究性学习、协作与自导性学习等。教材强调理论与实践的结合、技术与方法策略的结合、模式与实际案例的结合，力求在理论水平提升、教与学策略掌握、技术手段与方法运用、设计和开发等知识与能力的培养方面对教育技术学专业的学生有全面的引导作用。

本系列教材的编写不仅对我系教育技术学专业本科生的培养，而且对其他各类院校同专业的课程设置与教材建设都具有很好的实际参考价值；对教育技术学学科教师的培养具有较大的借鉴意义；对从事现代远程教育（高校网络学院）和从事成人教育的专业人才的培养也将大有助益。

衷心感谢华东师范大学马和民教授与中国人民大学出版社公管分社对本系列教材的策划，感谢中国人民大学出版社公管分社对本套教材的编辑和出版所做出的努力！

华东师范大学教育信息技术学系
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Contents

Unit 1 Overview of Educational Technology

本章提要

本章为教育技术学概述，重点涉及教育技术学的基本概念与定义，对教育技术学中最常用的核心概念进行了描述，尤其是对 AECT'04 定义中各个关键词进行了描述，同时也涵盖了该领域相关的理论知识、当前与未来的发展趋势以及教育技术学所面临的问题与挑战。

Text A: The Definition of Educational Technology

1. The Definition

Conceptions of educational technology have been evolving as long as the field has, and they continue to evolve. Therefore, today's conception is a temporary one, a snapshot[1] in time. In today's conception, educational technology can be defined as an abstract concept or as a field of practice. The definition is:

Educational technology is the study and ethical[2] practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources.[1] (AECT, 2004)

2. Elements of the Definition

Each of the key terms used in the definition will be discussed as to their intended meaning in the context of[3] the definition.

(1) Study. The theoretical understanding of, as well as the practice of, educational technology, requires continual knowledge construction and refinement through research and reflective practice, which are encompassed in the term "study". That is, "study" refers to information gathering and analysis beyond the traditional conceptions of research.[2] It is intended to include quantitative[4] and qualitative[5] research as well as other forms of disciplined inquiry[6] such as theorizing, philosophical analysis, historical investigations, development projects, fault analyses, system analyses, and evaluations. Research has traditionally been both a generator of new ideas and an evaluative process to help improve practice. Research can be conducted based upon a variety of methodological constructs as well as several contrasting theoretical constructs. The research in educational technology has grown from investigations

attempting to "prove" that media and technology are effective tools for learning, to investigations created to describe and detail the appropriate applications of processes and technologies to the improvement of learning.

Important to the latest research in educational technology is the use of authentic[7] environments and the voice of practitioners as well as researchers. Inherent[8] in the word "research" is the iterative[9] process it encompasses. Research seeks to resolve problems by investigating solutions, and those attempts lead to new practice and therefore new problems and questions. Certainly, the ideas of reflective[10] practice and inquiry based upon authentic settings are valuable perspectives on research. Reflective practitioners consider the problems in their environment (for example, a learning problem of their students) and attempt to resolve the problems by changes in practice, based upon both research results and professional experience. "Reflection on this process leads to changes in the considered solution and further attempts to identify and solve problems in the environment, a cyclical[11] process of practice/reflection that can lead to improved practice" (Schön, 1990).

Current inquiry problem areas are often determined by the influx[12] of new technologies into educational practice. The history of the field has recorded many research programs initiated in response to new technologies, investigating their best design, development, utilization, and management. [3] However, more recently, the inquiry programs in educational technology have been influenced by growth and change in major theoretical positions in learning theory, information management, and other allied fields. For example, the theoretical lenses of cognitive and constructivist theories have changed the emphasis in the field from teaching to learning. These theoretical shifts have changed the orientation of the field dramatically from a field driven by the design of instruction to be "delivered" in a variety of formats (technologies or strategies) to a field which seeks to create learning environments in which learners can explore — often assisted by electronic support systems — in order to arrive at meaningful understanding. [4] The research emphasis has shifted toward observing learners' active participation and construction of their own path toward learning. In other words, the interest is moving away from the design of pre-specified instructional routines and toward the design of environments to facilitate learning.

(2) Ethical Practice. Educational technology has long had an ethical stance and a list of ethical practice expectations. The AECT Ethics Committee has been active in defining the field's ethical standards and in providing case examples from which to discuss and understand the implications [13] of ethical concerns for practice. In fact, the recent emphasis in society on the ethical use of media and on the respect for intellectual property has been addressed by this AECT committee for the educational technology field.

There has been an increase in concerns and attention to the ethical issues within educational technology. Ethics are not merely "rules and expectations" but are a basis for practice. In fact, ethical practice is less a series of expectations, boundaries, and new laws than it is an approach or construct from which to work. Our definition considers ethical practice as essential to our professional success, for without the ethical considerations being addressed, success is not possible. [5]

From the perspective of critical theory, professionals in educational technology must question their practices and concern themselves with their appropriate and ethical use. From the perspective of critical theory, it is vital to question even basic assumptions such as the efficacy of traditional constructs such as the systems approach and technologies of instruction, as well as the power position of those designing and developing the technological solutions. [6] A postmodern stance [14] might impel [15] educational technologists to consider their learners, the environments for learning, and the needs and the "good" of society as they develop their practices. Considering who is included, who is empowered, and who has authority are new issues in the design and development of learning solutions, but an ethical stance insists that educational technologists question their practice areas in these ways as well as in the more traditional constructs of efficiency or effectiveness. [7]

The AECT Code of Ethics includes principles "intended to aid members individually and collectively in maintaining a high level of professional conduct" (Welliver, 2001). AECT's code is divided into three categories: Commitment to the Individual, such as the protection of rights of access to materials, and efforts to protect the health and safety of professionals; Commitment to Society, such as truthful public statements regarding educational matters or fair and equitable practices with those

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rendering [16] service to the profession, and Commitment to the Profession, such as improving professional knowledge and skill, and giving accurate credit to work and ideas published. Each of the three principle areas has several listed commitments which help inform educational technology professionals regarding their appropriate actions, regardless of their context or role. Consideration is provided for those serving as researchers, professors, consultants, designers, and learning resource directors, for example, to help shape their own professional behaviors and ethical conduct.

(3) Facilitating. The shift in views of learning and instruction reflected in cognitive and constructivist theories has caused a dramatic change in assumptions about the connection between instruction and learning. Earlier definitions in this field implied a more direct cause-and-effect [17] relationship between instructional interventions [18] and learning. For example, the 1963 AECT definition refers to "the design and use of messages which control the learning process". Later definitions were less explicit [19], but continued to imply a relatively direct connection between well-designed, well-delivered instruction and effective learning. With the recent paradigm [20] shift toward greater learner ownership and responsibility has come a role for technology that is more facilitative than controlling.

In addition, as learning goals in schools, colleges, and other organizations have shifted toward deep rather than shallow learning, the learning environments have become more immersive [21] and more authentic. In these environments, the key role of technology is not so much to present information in drill-and-practice format (to control learning) but to provide the problem space and the tools to explore it (to support learning). In such cases, the immersive environments and cognitive tools that educational technologists help design and use are created to guide learners, to make learning opportunities available, and to assist learners in finding the answers to their questions. [8] Therefore, educational technology claims to facilitate learning rather than to cause or control learning; that is, it can help create an environment in which learning could occur more easily.

Facilitating includes the design of the environment, the organizing of resources, and the providing of tools. It may still entail [22] the use of direct instruction within a pre-specified framework in some cases, or the use of open-ended inquiry methods to

guide further learning in other cases. The learning events can take place in face-to-face settings or in virtual environments, as in micro-worlds or distance learning.

(4) Learning. The simplest type of learning is the retention of information. In schools and colleges, learning may be assessed by means of tests that require the demonstration of such retention. Computer-based instruction units (as in "integrated learning systems") frequently operate this way. The learning goal may include understanding as well as retention. Assessments that require paraphrasing [23] or problem solving may tap the understanding dimension. Such forms of assessment are more challenging, mainly because they are more labor-intensive [24] to evaluate. Learning goals may be more ambitious, such that the knowledge and skills are applied in active use. "To assess this level of learning requires real or simulated problem situations, something that is obviously challenging to arrange. Some would characterize these differences in types of learning simply as surface vs. deep learning" (Weigel, 2001).

Such types or levels of learning have long been acknowledged, but there has been a growing demand in schools, higher education, and corporate training for more attention to the active-use level. [9] It is increasingly perceived that time and money spent on inculcating [25] and assessing "inert knowledge" is essentially wasted. If learners don't use the knowledge, skills, and attitudes outside the classroom, what is the point of teaching them? So today when educators talk about the pursuit [26] of learning, they usually mean productive, active-use, and deep learning. Pursuing deep learning implies different instructional and assessment approaches than surface learning, so this shift in connotation has profound [27] implications for what processes and resources are "appropriate".

(5) Improving. For a field to have any claim on public support, it must be able to make a credible case for offering some public benefit. It must provide a superior way to accomplish some worthy goals. For example, for chefs to claim to be culinary professionals, they must be able to prepare food in ways that are somehow better than non-specialists — more appealing [28], safer, more nutritious, prepared more efficiently, or the like. In the case of educational technology, to "improve performance" most often entails a claim of effectiveness: that the processes lead predictably to quality products, and that the products lead predictably to effective learning, changes in capabilities that carry over into real-world application.

Effectiveness often implies efficiency, that is, that results are accomplished with the least wasted time, effort, and expense. But what is efficient depends on the goals being pursued. If you want to drive from San Francisco to Los Angeles in the shortest time, Interstate Highway 5 is likely to be efficient. However, if your real goal is to see the ocean views along the way, State Highway 1, which winds along the coastline, would be more efficient. Likewise, designers might well disagree on methods if they do not have the same learning goals in mind. To a great extent, the systematic instructional development movement has been motivated by concerns of efficiency, defined as helping learners reach predetermined goals that are measured by objective assessments.

The concept of efficiency is viewed differently in the constructivist learning approach. In this approach, designers place greater emphasis on the appeal of the instruction and on the extent to which learners are empowered to choose their own goals and their own learning paths. They would more likely measure success in terms of knowledge that is deeply understood and experienced, and able to be applied to real-world problems as opposed to less authentic or embedded measures of learning, such as objective tests. [10] Such designs, however, would still need to be planned for learning to occur within a particular time frame with some goals in mind and resources for meeting those goals. Among parties who have managed to agree on goals, the efficiency in reaching those goals surely would be regarded as a plus.

With high expectations for learning, and high stakes [29] for successful achievement becoming ever more important in society, other things being equal, faster is better than slower and cheaper is better than more expensive.

(6) Performance. In the context of this definition, performance refers to the learner's ability to use and apply the new capabilities gained. Historically, educational technology has always had a special commitment to results, exemplified by programmed instruction, the first process to be labeled educational technology. Programmed instruction materials were judged by the extent to which users were able to perform the "terminal objective" after instruction. Terminal objectives were stated in terms of the actual conditions for which people were being trained or educated and were assessed according to how well learners functioned under these conditions.

The reference to "improving performance" also reinforces the newer connotation

of learning: not just inert knowledge but usable capability. The use of "performance" in this definition is not meant to imply that educational technology encompasses all forms of performance improvement. As is advocated in the related field of performance technology, "there are many different sorts of interventions that may be used in the workplace to improve performance: tool, incentives [30], organizational change, cognitive support, job redesign, in addition to instruction" (Stolovitch & Keeps, 1992). Since it encompasses all these sorts of interventions, performance technology is a broader concept than educational technology.

The definition mentions three major functions that are integral to the concept of educational technology — creating, using, and managing. These functions can be viewed as separate sets of activities that might be carried out by different people at different times. They can also be viewed as phases of the larger process of instructional development. Advocates of a systems approach to instructional development would go further to specify that these functions be accompanied by evaluation processes at each phase. Monitoring decisions and taking corrective actions at each phase are critical attributes of the systems approach. [11] Examples of such evaluation activities are mentioned under the headings of Creating, Using, and Managing below.

(7) Creating. Creation refers to the research, theory, and practice involved in the generation of learning environments in many different settings, formal and non-formal. Creating can include a variety of activities, depending on the design approach that is used. Design approaches can evolve from different developers' mindsets: aesthetic [31], scientific, engineering, psychological, procedural, or systemic, each of which can be employed to produce the necessary materials and conditions for effective learning.

A systems approach, for example, might entail procedures for analyzing an instructional problem, designing and developing a solution, evaluating and revising decisions made at each step, and then implementing a solution. Assessing results and taking corrective action along the way are referred to as formative evaluation, while assessing the impact of the project in the end is referred to as summative evaluation [32]. Different sorts of evaluative questions are asked at different stages. At the front-end analysis stage: is there a performance problem and does it entail instructional needs? In learner analysis: what are the characteristics of the learners? In task analysis: what

capabilities must the learners master? At the design stage: what are the learning objectives? Is the blueprint aligned with those objectives? Do instructional materials instantiate [33] the principles of message design? At the development stage: does the prototype actually guide learners toward the objectives? At the implementation stage: is the new solution being used and used properly? What is its impact on the original problem?

Design and development processes are influenced by the varied analog and digital technologies used to create learning environments. Designing for teacher-led classroom instruction, for example, may follow a different path than designing for a computer-based simulation game. What is created may be not only the materials for instruction and the surrounding learning environments, but also databases for knowledge management, online databases for problem exploration, automated help systems, and portfolios [34] for displaying and assessing learning.

(8) Using. This element refers to the theories and practices related to bringing learners into contact with learning conditions and resources. As such, it is Action Central, where the solution meets the problem. Using begins with the selection of appropriate processes and resources — methods and materials, in other words — whether that selection is done by the learner or by an instructor. Wise selection is based on materials evaluation, to determine if existing resources are suitable for this audience and purpose. Then the learner's encounter with the learning resources takes place within some environment following some procedures, often under the guidance of an instructor, the planning and conduct of which can fit under the label of utilization. If the resources involve unfamiliar media or methods, their usability may be tested before use.

In some cases, there is a conscious [35] effort to bring an instructional innovation to the attention of instructors, to market it. This diffusion process can be another phase of using. When teachers incorporate new resources into their curricular plans, this is referred to as integration; when such integration takes place on a larger scale, incorporating the innovation into the organizational structure, it is referred to as institutionalization [36].

In a systems approach, the design team would monitor the effectiveness of the

usage at each phase and take corrective actions where indicated.

(9) Managing. One of the earliest responsibilities of professionals in the field of educational technology has been management; in the early years, this took the form of directing the operations of audiovisual centers. As media production and instructional development processes became more complicated and larger-scale, they had to master project management skills as well. As distance education programs based on information and communications technologies (ICT) developed, educational technologists found themselves involved in delivery system management. In all of these managerial functions, there are sub-functions of personnel management and information management, referring to the issues of organizing the work of people and planning and controlling the storage and processing of information in the course of managing projects or organizations. Prudent [37] management also requires program evaluation. In the systems approach, this entails quality control measures to monitor results and quality assurance measures to enable continuous improvement of the management processes.

People who carry out management functions may be seen as exercising leadership, combining management expertise with support of ethical practice in all phases of educational technology practice.

(10) Appropriate. The term "appropriate" is meant to apply to both processes and resources, denoting suitability for and compatibility [38] with their intended purposes.

The term "appropriate technology" is widely used internationally in the field of community development to refer to a tool or practice that is the simplest and most benign solution to a problem. The concept grew out of the environmental movement of the 1970s, sparked by the book, *Small Is Beautiful* (Schumacher, 1975), in which the term was coined. In this sense, appropriate technologies are those that are connected with the local users and cultures and are sustainable [39] within the local economic circumstances. Sustainability is particularly critical in settings like developing countries, to ensure that the solution uses resources carefully, minimizes the damage to the environment, and will be available to future generations.

"AECT's professional standards have longed recognized that appropriateness has an ethical dimension. A number of provisions [40] in the AECT Code of Ethics

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