

*Advanced Educational Media Technologies Group
AEMTG*

3 Year Research Report

*Institute for Information Systems and Computer Media
Graz University of Technology*



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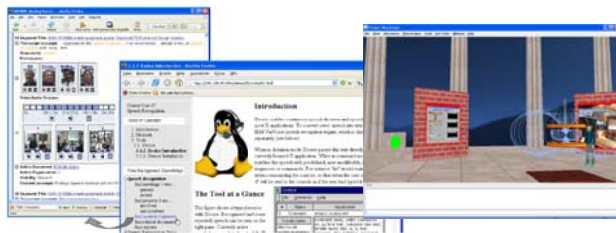
1 Introduction

1.1 Vision and Mission

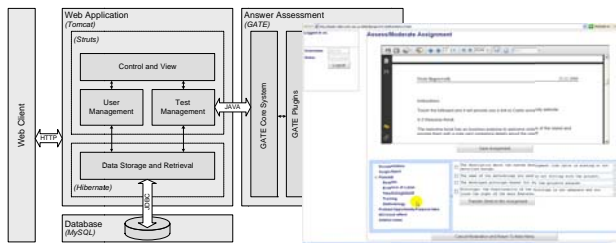
A great variety of media technologies are still on the market and new developments will be accessible soon. Our modern society need to apply these technologies efficiently and effectively to compete in a globalized world. The *Advanced Educational Media Technologies (AEMT) Group* focuses on research, development and application of computer-based media technologies for communication, information access and knowledge exchange. Research interest and expertise include cross-media retrieval, natural language processing, information visualization, adaptive systems, e-learning & e-assessment, and virtual 3D environments. The *AEMT Group* is nationally and internationally linked with academic & research institutions, communities as well as with industry partners.

1.2 Research Overview

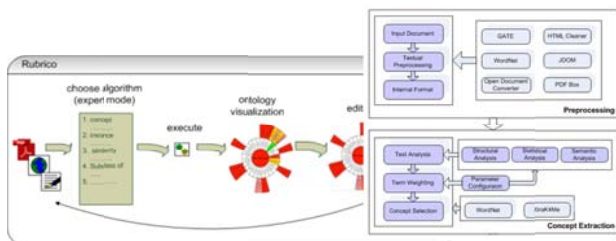
In order to support the vision to make media technologies effectively and efficiently usable for knowledge transfer and education settings, the *Advanced Educational Media Technologies Group* is focusing on the following three areas:



- *e-Education Research and Development*
 - *Adaptive Systems*
 - *Virtual Collaborative Environments*
 - *Virtual 3D Worlds*
 - *Web 2.0 Tools and Services*



- *e-Assessment Research and Development*
 - *e-Assessment Models and Experiment*
 - *Computer-supported Assessment*
 - *Computer-assisted Assessment*
 - *Peer Assessment*



- *Natural Language Processing*
 - *Statistical Approaches*
 - *Semantic Approaches*
 - *Structural Approaches*

2 Group Members

The Advanced Educational Media Technology group is very proud to bring together expertise on media technology, computer science, e-education & e-assessment as well as pedagogic, cognitive science and usability in an international team on experts in their field and also involving students of all levels in research and development activities.

2.1 Core Group Members

- *Dr. Christian Gütl, Head of AEMT Group*



- *Computer Science*
- media technologies and multimedia information systems, information retrieval and visualization, natural language processing, e-education and e-assessment, immersive virtual worlds for learning and knowledge transfer

- *Dr. Margit Höfler, Post-Doc Researcher*



- *Cognitive Science and Education*
- e-education and e-assessment, immersive virtual worlds for learning and knowledge transfer, usability, experimentation planning

- *Mohammad Al-Smadi, Researcher*



- *Computer Science*
- e-education and e-assessment, information systems and database systems, software design and development, software testing

- *Johanna Pirker, Researcher*



- *Computer Science*
- e-education, immersive virtual worlds for learning and knowledge transfer, usability, software design and development, software testing

- *Dominik Kowald, Researcher*



- *Computer Science*
- e-education and e-assessment, information systems and database systems, software design and development, software testing

- *Isabella Pichlmair, Researcher*



- *Pedagogy, Social and Cognitive Science*
- e-Education and e-Assessment, social and pedagogic research and experimentation, experimentation planning

2.2 PhD Student Researchers

- *Mohammad Al-Smadi, e-Assessment*
- *Rocael Hernández Rizzardini, e-Education*
- *Markus Lanthaler, e-Services*
- *Alexander Nussbaumer, e-Education and e-Assessment*
- *Mohamed Soliman, e-Education and Immersive Virtual Environments*
- *Josef Moser, Natural Language Processing*

2.3 Bachelor and Master Student Researchers

- *Daniel Berger, e-Assessment*
- *Stefan Freudenthaler, Immersive Virtual Environments*
- *Mirza Hadzic, Immersive Virtual Environments*
- *Julia Kaltenbeck, Immersive Virtual Environments*
- *Petra Kaltenbeck, Immersive Virtual Environments*
- *Roxane Koitz, e-Education*
- *Simone Kopeinik, Immersive Virtual Environments*
- *Dominik Kowald, e-Assessment*
- *Klaus Lankmayr, Natural Language Processing and e-Assessment*
- *Magdalena Lauber, Natural Language Processing e-Assessment*
- *Joachim Maderer, e-Assessment*
- *Christian Maier, Immersive Virtual Environments*
- *Georg Petritsch, Natural Language Processing*
- *Christine Pichler, Immersive Virtual Environments*
- *Johanna Pirker, e-Education and Immersive Virtual Environments*
- *Emanuel Reiterer, Natural Language Processing and e-Assessment*
- *Fabio Ricardo dos Santos, Immersive Virtual Environments*
- *Tina Scheucher, Immersive Virtual Environments*
- *Harald Schlatte, Immersive Virtual Environments*
- *Andreas Weinberger, Natural Language Processing and e-Assessment*
- *Joachim Weinhofer, Natural Language Processing and e-Assessment*

3 Research Projects

Following the vision on making use of new and emerging media technologies for knowledge transfer and learning activities, the Advanced Educational Media Technology Group is involved in a verity of research and development projects both on national and international level.

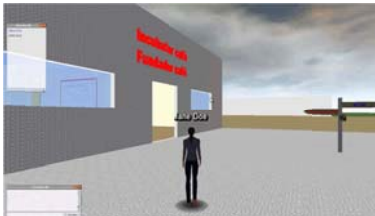
3.1 e-Education

- *Immersive Collaborative Environment for Physics Education*



- International Research Project
- in collaboration with *MIT, CECI, Boston, USA*
- research and development of an immersive collaborative virtual environment to support physics experimentation; integrates remote laboratory with synchronized visualization in virtual world

- *Virtual 3D World supporting Entrepreneurship Learning and Training*



- Part of an European Research Project
- in collaboration with *15 European partner*
- research and development of an immersive collaborative virtual environment to support entrepreneurship learning and training; includes social meeting space, virtual seminar room, learning and presentation tools

- *Virtual Collaborative World for Collaborative Learning Activities*



- International Research Project
- in collaboration with *Curtin University, Western Australia*
- research and development of an immersive collaborative virtual environment to group learning and group assignment; includes virtual seminar room, learning and presentation tools; based on Second Life

- *Flexible and Reusable Learning Settings in Immersive Virtual Worlds*



- International Research Project
- in collaboration with *Curtin University, Western Australia*
- research and development of a Web-based tool supporting a simply way to pre-configure and reuse learning settings out of world and instantiate settings on demand in world; applicable for Second Life and OpenSim environemtns

- *Project Management and Software Development Training for geographical dispersed Teams*



- International Research Project
- in collaboration with *Curtin University, Western Australia*
- research and development of a Web-based tool supporting geographical dispersed teams to train project management and software development; includes project management and software development tools in world; based on Open Wonderland

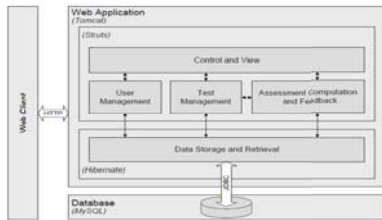
3.2 e-Assessment

Advanced e-Assessment in Complex Learning Activities



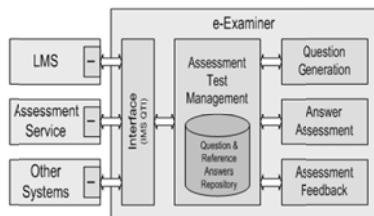
- Part of an European Research Project in FP 7
- in collaboration with *four European partner*
- research work includes an assessment model for complex learning activities, collaborative writing and assessment tool, assessment and feedback support in self-directed learning scenarios; pilot trails and experimentation

Computer-based Peer-Assessment System



- Internal Research Project
- No external partners
- Research and development of a computer-based peer-assessment system supporting assignment, assessment and provision of feedback; method and functionality to compute reliable assessment results and peer-assessment performance

Automatic Natural Free-Text Assessment



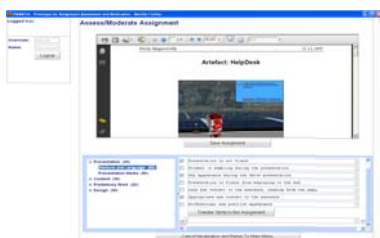
- Internal Research Project
- No external partners
- research and development of a computer-based system supporting assessment and grading of short natural language text answers based on the ROUGE similarity measures; usable as stand-alone tool and as integrative part of learning management systems

Automatic Test Item Creation



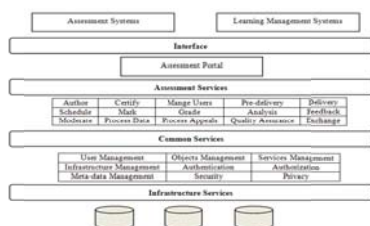
- International Research Project
- in collaboration with *University of Western Australia*
- research and development of a computer-based system to create different types of test items for knowledge assessment out of natural language content; usable as stand-alone tool and as integrative part of learning management systems

Computer-based Assessment Rubric



- International Research Project
- in collaboration with *Curtin University, Western Australia*
- research and development of a computer-based system to support the creation and application of assessment rubrics; both computer-supported and computer-assisted assessment is covered; usable as stand-alone tool and as integrative part of learning management systems

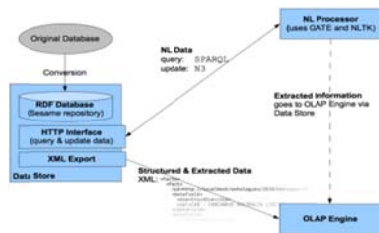
Flexible e-Assessment System



- Internal Research Project
- No external partners
- research and development of a computer-based e-assessment system which is quite flexible in terms of types of assessments, application domains, integration of supportive tools and modules; usable as stand-alone tool and as integrative part of learning management systems

3.3 Natural Language Processing

- *Improved Data Analyses applying Textcube and Automatic Taxonomy Extraction*



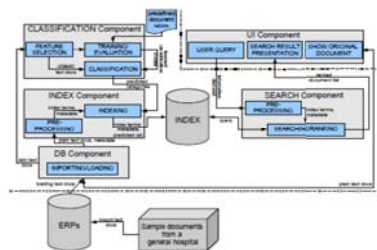
- International Research Project
- in collaboration with *University of Western Australia*
- analyzing databases with structured and unstructured data using text cube and automatic taxonomy extraction; typical OLAP functionality is extended by the so called Text Cube; is data is stored in an RDF datastore

- *Enhanced Personalization Systems with Collaborative Recommendations*



- National Research Project
- in collaboration with *startup company Xohana*
- approach assist the recommendation process of existing personalization systems in cold-start situations; provide supplementary collaborative recommendations based on an alternative knowledge source; user preferences are extracted from customer reviews by means of natural language processing

- *Improved Retrieval of Medical Information applying Semantic Information*



- National Research Project
- in collaboration with *Joanneum Research*
- approach assist the improved retrieval of medical patient records combining conventional text retrieval and semantic information; applying adapted classification methods and medical taxonomies; provides enhanced search capabilities and search interface for improved knowledge transfer

4 External Professional Activities

The *Advanced Educational Media Technology Group* is committed to bring in valuable experiences in initiatives of international consortia and to serve in international research community activities.

4.1 International Communities and Initiatives

- *Europe chapter of the Immersive Education Initiative, Christian Gütl - board member*
- *Global Online Laboratory Consortium (GOLC), founding and academic member, Christian Gütl – institutional representative*

4.2 Editorial Boards

- *International Journal of Knowledge and Learning (IJKL) – Christian Gütl, Co-Editor*
- *Computers & Education*
- *Cypriot Journal of Educational Sciences (CJES)*
- *IEEE Multimedia Journal (Special Issue: Multimedia-Metadata and Semantic Management)*
- *IEEE Transactions on Learning Technologies*
- *International Journal of Emerging Technologies in Learning (iJET)*
- *International Journal of Engineering Education (IJEE)*
- *International Journal of Knowledge and Learning (IJKL)*
- *Journal of Information Technology Research (JITR)*
- *Journal of Universal Computer Science (J.UCS)*
- *World Wide Web Journal (W3J)*

4.3 Chairs and Program Committees

- *International Workshop on Computer-based Knowledge & Skill Assessment and Feedback in Learning Settings (CAF), Christian Gütl – initiator and chair, since 2008*
- *International Workshop on Virtual Worlds for academic, organizational, and life-long learning (ViWo), Christian Gütl – initiator and co-chair, since 2009*
- *IEEE – DEST (Digital Ecosystems and Technologies), Christian Gütl – e-learning track co-chair, 2009 and 2010*
- *ICWL (International Conference on Web-based Learning), Christian Gütl – publicity co-chairs for 2009*
- *ICL (International Conference on Interactive Computer aided Learning), Christian Gütl – special track chair, since 2009*
- *IEEE EDUCON (International Conference of Global Learning in Engineering Education), Christian Gütl – program co-chair 2010*
- *Spain ACM SIG Chapter on Computer Science Education (SIGCSE), Christian Gütl – international advisory board member, since 2009*
- *ICBL (International Conference on Blended Learning), Christian Gütl – advisory board member, since 2009*
- *ACM SIGITE (Special Interest Group on Information Technology Education) Conference*
- *ACM MEDES'09 (Conference on Management of Emergent Digital EcoSystems)*
- *ACM International Workshop on Multimedia Technologies for Distance Learning (MTDL 2010)*

- *IEEE DEST (Conference on Digital Ecosystems and Technologies)*
- *IEEE ICDEM (International Conference on Data Engineering and Management)*
- *IEEE ETFA (International Conference on Emerging Technologies)*
- *IEEE INDIN (International Conference on Industrial Informatics)*
- *IEEE INCoS 2009 (International Conference on Intelligent Networking and Collaborative Systems)*
- *EC-TEL 2010, 2011 (European Conference on Technology Enhanced Learning)*
- *EISTA (International Conference on Education and Information Systems, Technologies and Applications)*
- *HIS 2009 (International Conference on Human System Interaction)*
- *ICDEM 2010 (International Conference on Data Engineering and Management)*
- *ICL (International Conference on Interactive Computer Aided Learning)*
- *IMCL 2009 (International Conference on Interactive Mobile and Computer Aided Learning)*
- *ICWL 2009, 2010 (International Conference on Web-based Learning)*
- *OnToContent 2010 (International Workshop on Ontology Content)*
- *TIR 2008 - 2010 (Text-based Information Retrieval)*
- *PAN Workshop 2008 and 2009 (Uncovering Plagiarism, Authorship, and Social Software Misuse)*
- *STEG 2008 and 2009 (Story-Telling and Educational Games)*
- *WM2011 (6th Conference Professional Knowledge Management)*

4.4 Other Professional Activities

- *Christian Gütl, expert for the European Commission in the FP 6, FP 7 and E-Content Plus program (multiple research project reviews and research project proposal evaluation involvements) , since 2005*
- *Christian Gütl, reviews for NSF, USA, since 2009*
- *Christian Gütl, reviews for Cyprus Research Council, Cyprus, since 2010*
- *Christian Gütl, reviews for Belgium Research Council, Belgium, since 2011*

5 Collaborations and Awards

The *Advanced Educational Media Technologies Group* is proud to be linked with institutions and researches from all over the world. A selection of collaboration activities and awards is outlined in this section.

5.1 International Collaborations

- *MIT, Center for Educational Computing Initiatives (CECI), Boston, USA*
Research collaboration on immersive educational environments for science education, 5 peer-reviewed publications, 5 TUG master students collaboratively supervised, 2 research visits at MIT
- *Curtin University, School of Information Systems, CBS, Perth, Western Australia*
Research on e-education and e-assessment, 10 peer-reviewed publications, 8 TUG master students collaboratively supervised, several research visits at Curtin
- *Curtin University, Digital Ecosystem and Business Intelligence Institute, Perth, Western Australia*
Research on flexible service composition, 2 peer-reviewed publications, 1 TUG PhD student collaboratively supervised, several invited talks at DEBII
- *University of Western Australia, Computer Science and Software Engineering, Perth, Australia*
Research on natural language processing for knowledge transfer, e-education and e-assessment, 1 peer-reviewed publications, 1 TUG PhD student and 2 TUG master students collaboratively supervised, invited talk at UWA
- *University of Technology, Centre for Real-Time Information Networks, Sydney, Australia*
Research collaboration on remote labs and simulations for engineering education, 1 peer-reviewed publication, 2 UTS PhD students collaboratively supervised, 2 research visits at UTS

5.2 National Collaborations

- *Carinthia University of Applied Science, School of Geoinformatics, Villach, Austria*
Research collaboration on mobile technologies for knowledge transfer and e-education, 1 TUG master students collaboratively supervised
- *Graz University, Austria Institute of Musicology, Graz, Austria*
Research collaboration on musical auditory skill assessment, 1 peer-reviews publication
- *Graz University of Technology, Institute for Software Technologies, Graz, Austria*
Research collaboration on e-education to support math learning, several co-supervised TUG students, 1 peer-reviews publication
- *Joanneum Research, Austria Institut für Medizinische Systemtechnik und Gesundheitsmanagement, Graz, Austria*
Research collaboration on medical information systems, 2 TUG master students collaboratively supervised, 3 peer-reviews publication

5.3 International Visiting Positions and Appointments

- *Christian Gütl, Adjunct Research Professor, Curtin University, SIS-CBS (since 2009 – current)*
- *Christian Gütl, Visiting Professor, University of Technology, Centre for Real-Time Information Networks, Sydney, Australia (2010 and 2011)*

- *Christian Gütl, Visiting Scholar, MIT, Center for Educational Computing Initiatives, Boston, USA (2009 and 2011)*
- *Christian Gütl, Visiting Professor, Visiting Academic, University of Salerno, Dipartimento di Matematica e Informatica, Italy (2009)*
- *Christian Gütl, Visiting Professor, Visiting professor, University of Madeira, Institute for Mathematics and Engineering, Portugal (2008)*

5.4 Honor and Awards

- *2011*
Christian Gütl, research fellow scholarship, Curtin University, Perth, Western Australia
Christian Gütl, research fellow scholarship, University of Technology, Sydney, Australia
- *2010*
Christian Gütl, research fellow scholarship, Curtin University, Perth, Western Australia
- *2009*
Christian Gütl, research fellow scholarship, Curtin University, Perth, Western Australia
Christian Gütl, Mohamad Smadi (co-authors), best paper award MIPRO 2009 (Conference Computers in Education)
Christian Gütl, honor of appreciation for learning ecosystem track chair, IEEE DEST 2009
- *2008*
Christian Gütl, research fellow scholarship, Curtin University, Perth, Western Australia
Research fellow scholarship, Curtin University of Technology, Perth, Western Australia
- *2007*
Christian Gütl (co-author), Best paper award, Medinfo 2007

5.5 International Scholar Visitors

- *Prof. Vanessa Chang, Curtin University of Technology, Australia*
- *Prof. Heinz Dreher, Curtin University of Technology, Australia*
- *Prof. Samir A. El-Seoud, Princess Sumaya University for Technology, Jordan*
- *Annie English, Curtin University of Technology, Australia*
- *Dr. Piedad Garrido Picazo, University of Zaragoza, Spain*
- *Prof. Inmaculada Plaza, University of Zaragoza, Spain*
- *Prof. David Lowe, University of Technology Sydney, Australia*
- *Prof. Robert Meersman, Vrije Universiteit Brussel, Belgium*
- *Dr. Steve Murray, University of Technology Sydney, Australia*
- *Dr. Steven Quinton, Curtin University of Technology, Australia*
- *Tapio Tammi, University of Jyväskylä, Finland*

6 Talks and Presentations

Research results dissemination and knowledge sharing is one of the major goals of the *Advanced Educational Media Technologies Group*.

6.1 Keynote Talks

- [1] Christian Gütl, Immersive Collaborative Virtual Learning Environments for Science Education. Key Note, MIPRO – Computers in Education (CE), May 2010, Opatia, Croatia
- [2] Christian Gütl, Immersive Collaborative Virtual Environments for Learning and Training Activities. Key Note, ICBL - International Conference on Interactive Computer aided Blended Learning, November 2009, Florianópolis, Brazil

6.2 Invited and Other Talks

- [1] Christian Gütl, Enhanced Approaches of Automatic Creation of Test Items to foster Modern Learning Settings, Curtin University, invited research seminar February 2011 (invited research seminar)
- [2] Christian Gütl, Automatic Creation of Test Items to foster Modern Learning Settings, UWA, February 2011, (invited research seminar)
- [3] Christian Gütl, Virtual 3D Environments for Learning& Training. Introductory speech, Third Special Track on Virtual 3D Worlds for Learning and Training Activities (ViWo), 2010, Kuala Lumpur, Malaysia.
- [4] Christian Gütl, E-Assessment. Introductory speech, Third Special Track on Computer-based Knowledge & Skill Assessment and Feedback in Learning Settings (CAF), September 2010, Hasselt, Belgium
- [5] Christian Gütl, Immersive Learning Environments for Science Education. Invited talk at EURECOM, Nice, France, May 2010 (invited talk).
- [6] Christian Gütl, Collaborative Virtual Environments for Learning and Training. Invited talk IEEE Section Slovenia, University of Maribor, November 2009, Maribor, Slovenia (invited talk).
- [7] Christian Gütl, Collaborative Virtual Environments for Learning and Training. University of Sao Paulo, Integrated System Laboratory, November 2009, Sao Paulo, Brazil.
- [8] Christian Gütl, Immersive Collaborative Virtual Environments for Learning and Training Activities. University of Salerno, Dipartimento di Matematica e Informatica, October 2009, Salerno, Italy.
- [9] Christian Gütl, E-Assessment. Introductory speech, Second Special Track on Computer-based Knowledge & Skill Assessment and Feedback in Learning Settings (CAF), September 2009, Villach, Austria
- [10] Christian Gütl, Enhanced Computer-based Support for Personalized Learning Activities. Graz University of Technology, June 2009.
- [11] Christian Gütl, Virtual 3D Environments for Learning& Training. Introductory speech, First Special Track on Virtual 3D Worlds for Learning and Training Activities (ViWo), 2009, Amman, Jordan.
- [12] Christian Gütl, Ecosystem-based Theoretical Models for Learning in Environments of the 21st Century, Digital Ecosystems and Business Intelligence Institute, Curtin University of Technology, February 2009.
- [13] Christian Gütl, e-Assessment Approaches supporting Personalization in Modern Learning Settings, School of Information Systems, Curtin University of Technology, February 2009,
- [14] Christian Gütl, E-Learning in modern Learning Settings: Selected Research Activities. Guest Lecture. University of Madeira, Portugal.
- [15] Christian Gütl, E-Assessment. Introductory speech, First Special Track on Computer-based Knowledge & Skill Assessment and Feedback in Learning Settings (CAF), 2008, Villach, Austria.
- [16] Christian Gütl, Enhancements of Meeting Information Management and Application for Knowledge Access and Learning Activities, Curtin Business School, Curtin University of Technology, February 2008.
- [17] Christian Gütl, Towards a flexible Computer-Based Assessment System, School of Information Systems – Semantic Eagle Research Group, Curtin University of Technology, February 2008.
- [18] Christian Gütl, Overview of Current Research Work, Digital Ecosystems and Business Intelligence Institute, Curtin University of Technology, February 2008.

7 Peer Reviewed Publications

7.1 Journal Publications

- [1] Syed Nadeem Ahsan, Muhammad Tanvir Afzal, Safdar Zaman, Christian Gütel, Franz Wotawa (2010). Mining Effort Data from the OSS Repository of Developer's Bug Fix Activity. *Journal of IT in Asia*, Vol 3 (2010), 67-80.
- [2] Mohammad Al-Smadi, Christian Guetl, Frank Kappe (2010). Peer Assessment System for Modern Learning Settings: Towards a Flexible E-Assessment System. *iJET*, Vol 5 (2010), 5-11.
- [3] Nadine Abu Rumman, Samir Abou El-Seoud, Khalaf F Khatatneh and Christain Gütl (2010). Geometry Compression for 3D Polygonal Models using a Neural Network. *International Journal of Computer Applications* 1(29):13–22, February 2010.
- [4] Mohammad AL-Smadi, Christian Gütl and Rajkumar Kannan (2010). Modular Assessment System for Modern Learning Settings: MASS. *International Journal of Computer Applications*, V01, No 9, 43-49.
- [5] Rajkumar Kannan, Frederic Andres and Christian Gütl (2009). DanVideo: an MPEG-7 authoring and retrieval system for dance videos. *Multimedia Tools and Applications*, Springer Netherlands, October 22nd, 2009 (Online), retrieved from <http://www.springerlink.com/content/3858428730083007/fulltext.pdf>.
- [6] Vanessa Chang, Christian Gütl, Simone Kopeinik, Robert Williams (2009). Evaluation of Collaborative Learning Settings in 3D Virtual Worlds. *International. Journal of Emerging Technologies in Learning (iJET)*, Vol 4 (2009): Special Issue: ICL2009, 6-17.
- [7] Tina Scheucher, Phil H. Bailey, Christian Gütl, V. Judson Harward (2009). Collaborative Virtual 3D Environment for Internet-accessible Physics Experiments. *International Journal of Online Engineering (iJOE)*, (republished), Vol 5 (2009), Special Issue 1: REV2009, August 2009, 65-71.
- [8] Mohammad AL-Smadi, Christian Guetl and Denis Helic (2009). Towards a Standardized e-Assessment System: Motivations, Challenges and First Findings. *iJET*, Vol 4 (2009) Special Issue: IMCL2009, 6-12.
- [9] Christian Gütl, and Vanessa Chang (2008). Ecosystem-based Theoretical Models for Learning in Environments of the 21st Century. *International. Journal of Emerging Technologies in Learning (iJET)*, Vol 3 (2008), 50-60.
- [10] Christian Gütl (2008). Enhancements of Meeting Information Management and Application for Knowledge Access and Learning Activities. *Journal of Universal Computer Science (J.UCS)*, 14, 10, 1625--1653.
- [11] Christian Gütl (2008). Moving towards a Fully-Automatic Knowledge Assessment Tool. *iJET International Journal of Emerging Technologies in Learning*, Vol 3, No 1 (2008), and <http://online-journals.org/i-jet/article/view/172/240>

7.2 Peer-Review Book Chapters

- [1] Christian Gütl, Tina Scheucher, Philip H. Bailey, John Belcher, Fabio Ricardo dos Santos, and Stefan Berger (2011). Towards an Immersive Virtual Environment for Physics Experiments supporting Collaborative Settings in Higher Education. In Abul K. M. Azad, Michael E. Auer and V. Judson Harward (Eds.): *Internet Accessible Remote Laboratories: Scalable E-learning Tools for Engineering and Science Disciplines*, IGI Global (accepted)
- [2] Christian Gütl (2011). The Support of Virtual 3D Worlds for enhancing Collaboration in Learning Settings. In Francesca Pozzi and Donatella Persico (Eds.) *Techniques for Fostering Collaboration in Online Learning Communities: Theoretical and Practical Perspectives*, IGI Global, 2011, 278-299.
- [3] Christian Gütl, and Victor Manuel García-Barrios (2009). The DEKOR System: Personalization of Guided Access to Open Repositories. In Mourlas, C., Tsianos, N., & Germanakos, P. (Eds.) *Cognitive and Emotional Processes in Web-based Education: Integrating Human Factors and Personalization*, Idea Group Inc., Hershey, USA, 164-186.
- [4] Christian Gütl (2008). Automatic Extraction, Indexing, Retrieval and Visualization of Multimodal Meeting Recordings for Knowledge Management Activities. In M. Granitzer, M. Lux, and M.

Spaniol (Ed.) *Multimedia Semantics – The Role of Metadata* (peer reviewed), Springer, Berlin / Heidelberg, 239-261.

7.3 Peer-Reviewed Conference Papers

- [1] Markus Lanthaler and Christian Guetl (2011). A Semantic Description Language for RESTful Data Services to Combat Semaphobia. IEEE DEST 2011 (accepted).
- [2] Amir Mujkanovic, David. Lowe, Christian Guetl, and Thorsten Kostulski (2011). An architecture for automated group formation within remote laboratories. REF 2011 (accepted)
- [3] Markus Lanthaler and Christian Guetl (2011). SAPS: Semantic AtomPub-based Services. SAINT 2011, Munich, Germany (accepted)
- [4] Mohammad AL-Smadi and Christian Gütl (2011). Supporting Self-Regulated Learners with Formative Assessments using Automatically created QTI-Questions. IEEE EDUCON 2011, Amman, Jordan, 04-06 April 2011 (accepted).
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