

全国教育科学“十五”规划国家重点课题
“信息化进程中的教育技术发展研究”子课题研究成果

教育技术

Educational Technology

专业英语

刘世清 关 伟 王肖虹 等编著



电子工业出版社
PUBLISHING HOUSE OF ELECTRONICS INDUSTRY

<http://www.phei.com.cn>

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電子工業出版社

Publishing House of Electronics Industry

北京·BEIJING

内 容 简 介

本书精选 26 篇教育技术专业英文文献,全面反映教育技术发展的历史和现状。通过专业英语和教育技术最新专业知识的结合,使学习者不仅能掌握大量本专业英语术语的表达方法,而且能学习权威专家最新的研究成果,同步提高专业知识和专业英语水平。

全书分为 5 章:教育技术的历史与基本理论、教学设计、绩效技术与知识管理、远程教育和信息化环境与资源建设。书中原文配有词汇、专业术语、参考译文、思考与练习等。书末附有相关资源介绍。

本书可作为教育技术专业本科生、研究生的专业英语教材,也可作为教育技术和绩效技术从业人员的学习用书。

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图书在版编目(CIP)数据

教育技术专业英语 / 刘世清, 关伟, 王肖虹等编著. —北京: 电子工业出版社, 2004.7

ISBN 7-121-00057-1

I. 教… II. ① 刘… ② 关… ③ 王… III. 教育技术学—英语—高等学校: 技术学校—教材
IV.H31

中国版本图书馆 CIP 数据核字 (2004) 第 061729 号

责任编辑: 张 旭 张贵芹

印 刷: 北京市顺义兴华印刷厂

出版发行: 电子工业出版社

北京市海淀区万寿路 173 信箱 邮编: 100036

经 销: 各地新华书店

开 本: 787×980 1/16 印张: 16.25 字数: 304 千字

印 次: 2006 年 1 月第 2 次印刷

定 价: 25.00 元

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前 言

教育技术作为一门新兴的综合性学科,发展颇为迅速,但在教材建设方面还相对滞后,具体表现是迄今为止还没有一本教育技术专业英语教材,教师在讲授教育技术专业英语课时,更多地是按照自己的理解寻找一些相关材料作为教学内容。由于任课教师研究方向的差异以及对教育技术理解的不同,所选取的材料往往比较繁杂,这给本科生和研究生的专业英语教学带来了不少困难,也影响了教学质量。为此,我们组织了讲授教育技术专业英语的教师和从美国学成归国人员组成编写组,经过两年的努力,编写成本书。

本书具有以下几个特点:

1. 把专业英语和专业知识结合起来。学生通过学习书中的专业英语文献,不仅能掌握本专业各种术语的表达方法,而且能学习权威专家最新的研究成果,使专业知识得到进一步提高。

2. 内容逐步递进,能适合不同层次的使用者。教材中的每一章都分为两部分,前半部分主要提供给本科学生,后半部分提供给研究生。本科生可以根据个人喜好研修后半部分内容;对于研究生,希望能全面学习和研究本教材的内容,从整体上把握教育技术的最新发展动态。

3. 教材内容全面,选择精细。书中的内容几乎涵盖了教育技术涉及的所有领域,基本能反映当前教育技术研究的全貌;原文均为国际权威专家的文献资料;对原文的解读处理,除了有参考译文外,还有词汇、专业术语、思考与练习等。书后附有教育技术相关资源介绍。

本书的编写力争实现三个目标:一是为教育技术专业的学生学习专业英语提供良好的教材;二是帮助学习者通过学习专业英语来获得较新的专业知识;三是为教育技术及相关人员提供查找教育技术资源的工具。

鉴于资料 and 水平所限,难免会有不足与错误之处,恳请各位读者不吝赐教,批评指正,将发现的问题和有创意的建议反馈给我们,以利于修改和完善。

在编写本书的过程中,编写组人员参阅了大量英文文献资料,并对其逐一筛选,最后选用了教育技术领域多位专家的 26 篇力作。写作之初,我们与各位原文作者进行了各种形式的联系,大部分作者同意把他们的论文选入本书,我们对他们的爱心和诚意表示深深的感谢。但至今我们仍然和少部分作者未能取得联系,请他们见到此书后联系我们:

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编 者

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第 1 章 教育技术的历史与基本理论

§ 1 A History of Instructional Design and Technology

Part I A History of Instructional Media

This is the first of a two-part article that will discuss the history of the field of instructional design and technology in the United States. A definition of the field is provided and the major features of the definition are identified. A rational account for using instructional design and technology as the label for the field is also presented. Events in the history of instructional media, from the early 1900s to the present day, are described. The birth of school museums, the visual and audiovisual instruction movements, the use of media during World War II, and the interest in instructional television, computers, and the Internet are among the topics discussed. The article concludes with a summarization of the effects media have had on instructional practices, and a prediction regarding the effect computers, the Internet, and other digital media will have on such practices over the next decade.

Approximately 15 years ago I wrote a history of the field of *instructional technology* (Reiser, 1987), which appeared as a chapter in a book edited by Robert M. Gagne. Since that time, many innovations and new ideas have affected the nature of the field. For example, recent technological advances, new ideas and theories regarding the learning process, and new views of how to promote learning and performance in classrooms and in the workplace have all had an influence on the field. In light of all the changes that have taken place, it seems appropriate to update the earlier history. This article and another that will appear in the next issue of *Educational Technology Research and Development* serve as an update of my description of the history of the field I now refer to as instructional design and technology.

Before I begin to discuss the history of the field of instructional design and technology, and before I provide my reasons for labeling it as such, let me provide a definition of field:

The field of instructional design and technology encompasses the analysis of learning and performance problems, and the design, development, implementation, evaluation and management of instructional and non-instructional processes and resources intended to improve learning and performance in a variety of settings, particularly educational institutions and the

workplace. Professionals in the field of instructional design and technology often use systematic instructional design procedures and employ a variety of instructional media to accomplish their goals. Moreover, in recent years, they have paid increasing attention to non-instructional solutions to performance problems. Research and theory related to each of the aforementioned areas is also an important part of the field. (Reiser, in press)

What are the major features of this definition? In many ways it is similar to the most recent Association for Educational Communication and Technology (AECT) definition of the field (Seels & Richey, 1994). Like the 1994 AECT definition, the definition presented in this article mentions five categories of activities or practices: (a) *design*, (b) *development*, (c) *utilization or implementation*, (d) *management*, and (e) *evaluation*, often associated with the field; and adds a sixth category, (f) *analysis*. Moreover, like the 1994 definition, the current definition relates those activities or practices to processes and resources for learning. In addition, the current definition indicates that research and theory, as well as practice, play an important role in the field.

In several respects, however, the current definition goes beyond the 1994 AECT definition. For example, the current definition makes specific reference to some of the performance technology concepts that have recently expanded the nature of the field (e.g., *analyzing performance problems in the workplace* and employing *non-instructional* solutions, as well as instructional solutions, to solve those problems). Moreover, the current definition highlights two practices that have, over the years, formed the core of the field. These two practices are (a) *the use of media for instructional purposes* and (b) *the use of systematic instructional design* procedures (often simply called instructional design). Although many have argued about the value of employing these practices, they remain as the key defining elements of the field of instructional design and technology. Individuals involved in the field are those who spend a significant portion of their time working with media, or with tasks associated with systematic instructional design procedures, or with both.

Why use the term *instructional design and technology*, rather than instructional technology, as the label for the field? Because in spite of the many efforts to clearly define the broad meaning of the latter term (Reiser & Ely, 1997), most individual outside of the profession, as well as many inside it, when asked to define the term *instructional technology* mention computers, videos, CD-ROMs, overhead and slide projectors, and other types of hardware and software typically associated with the term *instructional media*. In other words, most individuals equate the term *instructional technology* with the term *instructional media*. In light of this fact, perhaps it is time to reconsider the label we use for the broad field that encompasses the areas of instructional media, instructional design and performance technology. While any of a number of terms come to

mind, I like instructional design and technology (IDT). This term, which has been employed by one of the professional organizations in our field (Professors of Instructional Design and Technology), directly refers to the key concepts mentioned earlier—instructional design and instructional technology (i.e., instructional media). Moreover, as my description of the history of instructional design will indicate, in recent years many of the concepts associated with the performance technology movement have been regularly employed by those individuals who call themselves instructional designers.

As stated earlier, this history of the field will appear in two articles in succeeding issues of this journal. This article focuses on the history of instructional media, and the second article will focus on the history of instructional design. This is a natural separation because, from a historical perspective, most of the practices related to instructional media have occurred independent of developments associated with instructional design.

It should also be noted that although many important events in the history of the IDT field have taken place in other countries, the emphasis in this article and the one that will follow will be on events that have taken place in the United States.

History of Instructional Media

The term *instructional media* has been defined as the physical means via which instruction is presented to learners (Reiser & Gagne, 1983). Under this definition, every physical means of instructional delivery, from the live instructor to the textbook to the computer and so on, would be classified as an instructional medium. It may be wise for practitioners in the field to adopt this viewpoint; however, in most discussions of the history of instructional media, the three primary means of instruction prior to the 20th century (and still the most common means today)—the teacher, the chalkboard, and the textbook—have been categorized separately from other media (cf. Commission on Instructional Technology, 1970). In order to clearly describe the history of media, this viewpoint will be employed in this article. Thus, instructional media will be defined as the physical means, other than the teacher, chalkboard, and textbook, via which instruction is presented to learners.

School Museums

In the United States, the use of media for instructional purposes has been traced back to at least as early as the first decade of the 20th century (Saettler, 1990). It was at that time that school museums came into existence. As Saettler (1968) has indicated, these museums “served as the

central administrative unit(s) for visual instruction by (their) distribution of portable museum exhibits, stereographs (three-dimensional photographs), slides, films, study prints, charts, and other instructional materials” (p. 89). The first school museum was opened in St. Louis in 1905, and shortly thereafter, school museums were opened in Reading, PA, and Cleveland, OH. Although few such museums have been established since the early 1900s, the district-wide media center may be considered a modern-day equivalent.

Saettler (1990) has also stated that the materials housed in school museums were viewed as supplementary curriculum materials. They were not intended to supplant the teacher or the textbook. Throughout the past 100 years, this early view of the role of instructional media has remained prevalent in the educational community at large. That is, during this time period most educators have viewed instructional media as supplementary means of presenting instruction. In contrast, teachers and textbooks are generally viewed as the primary means presenting instruction, and teachers are usually given the authority to decide what other instructional media they will employ. Over the years, a number of professionals in the IDT field (e.g., Heinich, 1970) have argued against this notion, indicating that (a) teachers should be viewed on an equal footing with instructional media—as just one of many possible means of presenting instruction; and (b) teachers should not be given sole authority for deciding what instructional media will be employed in classrooms. However, in the broad educational community, these viewpoints have not prevailed.

The Visual Instruction Movement and Instructional Films

As Saettler (1990) has indicated, in the early part of the 20th century, most of the media housed in school museums were visual media, such as films, slides, and photographs. Thus, at the time, the increasing interest in using media in the school was referred to as the “visual instruction” or “visual education” movement. The latter term was used at least as far back as 1908, when the Keystone View Company published *Visual Education*, a teacher’s guide to lantern slides and stereographs.

Besides lantern slide projectors and stereograph viewers, which were used in some schools during the second half of the 19th century (Anderson, 1962), the motion picture projector was one of the first media devices used in schools. In the United States, the first catalog of instructional films was published in 1910. Later that year, the public school system of Rochester, NY, became the first to adopt films for regular instructional use. In 1913, Thomas Edison proclaimed: “Books will soon be obsolete in the schools .It is possible to teach every branch of

human knowledge with the motion picture. Our school system will be completely changed in the next ten years" (cited in Saettler, 1968, p. 98).

Ten years after Edison made his forecast, the changes he had predicted had not come about.

However, during this decade (1914—1923), the visual instruction movement did grow. Five national professional organizations for visual instruction were established, five journals focusing on visual instruction began publication, more than 20 teacher-training institutions began offering courses in visual instruction, and at least a dozen large-city school systems developed bureaus of visual education (Saettler, 1990).

The Audiovisual Instruction Movement and Instructional Radio

During the remainder of the 1920s and through much of the 1930s, technological advances in such areas as radio broadcasting, sound recordings, and sound motion pictures led to increased interest in instructional media. With the advent of media incorporating sound, the expanding visual instruction movement became known as the audiovisual instruction movement (Finn, 1972; McChuskey, 1981). However, McChuskey, who was one of the leaders in the field during this period, indicated that while the field continued to grow, the educational community at large was not greatly affected by that growth. He stated that by 1930, commercial interests in the visual instruction movement had invested and lost more than \$50 million, only part of which was due to the Great Depression, which began in 1929.

In spite of the adverse economic effects of the Great Depression, the audiovisual instruction movement continued to evolve. According to Saettler (1990), one of the most significant events in this evolution was the merging, in 1932, of the three existing national professional organizations for visual instruction. As a result of this merger, leadership in the movement was consolidated within one organization, the Department of Visual Instruction (DVI), which at that time was part of the National Education Association. Over the years, this organization, which was created in 1923, and which is now called AECT, has maintained a leadership role in the field of instructional design and technology.

During the 1920s and 1930s, a number of textbooks on the topic of visual instruction were written. Perhaps the most important of these textbooks was *Visualizing the Curriculum* (Hoban, Hobart, & Zissman, 1937). In this book, the authors stated that the value of audiovisual material was a function of their degree of realism. The authors also presented a hierarchy of media, ranging from those that could only present concepts in an abstract fashion to those that allowed for very concrete representations (Heinich, g01enda, Russell, & Smaldin0,1999). Some of these

ideas had previously been discussed by others, but had not been dealt with as thoroughly. In 1946, Edgar Dale further elaborated on these ideas when he developed his famous Cone of Experience. Throughout the history of the audiovisual instruction movement, many have indicated that part of the value of audiovisual materials is their ability to present concepts in a concrete manner (Saettler, 1990).

A medium that gained a great deal of attention during this period was radio. By the early 1930s, many audiovisual enthusiasts were hailing radio as the medium that would revolutionize education. For example, in referring to the instructional potential of radio, films, and television, the editor of publications for the National Education Association stated that "tomorrow they will be as common as the book and powerful in their effect on learning and teaching" (Morgan, 1932, p. ix). However, contrary to these sorts of predictions, over the next 20 years radio had very little impact on instructional practices (Cuban, 1986).

World War II

With the onset of World War II, the growth of the audiovisual instruction movement in the schools slowed; however, audiovisual devices were used extensively in the military services and in industry. For example, during the war the United States Army Air Force produced more than 400 training films and 600 filmstrips, and during a two-year period (from mid-1943 to mid-1945) it was estimated that there were more than four million showings of training films to United States military personnel. Although there was little time and opportunity to collect hard data regarding the effect of these films on the performance of military personnel, several surveys of military instructors revealed that they felt that the training films and filmstrips used during the war were effective training tools (Saettler, 1990). Apparently, at least some of the enemy agreed; in 1945, after the war ended, the German Chief of General Staff said: "We had everything calculated perfectly except the speed with which America was able to train its people. Our major miscalculation was in underestimating their quick and complete mastery of film education" (cited in Olsen & Bass, 1982, p. 33).

During the war, training films also played an important role in preparing civilians in the United States to work in industry. In 1941, the federal government established the Division of Visual Aids for War Training. From 1941 to 1945, this organization oversaw the production of 457 training films. Most training directors reported that the films reduced training time without having a negative impact on training effectiveness, and that the films were more interesting and resulted in less absenteeism than traditional training programs (Saettler, 1990).

In addition to training films and film projectors, a wide variety of other audiovisual materials and equipment were employed in the military forces and in industry during World War II. Those devices that were used extensively included overhead projectors, which were first produced during the war; slide projectors, which were used in teaching aircraft and ship recognition; audio equipment, which was used in teaching foreign languages; and simulators and training devices, which were employed in flight training (Olsen & Bass, 1982; Saettler, 1990).

Post-World War II Developments and Media Research

The audiovisual devices used during World War II were generally perceived as successful in helping the United States solve a major training problem—namely, how to train effectively and efficiently large numbers of individuals with diverse backgrounds. As a result of this apparent success, after the war there was a renewed interest in using audiovisual devices in the schools (Finn, 1972; Olsen & Bass, 1982).

In the decade following the war, several intensive programs of audiovisual research were undertaken (e.g., Carpenter & Greenhill, 1956; Lumsdaine, 1961; May & Lumsdaine, 1958). The research studies that were conducted as part of these programs were designed to identify how various features, or attributes, of audiovisual materials affected learning; the goal is being to identify those attributes that would facilitate learning in given situations. For example, one research program, conducted under the direction of Arthur A. Lumsdaine, focused on identifying how learning was affected by various techniques for eliciting over student response during the viewing of instructional films (Lumsdaine, 1963).

The post-World War II audiovisual research programs were among the first concentrated efforts to identify principles of learning that could be used in the design of audiovisual materials. However, educational practices were not greatly affected by these research programs in that many practitioners either ignored, or were not made aware of, many of the research findings (Lumsdaine, 1963, 1964).

Most of the media research studies conducted over the years have compared how much students have learned after receiving a lesson presented via a particular medium, such as film, radio, television, or the computer, versus how much students have learned from live instruction on the same topic. Studies of this type, often called media comparison studies, have usually revealed that students learned equally well regardless of the means of presentation (Clark, 1983, 1994; Schramm, 1977). In light of these repeated findings, critics of such research have suggested that the focus of such studies should change. Some have argued that researchers should focus on the attributes (characteristics) of media (Levie & Dickie, 1973); others have suggested an

examination of how media influence learning (Kozma, 1991,1994); and still others have suggested that the research focus should be on instructional methods, rather than on the media that deliver those methods (Clark, 1983, 1994). In recent years, some of these types of studies have become more prevalent.

Theories of Communication

During the early 1950s, many leaders in the audiovisual instruction movement became interested in various theories or models of communication, such as the model put forth by Shannon and Weaver (1949). These models focused on the communication process, a process involving a sender and a receiver of a message, and a channel, or medium, through which that message is sent. The authors of these models indicated that during planning for communication it was necessary to consider all the elements of the communication process, and not just focus on the medium, as many in the audiovisual field tended to do. As Berlo (1963) stated: "As a communication man I must argue strongly that it is the process that is central and that the media, though important, are secondary" (p. 378). Several leaders in the audiovisual movement, such as Dale (1953) and Finn (1954), also emphasized the importance of the communication process. Although at first, audiovisual practitioners were not greatly influenced by this notion (Lumsdaine, 1964; Meierhenry, 1980), the expression of this point of view eventually helped expand the focus of the audiovisual movement (Ely, 1963,1970; Silber, 1981).

Instructional Television

Perhaps the most important factor to affect the audiovisual movement in the 1950s was the increased interest in television as a medium for delivering instruction. Prior to the 1950s, there had been a number of instances in which television had been used for instructional purposes (Gumpert, 1967; Taylor, 1967). During the 1950s, however, there was a tremendous growth in the use of instructional television. This growth was stimulated by at least two major factors: (a) the setting aside by the Federal Communications Commission of educational channels, and (b) Ford Foundation funding.

The 1952 decision by the Federal Communications Commission to set aside 242 television channels for educational purposes, led to the rapid development of a large number of public (then called "educational") television stations. By 1955, there were 17 such stations in the United States, and by 1960 that number had increased to more than 50 (Blakely, 1979). One of the primary missions of these stations was the presentation of instructional programs. As Hezel (1980) indicated: "The teaching role has been ascribed to public broadcasting since its origins.