

# Table of Contents

## Invited Presentations

Instructional Applications of ACT: Past, Present, and Future' .....	1
<i>J.R. Anderson (Abstract)</i>	
Teaching Expertise and Learning Environments' .....	2
<i>M. Grandbastien (Abstract)</i>	
Hanging by Two Threads: The Evolution of Intelligent Tutoring Systems Research .....	3
<i>J. Self (Abstract)</i>	
My Knowledge of Knowledge .....	4
<i>V.J. Shute (Abstract)</i>	
Cognitive Tools to Support Discovery Learning .....	5
<i>W.R. van Joolingen (Abstract)</i>	

## Architectures for ITS

Using a Learning Agent with a Student Model .....	6
<i>J.E. Beck, B. Park Woolf</i>	
Model-Based Explanations in Simulation-Based Training .....	16
<i>T.M. Khan, S.J. Paul, K.E. Brown, and R.R. Leitch</i>	
Towards an Intelligent Tutoring System for Situation Awareness Training in Complex, Dynamic Environments .....	26
<i>E.J. Bass</i>	
Embedded Training for Complex Information Systems .....	36
<i>B.A. Cheikes, M. Geier, R. Hyland, F. Linton, L. Rodi, and H.-P. Schaefer</i>	
Macro-Definitions, a Basic Component for Interoperability between ILEs at the Knowledge Level: Application to Geometry .....	46
<i>M. Macrelle, C. Desmoulins</i>	
Modelling the Knowledge-Based Components of a Learning Environment within the Task/Method Paradigm .....	56
<i>C. Choquet, F. Danna, P. Tchounikine, and F. Trichet</i>	

## Design and Interface Issues

Deconstructing a Computer-Based Tutor: Striving for Better Learning Efficiency in Stat Lady .....	66
<i>K.A. Gluck, V.J. Shute, J.R. Anderson, and M.C. Lovett</i>	
Habitable 3D Learning Environments for Situated Learning .....	76
<i>W.H. Bares, L.S. Zettlemoyer, and J.C. Lester</i>	
Motivation Diagnosis in Intelligent Tutoring Systems .....	86
<i>A. de Vicente, H. Pain</i>	
Some Reasons Why Learning Science Is Hard: Can Computer Based Law Encoding Diagrams Make it Easier? .....	96
<i>P.C.-H. Cheng</i>	
Curriculum Evaluation : A Case Study .....	106
<i>H. Dufort, E. Aïmeur, C. Frasson, and M. Lalonde</i>	

## Tutoring and Authoring Tools

A Bottom-Up Approach to Multimedia Teachware .....	116
<i>J. Caumanns</i>	
The Authoring Assistant .....	126
<i>S. Ritter</i>	
Explanatory Mechanisms for Intelligent Tutoring Systems .....	136
<i>D.P. Metzler, C.J. Martincic</i>	
DNA - Uncorking the Bottleneck in Knowledge Elicitation and Organization .....	146
<i>V.J. Shute, L.A. Torreano, and R.E. Willis</i>	
Evaluating Subject Matter Experts' Learning and Use of an ITS Authoring Tool .....	156
<i>B.M. Wenzel, M.T. Dirnberger, P.Y. Hsieh, T.J. Chudanov, and H.M. Halfff</i>	
Component-Based Construction of a Science Learning Space .....	166
<i>K.R. Koedinger, D.D. Suthers, and K.D. Forbus</i>	

## Collaborative Learning

'Do It Yourself' Student Models for Collaborative Student Modelling and Peer Interaction .....	176
<i>S. Bull</i>	
Promoting Effective Peer Interaction in an Intelligent Collaborative Learning System .....	186
<i>A. Soller, B. Goodman, F. Linton, and R. Gaimari</i>	
Using Induction to Generate Feedback in Simulation Based Discovery Learning Environments .....	196
<i>K. Veermans, W.R. Van Joolingen</i>	
An Interactive Graphical Tool for Efficient Cooperative Task Acquisition Based on Monaco-T Model .....	206
<i>S. Guepfi Tadié, J.-Y. Rossignol, C. Frasson, and B. Lefebvre</i>	
Learning in the Workplace: Initial Requirements of a Lessons Learned Centred Corporate Memory .....	216
<i>L. Alem</i>	

## Knowledge Structure and Representation

An ITS for Dutch Punctuation .....	224
<i>A. Bouwer</i>	
Cognitive Task Analysis in Service of Intelligent Tutoring System Design: A Case Study in Statistics .....	234
<i>M.C. Lovett</i>	
Diagrammatic Reasoning for Geometry ITS to Teach Auxiliary Line Construction Problems .....	244
<i>N. Matsuda, T. Okamoto</i>	
Providing Feedback to Equation Entries in an Intelligent Tutoring System for Physics .....	254
<i>A.S. Gertner</i>	
Using Automatic Methods for Structuring Conceptual Knowledge in Intelligent Learning Environments .....	264
<i>B. Fernandez-Manjon, J.M. Cigarran, A. Navarro, and A. Fernandez-Valmayor</i>	
Two-Phase Updating of Student Models Based on Dynamic Belief Networks .....	274
<i>J. Reye</i>	

## Teaching and Learning Strategies

Teaching and Learning with Intelligent Agents: Actors .....	284
<i>T. Mengelle, C. de Léan, and C. Frasson</i>	
Self-Organized Goal-Oriented Tutoring in Adaptive Hypermedia Environments .....	294
<i>E. Schwarz</i>	
Ecolab: Exploring the Construction of a Learning Assistant .....	304
<i>R. Luckin</i>	
Information Types and Cognitive Principles in Program Comprehension: Towards Adaptable Support for Novice Visual Programmers .....	314
<i>J. Good, P. Brna</i>	
A Domain Theory Extension of a Student Modeling System for Pascal Programming .....	324
<i>R.L. Reyes</i>	

## Applications of ITS

The Foundations and Architecture of Autotutor .....	334
<i>P. Wiemer-Hastings, A.C. Graesser, D. Harter, and the Tutoring Research Group</i>	
Verbal Coaching During a Real-Time Task .....	344
<i>B. Roberts, N.J. Pioch, and W. Ferguson</i>	
Successful Use of an Expert System to Teach Diagnostic Reasoning for Antibody Identification .....	354
<i>P.J. Smith, J.H. Obradovich, S.A. Guerlain, S. Rudmann, P. Strohm, J.W. Smith, J. Svirbely, and L. Sachs</i>	
Combatting Shallow Learning in a Tutor for Geometry Problem Solving ....	364
<i>V. Aleven, K.R. Koedinger, H.C. Sinclair, and J. Snyder</i>	
A Formative Evaluation of the PACT Algebra II Tutor: Support for Simple Hierarchical Reasoning .....	374
<i>A.T. Corbett, H.J. Trask, K.C. Scarpinato, and W.S. Hadley</i>	

## Student Modeling

Evaluation of Data Aging: A Technique for Discounting Old Data During Student Modeling .....	384
<i>G.I. Webb, M. Kuzmycz</i>	
Student Modelling by Case Based Reasoning .....	394
<i>M.E. Shiri A., E. Aïmeur, and C. Frasson</i>	
Tutoring Prolog Novices Based on Programming Techniques .....	404
<i>J. Hong</i>	
Experiences in Implementing Constraint-Based Modeling in SQL-Tutor ....	414
<i>A. Mitrović</i>	
A Practical Approach to Bayesian Student Modeling .....	424
<i>W.R. Murray</i>	
Student Modeling from Conventional Test Data: A Bayesian Approach Without Priors .....	434
<i>K. VanLehn, Z. Niu, S. Siler, and A.S. Gertner</i>	

## Educational Agents

Toward a Unification of Human-Computer Learning and Tutoring .....	444
<i>H. Hamburger, G. Tecuci</i>	
Developing Intelligent Educational Agents with the Disciple Learning Agent Shell .....	454
<i>G. Tecuci, H. Keeling</i>	
An Instructor's Assistant for Team-Training in Dynamic Multi-Agent Virtual Worlds .....	464
<i>S.C. Marsella, W.L. Johnson</i>	
Visual Emotive Communication in Lifelike Pedagogical Agents .....	474
<i>S.G. Towns, P.J. FitzGerald, and J.C. Lester</i>	
Incorporating Personality into a Multi-Agent Intelligent System for Training Teachers .....	484
<i>J. Yin, M.Seif El-Nasr, L. Yang, and J. Yen</i>	

**Deploying ITS**

The Intelligent Helpdesk: Supporting Peer-Help in a University Course ..... 494  
*J. Greer, G. McCalla, J. Cooke, J. Collins, V. Kumar, A. Bishop, and J. Vassileva*

On the Notion of Components for Intelligent Tutoring Systems ..... 504  
*V. Devedzic, D. Radovic, and L. Jerinic*

An Intelligent Tutoring System for Teaching Formal Languages ..... 514  
*V. Devedzic, J. Debenham*

Elaborating Models of Algebraic Expression-Writing ..... 524  
*M.A. Mark, K.R. Koedinger, and W.S. Hadley*

AVATAR: An Intelligent Air Traffic Control Simulator and Trainer ..... 534  
*C.A. Connolly, J. Johnson, and C. Lexa*

An Advanced Embedded Training System (AETS) for Tactical Team  
Training ..... 544  
*W. Zachary, J. Cannon-Bowers, J. Burns, P. Bilazarian, and D. Krecker*

**Web-Based ITS**

Creating More Versatile Intelligent Learning Environments with a  
Component-Based Architecture ..... 554  
*S. Ritter, P. Brusilovsky, and O. Medvedeva*

Goal-Based Autonomous Social Agents: Supporting Adaptation and  
Teaching in a Distributed Environment ..... 564  
*J. Vassileva*

Curriculum Sequencing in a Web-Based Tutor ..... 574  
*M.K. Stern, B. Park Woolf*

Vincent, an Autonomous Pedagogical Agent for On-the-Job Training ..... 584  
*A. Paiva, I. Machado*

LANCA : A Distance Learning Architecture Based on Networked  
Cognitive Agents ..... 594  
*C. Frasson, L. Martin, G. Gouardères, and E. Aïmeur*

**Poster Papers** ..... 604

The Extension of an Actor Language from Domain-Specific  
Requirements ..... 604  
*Stefano.A. Cerri, Antonina Dattolo, and Vincenzo Loia*

A Classification System for Web-Based Training .....	604
<i>Terrell N. Chandler and Craig Earon</i>	
An Interactive Intelligent Tutoring System with Tutorials Generation and English-Malay Translation Abilities .....	605
<i>Noornina Dahlan</i>	
WinKE: A Pedagogic Tool for Teaching Logic and Reasoning .....	605
<i>Marcello D'Agostino, Marco Mondadori, Ulrich Endriss, Dov Gabbay, and Jeremy Pitt</i>	
Thai Learning System on the WWW Using Natural Language Processing and ITS Evaluation .....	606
<i>Suyada Dansuwan, Kikuko Nishina, and Kanji Akahori</i>	
Flexible ILE Development: Case Studies of an Agent-Based Software Engineering Approach .....	606
<i>David Duncan and Paul Brna</i>	
Declarative Mark-Up Languages as a Tool for Developing Educational Hypermedia .....	607
<i>Baltasar Fernandez-Manjon, Antonio Navarro, Juan M. Cigarran, and Alfredo Fernandez-Valmayor</i>	
Multi-Agent Based Pedagogical Games .....	607
<i>Lucia M.M. Giraffa, Rosa M. Viccari, and John Self</i>	
The SYSTEMIONS: Agents to Design Intelligent Tutoring Systems .....	608
<i>Guy Gouarderes, C. M. Françoise Canut, and Eric Sanchis</i>	
An Intelligent Learning Environment for Data Modeling .....	608
<i>Lynn Hall and Adrian Gordaon</i>	
Lessons Learned in Developing Simulation-Based Expert Systems for Troubleshooting Training .....	609
<i>Julie A. Jones and Robin Taber</i>	
Adult Learning and University Aviation Education .....	609
<i>Merrill R. (Ron) Karp</i>	
Integrating the CITS and CSCL Paradigms for the Design of an Effective Collaborative Learning System .....	610
<i>Sofiane Labidi and Jeane Silva Ferreira</i>	
Cognitive Diagnosis in ITS Using General Pedagogical Rules .....	610
<i>Tang-Ho Le</i>	

## XVIII

Coaching Software Skills on the Job: Laying the Groundwork .....	611
<i>Frank Linton, Andy Charron, and Debbie Joy</i>	
The F-16 C Shop Maintenance Skills Tutor .....	611
<i>Christopher Marsh</i>	
Using Bayesian Networks to Build and Handle the Student Model in Exercise-Based Domains .....	612
<i>E. Millán-Valldeperas, J.L. Pérez-de-la-Cruz, and F. Triguero-Ruiz</i>	
SERAC : A Multi-Agent System for the Evaluation and Revision of Knowledge in ITS .....	612
<i>Sophie Millett and Guy Gouarderes</i>	
MIS-Tutor: An ITS in Support of IS Mastery Learning .....	613
<i>Ali Montazemi and Feng Wang</i>	
Modeling the Cognitive Effects of Participative Learner Modeling .....	613
<i>Rafael Morales, Helen Pain, and Michael Ramscar</i>	
Cognitive Measures for Visual Concept Teaching with Intelligent Tutoring Systems .....	614
<i>Andrey R. Pimentel and Alexandre I. Direne</i>	
GURU: A Self-Extending Tutor Model for Pascal Programming .....	614
<i>Rhodora L. Reyes, Ruzelle Apostol, Tiffany Kua, Rowena Mendoza, and Carlo Antonio Tan</i>	
Computational Instructional Design for Construction of Adaptive Tutors in Real Time from Distributed Learning Objects .....	615
<i>Kurt Rowley</i>	
Influence of Didactic and Computational Constraints on ILE Design .....	615
<i>Nicolas van Labeke and Josette Morinet-Lambert</i>	
<b>Panels</b> .....	616
Methodologies for Tutoring in Procedural Domains .....	616
<i>Carol Redfield (Co-chair), Ben Bell (Co-chair), Patricia Y. Hsieh, Joseph Lamos, R. Bowen Loftin, and David Palumbo</i>	
ITS Technologies in Virtual Environments: Can We Harness the Synergy? .....	617
<i>Carol Horwitz (Chair), Jeff Rickel, Allen Munro, Craig Hall, Randy Stiles, and Helen Gigley</i>	



Semantics and Pedagogy in Authoring Educational Technology: Confronting the Mismatch Between Researchers' Expectations and Users' .....	618
<i>Benjamin Bell (Chair), Alex Kass, M. David Merrill, Tom Murray, and Brenda M. Wenzel</i>	
The Use of 'War Stories' in Intelligent Learning Environments .....	619
<i>Benjamin Bell (Co-chair), Jan Hawkins (Co-chair), R. Bowen Loftin, Tom Carey and Alex Kass</i>	
Lessons Learned from Large-Scale Implementation of Adaptive Tutoring Systems: The Fundamental Skills Training Project .....	620
<i>Kurt Rowley (Chair), Kurt Steuck, D'Anne Redmon, and Todd Miller</i>	
<b>Workshops</b> .....	621
Workshop I - Intelligent Tutoring Systems on the Web .....	621
<i>Beverly P. Woolf and Mia K. Stern</i>	
Workshop II - Pedagogical Agents .....	622
<i>Claude Frasson and Guy Gouarderes</i>	
Workshop III - Efficient ITS Development .....	623
<i>Allen Munro and Wouter R. Van Joolingen</i>	
Workshop IV - The Failure of Cognitive Science in the Courseware Marketplace: If We're So Damned Smart, Why Aren't We Rich? .....	624
<i>J. Wesley Regian</i>	
<b>Exhibits</b> .....	625
<b>Authors Index</b> .....	627

Intelligent Tutoring Systems

4th International Conference, ITS '98, San Antonio,

Texas, USA, August 16-19, 1998, Proceedings

Goettl, B.P.; Halff, H.M.; Redfield, C.L.; Shute, V.J. (Eds.)

1998, XIX, 629 p. 136 illus., 99 illus. in color., Softcover

ISBN: 978-3-540-64770-6