Cognitive Approaches To Automated Instruction

Useful to researchers as well as practitioners looking for guidance on designing automated instruction systems, this book provides a snapshot of the state-of-the-art in this research area. In so doing, it focuses on the two critical problems: first, diagnosis of the student's current level of understanding or performance; and second, selection of the appropriate intervention that will transition the student toward expert performance. Containing a comprehensive set of principled approaches to automated instruction, diagnosis, and remediation, it is the first volume on the topic to provide specific, detailed guidance on how to develop these systems. Leading researchers and practitioners represented in this book address the following questions in each chapter: * What is your approach to cognitive diagnosis for automated instruction? * What is the theoretical basis of your approach? * What data support the utility of the approach? * What is the range of applicability of your approach? * What knowledge engineering or task analysis methods are required to support your approach? Referring to automated instruction as instruction that is delivered on any microprocessor-based system, the contributors to -- and editors of -- this book believe that it is possible for automated instructional systems to emulate the desirable properties of human tutors in one-on-one instruction.
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**Cognitive Approaches To Automated Instruction** - J. Wesley Regian - 2013-05-13

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**Resources in Education** - - 1994

**Handbook of Writing Research, Second Edition** - Charles A. MacArthur - 2016-10-31

The definitive reference in the field, this volume synthesizes current knowledge on writing development and instruction at all grade levels. Prominent scholars examine numerous facets of writing from sociocultural, cognitive, linguistic, neuroscience, and new literacy/technological perspectives. The volume reviews the evidence base for widely used instructional approaches, including those targeting particular components of writing. Issues in teaching specific populations—including students with disabilities and English learners—are addressed. Innovative research methods and analytic tools are clearly explained, and key directions for future investigation identified. New to This Edition *Chapters on genre instruction, evaluation and revision, argumentative writing, computer-based
education: its research, methodology, and technology. Fifteen stimulating, of-school writing, translation, and self-regulation. *Many new topics and authors, including more international perspectives. *Multiple chapters connect research findings to the Common Core writing standards. See also the editors’ Best Practices in Writing Instruction, Second Edition, an accessible course text and practitioner’s guide.

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Automating Instructional Design - J. Michael Spector - 1993

Understanding Models for Learning and Instruction: - Dirk Ifenthaler - 2008-02-22
The pioneering research and theories of Norbert Seel have had a profound impact on educational thought in mathematics. In this special tribute, an international panel of researchers presents the current state of model-based education: its research, methodology, and technology. Fifteen stimulating, sometimes playful chapters link the multiple ways of constructing knowledge to the complex real world of skill development. This synthesis of latest innovations and fresh perspectives on classic constructs makes the book cutting-edge reading for the researchers and educators in mathematics instruction building the next generation of educational models.

This edited book gives a comprehensive picture of the state of the art in authoring systems and authoring tools for advanced technology instructional systems. It includes descriptions of fifteen systems and research projects from almost every significant effort in the field. The book will appeal to researchers, teachers and advanced students working in education, instructional technology and computer-based education, psychology, cognitive science and computer science.

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**Research in Education** - 1973

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**Biomedical Index to PHS-supported Research** - 1990

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**Diagnostic Monitoring of Skill and Knowledge Acquisition** - Norman Frederiksen - 2013-07-04

An adjunct to the increased emphasis on developing students’ critical thinking and higher order skills is the need for methods to monitor and evaluate these abilities. These papers provide insight into current techniques and examine possibilities for the future. The contributors to Diagnostic Monitoring of Skill and Knowledge Acquisition focus on two beliefs: that new kinds of tests and assessment methods are needed; and that instruction and learning can be improved by developing new assessment methods based on work in cognitive science.

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**Learning to Solve Problems** - David H. Jonassen - 2010-09-13

This book provides a comprehensive, up-to-date look at problem solving research and practice over the last fifteen years. The first chapter describes differences in types of problems, individual differences among problem-solvers, as well as the domain and context within which a problem is being solved. Part one describes six kinds of problems and the methods required to solve them. Part two goes beyond traditional discussions of case design and introduces six different purposes or functions of cases, the building blocks of problem-solving learning environments. It also describes methods for constructing cases to support problem solving. Part three introduces a number of cognitive skills required for studying cases and solving problems. Finally, Part four describes several methods for assessing problem solving. Key features includes: Teaching Focus – The book is not merely a review of research. It also provides specific research-based advice on how to design problem-solving learning environments. Illustrative Cases – A rich array of cases illustrates how to build problem-solving learning environments. Part two introduces six different functions of cases and also describes the parameters of a case. Chapter Integration – Key theories and concepts are addressed across chapters and links to other chapters are made explicit. The idea is to show how different kinds of problems, cases, skills, and assessments are integrated. Author expertise – A prolific researcher and writer, the author has been researching and publishing books and articles on learning to solve problems for the past fifteen years. This book is appropriate for advanced courses in instructional design and technology, science education, applied cognitive psychology, thinking and reasoning, and educational psychology. Instructional designers, especially those involved in designing problem-based learning, as well as curriculum designers who seek new ways of structuring curriculum will find it an invaluable reference tool.
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Medicine Meets Virtual Reality 15 - J.D. Westwood - 2007-01-18
Our culture is obsessed with design. Sometimes designers can fuse utility and fantasy to make the mundane appear fresh—a cosmetic repackaging of the same old thing. Because of this, medicine—grounded in the unforgiving realities of the scientific method and peer review, and of flesh, blood, and pain—can sometimes confuse “design” with mere “prettifying.” Design solves real problems, however. This collection of papers underwrites the importance of design for the MMVR community, within three different environments: in vivo, in vitro and in silico. in vivo: We design machines to explore our living bodies. Imaging devices, robots, and sensors move constantly inward, operating within smaller dimensions: system, organ, cell, DNA. in vitro: Using test tubes and Petri dishes, we isolate in vivo to better manipulate and measure biological conditions and reactions. in silico: We step out of the controlled in vitro environment and into a virtual reality. The silica mini-worlds of test tubes and Petri dishes are translated into mini-worlds contained within silicon chips. The future of medicine remains within all three environments: in vivo, in vitro, and in silico. Design is what makes these pieces fit together—the biological, the informational, the physical/material—into something new and more useful.
the human cognitive system, then the learners will not only be able to acquire information more efficiently, but they will also remember it better and use it. Technology should not be the driving force in shaping e-learning, but rather how that technology can better serve the cognitive system. This volume, originally published as a special issue of Pragmatics & Cognition 16:2 (2008) and partly in Pragmatics & Cognition 17:1 (2009), explores the research frontiers in cognition and learning technology. It provides important theoretical insights into these issues, as well as very practical implications of how to make e-learning more brain friendly and effective.

Constructivist Learning Environments - Brent Gayle Wilson - 1996

Instructional Guidance - Slava Kalyuga - 2015-05-01

The book explores a cognitive load perspective on instructional guidance. Cognitive load theory is focused on instructional design implications and prescriptions that flow from human cognitive architecture, and it has become one of the leading theories of instructional design. According to this theoretical perspective, the purpose of instructional guidance is to reduce learner potential cognitive overload by providing appropriate information in the right time and in a suitable format. As the learner's level of prior knowledge is considered as the main factor influencing this decision, the effect of learner prior knowledge on effectiveness of instructional methods (the expertise reversal effect in cognitive load theory) provides the basic framework for the book. The fully-guided direct instruction and minimally-guided inquiry (discovery or exploratory) learning are often discussed in instructional psychology literature as examples of approaches with opposed degrees of guidance provided to the learners. This book considers the whole range of the levels of guidance (including intermediate levels) and approaches the problem of balancing learner guidance from a cognitive load perspective. The significance of this approach is in applying our current knowledge of human cognitive architecture to develop an integrated instructional approach bringing together the best features and advantages of direct instruction and inquiry learning. Both direct instruction and inquiry learning approaches have been around for long time, and their
This volume presents and discusses current research that makes the connection between cognitive theory and instructional application. Addressing two general issues, the first set of chapters specifies the relation between cognitive theory and the development and evaluation of instruction, while the second set deals with the questions involved in understanding and assessing cognitive skills. The outstanding feature of these chapters is that they all present in-depth discussions of the theoretical issues underlying instructional decisions. Many present specific implementations that provide examples of concrete applications of theory. In addition, the settings for implementing these examples span a broad range of instructional areas and environments, illustrating the generality and transferability of the application of theory to practice.
Presents a collection of essays discussing the theories and models of writing research.

**Handbook of Writing Research** - Charles A. MacArthur - 2008-01-14
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**Cognitively Diagnostic Assessment** - Paul D. Nichols - 2012-12-06
During the past two or three decades, research in cognitive science and psychology has yielded an improved understanding of the fundamental psychological nature of knowledge and cognitive skills that psychological testing attempts to measure. These theories have reached sufficient maturity, making it reasonable to look upon them to provide a sound theoretical foundation for assessment, particular for the content of assessments. This fact, combined with much discontentedness over current testing practices, has inspired efforts to bring testing and cognitive theory together to create a new theoretical framework for psychological testing -- a framework developed for diagnosing learners' differences rather than for ranking learners based on their differences. This volume presents some initial accomplishments in the effort to bring testing and cognitive theory together. Contributors originate from both of the relevant research communities -- cognitive research and psychometric theory. Some represent collaborations between representatives of the two communities; others are efforts to reach out in the direction of the other community. Taking fundamentally different forms, psychometric test theory assumes that knowledge can be represented in terms of one or at most a few dimensions, whereas modern cognitive theory typically represents knowledge in networks -- either networks of conceptual relationships or the transition networks of production systems. Cognitively diagnostic assessment is a new enterprise and it is evident that many challenging problems remain to be addressed. Still, it is already possible to develop highly productive interactions between assessment and instruction in both automated tutoring systems and more conventional classrooms. The editors hope that the chapters presented here show how the reform of assessment can take a rigorous path.

**Building Intelligent Interactive Tutors** - Beverly Park Woolf - 2010-07-28
Building Intelligent Interactive Tutors discusses educational systems that assess a student's knowledge and are adaptive to a student's learning needs. The impact of computers has not been generally felt in education due to lack of hardware, teacher training, and sophisticated software. and
systems to support e-learning, and who want to build intelligence into the needs nor flexible enough to emulate teaching. Dr. Woolf taps into 20 years of research on intelligent tutors to bring designers and developers a broad range of issues and methods that produce the best intelligent learning environments possible, whether for classroom or life-long learning. The book describes multidisciplinary approaches to using computers for teaching, reports on research, development, and real-world experiences, and discusses intelligent tutors, web-based learning systems, adaptive learning systems, intelligent agents and intelligent multimedia. It is recommended for professionals, graduate students, and others in computer science and educational technology who are developing online tutoring systems to support e-learning, and who want to build intelligence into the system. Combines both theory and practice to offer most in-depth and up-to-date treatment of intelligent tutoring systems available. Presents powerful drivers of virtual teaching systems, including cognitive science, artificial intelligence, and the Internet. Features algorithmic material that enables programmers and researchers to design building components and intelligent systems

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**A Principled Approach to Language Assessment** - National Academies of Sciences, Engineering, and Medicine - 2020-08-19

The United States is formally represented around the world by approximately 14,000 Foreign Service officers and other personnel in the U.S. Department of State. Roughly one-third of them are required to be proficient in the local languages of the countries to which they are posted. To achieve this language proficiency for its staff, the State Department's Foreign Service Institute (FSI) provides intensive language instruction and assesses the proficiency of personnel before they are posted to a foreign country. The requirement for language proficiency is established in law and is incorporated in personnel decisions related to job placement, promotion, retention, and pay. A Principled Approach to Language Assessment: Considerations for the U.S. Foreign Service Institute evaluates the different approaches that exist to assess foreign language proficiency that FSI could potentially use. This report considers the key assessment approaches in the research literature that are appropriate for language testing, including, but not limited to, assessments that use task-based or performance-based approaches, adaptive online test administration, and portfolios.
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One-on-One Tutoring by Humans and Computers - Martha Evans - 2006-08-15
One-on-One Tutoring by Humans and Computers articulates the CIRCSIM-Tutor project, an attempt to develop a computer tutor that generates a natural language dialogue with a student. Editors Martha Evans and Joel Michael present the educational context within which the project was launched, as well as research into tutoring, the process of implementation of CIRCSIM-Tutor, and the results of using CIRCSIM-Tutor in the classroom. The domain of this project is cardiovascular physiology, specifically targeting first-year medical students, though the idea is applicable to the development of intelligent tutoring systems across populations, disciplines, and domains. This 5 year-long project was motivated by the belief that students need assistance in building appropriate mental models of complex physiological phenomena, as well as practice in expressing these ideas in their own words to fully develop those models, and experience in problem-solving to use those models effectively.

The book outlines directions for future research, and includes distinct features such as: *detailed studies of human one-on-one tutoring; *learning outcomes resulting from use of the tutor; *natural language input parsed and translated into logical form; and *natural language output generated using the LFG paradigm. This volume will appeal to educators who want to improve human tutoring or use computer tutors in the classroom, and it will interest computer scientists who want to build those computer tutors, as well as anyone who believes that language is central to teaching and learning.

The Instructional Design Knowledge Base - Rita C. Richey - 2010-10-18
The Instructional Design Knowledge Base: Theory, Research and Practice
organizations. Each chapter provides an integrative summary of a research exploration of the theories and research that serve as a foundation for current and emerging ID practice. This book offers both current and classic interpretations of theory from a range of disciplines and approaches. It encompasses general systems, communication, learning, early instructional, media, conditions-based, constructivist design and performance-improvement theories. Features include: rich representations of the ID literature concise theory summaries specific examples of how theory is applied to practice recommendations for future research a glossary of related terms a comprehensive list of references. A perfect resource for instructional design and technology doctoral, masters and educational specialist certificate programs, The Instructional Design Knowledge Base provides students and scholars with a comprehensive background for ID practice and a foundation for future ID thinking.

The Instructional Design Knowledge Base - Rita C. Richey - 2010-10-18
The Instructional Design Knowledge Base: Theory, Research and Practice provides ID professionals and students at all levels with a comprehensive exploration of the theories and research that serve as a foundation for current and emerging ID practice. This book offers both current and classic interpretations of theory from a range of disciplines and approaches. It encompasses general systems, communication, learning, early instructional, media, conditions-based, constructivist design and performance-improvement theories. Features include: rich representations of the ID literature concise theory summaries specific examples of how theory is applied to practice recommendations for future research a glossary of related terms a comprehensive list of references. A perfect resource for instructional design and technology doctoral, masters and educational specialist certificate programs, The Instructional Design Knowledge Base provides students and scholars with a comprehensive background for ID practice and a foundation for future ID thinking.

Improving Training Effectiveness in Work Organizations - J. Kevin Ford - 2014-01-14
This compelling volume presents the work of innovative researchers dealing with current issues in training and training effectiveness in work organizations. Each chapter provides an integrative summary of a research area with the goal of developing a specific research agenda that will not only stimulate thinking in the training field but also direct future research. By concentrating on new ideas and critical methodological and measurement issues rather than summarizing existing literature, the volume offers definitive suggestions for advancing the effectiveness of the training field. Its chapters focus on emerging issues in training that have important implications for improving both training design and efficacy. They discuss various levels of analysis-- intra-individual, inter-individual, team, and organizational issues--and the factors relevant to achieving a better understanding of training effectiveness from these different perspectives. This type of coverage provides a theoretically driven scientist/practitioner orientation to the book.

Automating Instructional Design, Development, and Delivery - Robert D. Tennyson - 2012-12-06
This workshop was organized and presented by an international group of scholars interested in the advancement of automating instructional design.
Although the principal leader for this effort was myself, each of the committee members devoted equally in time and effort in the total preparation and conducting of the workshop. Members of the organizing committee included Dr. Klaus Breuer from disce and the University of Paderbom (Germany), Dr. Begofia Gros from the University of Barcelona, and Dr. Daniel Muraida and Dr. Michael Spector from the Armstrong Laboratory (USA). Dr. Gros participated as the co-director of the workshop and was directly responsible for the preparation and operation of the workshop in Sitges, Spain. The workshop was held in Sitges, a short distance from Barcelona, March 23-27, 1992. Because of preparations at that time for the 1992 summer Olympic Games in Barcelona, the workshop was moved to a more convenient location. The theme of the workshop included three main topics: planning, production, and implementation. Dr. Peter Goodyear, from the Lancaster University (England), presented the invited keynote address. During the four day workshop, 14 papers were presented and discussed. Following each of the three topic areas, Drs. Gros and Breuer led discussions critiquing the ideas presented.
Instructional Design for Learning - Norbert M. Seel - 2017-04-17
This textbook on Instructional Design for Learning is a must for all education and teaching students and specialists. It provides a comprehensive overview about the theoretical foundations of the various models of Instructional Design and Technology from its very beginning to the most recent approaches. It elaborates Instructional Design (ID) as a science of educational planning. The book expands on this general understanding of ID and presents an up-to-date perspective on the theories and models for the creation of detailed and precise blueprints for effective instruction. It integrates different theoretical aspects and practical approaches, such as conceptual ID models, technology-based ID, and research-based ID. In doing so, this book takes a multi-perspective view on the questions that are central for professional ID: How to analyze the relevant characteristics of the learner and the environment? How to create precise goals and adequate instruments of assessment? How to design classroom and technology-supported learning environments? How to ensure effective teaching and learning by employing formative and summative evaluation? Furthermore, this book presents empirical findings on the processes that enable effective instructional designing. Finally, this book demonstrates two different fields of application by addressing ID for teaching and learning at secondary schools and colleges, as well as for higher education.

Handbook of Research for Educational Communications and Technology - David Jonassen - 2003-12-08
First Published in 2008. Routledge is an imprint of Taylor & Francis, an informa company.

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Cognitive Models and Intelligent Environments for Learning Programming - Enrica Lemut - 2013-11-11
At present, there is a general consensus on the nature of learning programming, but there are different opinions on what forms an effective environment for it. It is generally recognized that the development of a mental model is a formidable task for the student and that learning programming is a complex activity that depends heavily on metacognitive skills. This book, based on a NATO workshop, presents both pure cognitive models and experimental learning environments, and discusses what characteristics can make a learning model effective, especially in relation to the learning environment (natural or computerized). The papers cover cognitive models related to different aspects of programming, classes of learners, and types of environment, and are organized in three groups: theoretical and empirical studies on understanding programming, environments for learning programming, and learning programming in school environments. Comprehension, design, construction, testing, debugging, and verification are recognized as interdependent skills, which require complicated analysis and may develop independently, and indifferent orders, in novices. This book shows that there is unlikely to be a single path from novice to expert and that the structure of the final product (the program) may not constrain the process by which it comes into being as much as some would advocate.

Handbook of Improving Performance in the Workplace, Instructional Design and Training Delivery - Kenneth H. Silber - 2009-11-19
With the contributions from leading national and international scholars and practitioners, this volume provides a "state-of-the-art" look at ID, addressing the major changes that have occurred in nearly every aspect of ID in the past decade and provides both theory and "how-to" information for ID and performance improvement practitioners practitioners who must stay current in their field. This volume goes beyond other ID references in its approach: it is useful to students and practitioners at all levels; it is grounded in the most current research and theory; and it provides up-to-the-minute coverage of topics not found in any other ID book. It addresses timely topics such as cognitive task analysis, instructional strategies based on cognitive research, data collection methods, games, higher-order problem-solving and expertise, psychomotor learning, project management, partnering with clients, and managing a training function. It also provides a new way of looking at what ID is, and the most comprehensive history of ID ever published. Sponsored by International Society for Performance Improvement (ISPI), the Handbook of Improving Performance in the Workplace, three-volume reference, covers three core areas of interest including Instructional Design and Training Delivery, Selecting and Implementing Performance Interventions, and Measurement and Evaluation.
on the affective and cognitive modeling of the student in this kind of performance improvement practitioners who must stay current in their field. This volume goes beyond other ID references in its approach: it is useful to students and practitioners at all levels; it is grounded in the most current research and theory; and it provides up-to-the-minute coverage of topics not found in any other ID book. It addresses timely topics such as cognitive task analysis, instructional strategies based on cognitive research, data collection methods, games, higher-order problem-solving and expertise, psychomotor learning, project management, partnering with clients, and managing a training function. It also provides a new way of looking at what ID is, and the most comprehensive history of ID ever published. Sponsored by International Society for Performance Improvement (ISPI), the Handbook of Improving Performance in the Workplace, three-volume reference, covers three core areas of interest including Instructional Design and Training Delivery, Selecting and Implementing Performance Interventions, and Measurement and Evaluation.

Scientific and Technical Aerospace Reports - - 1994

Scientific and Technical Aerospace Reports - - 1994

Handbook of Research on Educational Communications and Technology - David Jonassen - 2008-09-25
First Published in 2008. Routledge is an imprint of Taylor & Francis, an informa company.

Agent-Based Tutoring Systems by Cognitive and Affective Modeling - Viccari, Rosa Maria - 2008-05-31
"This book presents a modern view of intelligent tutoring, focusing mainly on the conception of these systems according to a multi-agent approach and educational environment"--Provided by publisher.

Related to the earlier well-known ACT production system theory, this book's basic goal is to present evidence for the psychological reality of a production system model of mind. Distinguished from the original theory in three ways, this volume uses the rational analyses of Anderson (1990) to improve upon that theory and extend its scope. It also relates the theory to a great deal of new data on the performance and acquisition of cognitive skills. The new theory -- ACT-R -- involves a neurally plausible implementation of a production system architecture. Rational analysis is used to structure and parameterize the system to yield optimal information processing. The theory is applicable to a wide variety of research disciplines, including memory, problem solving, and skill acquisition. Using intelligent tutors, much of the data is concerned with the acquisition of cognitive skills. The book provides analyses of data sets describing the extended course of the acquisition of mathematical and computer programming skills.

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measures, and approaches to feedback and adaptation of instruction, processing. The theory is applicable to a wide variety of research disciplines, including memory, problem solving, and skill acquisition. Using intelligent tutors, much of the data is concerned with the acquisition of cognitive skills. The book provides analyses of data sets describing the extended course of the acquisition of mathematical and computer programming skills.

**Training in Information Management for Army Brigade and Battalion Staff** - 1997

"Training, training Support software, and measurement instruments were developed to help Army brigade and below staff manage information and overcome information overload in a digital messaging environment. Development of the training was guided by two theoretical models: a model of team adaptations to stress and a model of adaptive decision making. The instruction focused on selected skills concerning critical thinking and team coordination. The results of a pilot study suggest that training may have beneficial effects on the targeted skills. Measures of decision accuracy, decision making processes, information filtering, and information production were developed. Methods of automating the training and measures, and approaches to feedback and adaptation of instruction, practice, and testing are described. Concepts for a system architecture are presented."--DTIC.


This volume features the complete text of all regular papers, posters, and summaries of symposia presented at the 14th annual meeting of the Cognitive Science Society.


"This book goes beyond traditional discussion on technology enhanced learning provides research and insights on increasing the efficiency of learning for individuals and groups, facilitating the transfer and sharing of knowledge in organizations, and understanding of the learning process by exploring links among human learning, cognition, and technologies. "-- Provided by publisher.

**AFHRL Newsletter** - 1986

**AFHRL Newsletter** - 1986