

Folder: CbKST-WORKSHOP_Wuhan 2013

File: CbKST-Workshop_Applications&Projects_Wuhan 2013 FINAL

Advances in Behavioral Sciences in the Internet Age: Selected Topics in Mathematical Psychology

Scientific Organizer: Xiangen Hu - Central China Normal University - Wuhan – China - June 27th 2013

Workshop on ‘Knowledge & Competence/Skill Spaces and their Applications’

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PART 3

Recent Applications: Dietrich Albert

APPLICATIONS & PROJECTS (Status of June 2013)

In the following access to applications and projects regarding (Competence-based) Knowledge Spaces (KST and CbKST) are listed in terms of (a) **Guided, Personalised Learning and Teaching**, (b) **Self-Regulated Learning**, and (c) **Game-based Learning** as well as (d) **Other Applications & Projects** are mentioned below.

The applications are either the already commercialised system ALEKS or prototypes of systems and of tools developed for demonstration purposes primarily in European projects like the RATH-system, APeLS-system, iClass-tools. Some projects are merely mentioned without going into details, like GRAPPLE and MedCAP. However access to detailed information is possible also in these cases, via the respective homepages and via the publications (see List of References).

The information given below may establish Your basis for exploring the software, systems, reports by self-regulated studies.

Guided, Personalised Learning and Teaching

- ALEKS-System

Assessment and LEarning in Knowledge Spaces

<http://www.aleks.com/Welcome-ENGLISH.html>

The URL gives access to the commercial ALEKS system

and a lot of information e.g. about its scientific basis. I recommend to use [Begin Free Trial](#) using two different identities – a good and a less good learner. For a brief overview and introduction I recommend: http://www.aleks.com/k12/Grant_Writing_Assistance.pdf

- RATH-System

Relational Adaptive Tutoring Hypertext

<http://wundt.uni-graz.at/projects/rath/Welcome.html>

http://wundt.uni-graz.at/projects/rath/frame_course1.htm

URL gives access to the demonstration/prototype system RATH and a lot of scientific background information.

Registration/Authorization is required by

<http://css.uni-graz.at/rath/selfreg.html>

however via <http://css.kfunigraz.ac.at/rath/>

registration is not required. If however you want to test the adaptivity of the system you should register twice with two different identities.

- APeLS-System

Adaptive Personalised eLearning Service

<http://css.uni-graz.at/demos/apels/>

Access requires self registration. The system is immediately available, however **first turn off the popup blocker in your browser OR mention** css.uni-graz.at and telearn.uni-graz.at as exceptions in your browser.

Basic background information and further references regarding APeLS you can e.g. find here:

Hockemeyer, C., Conlan, O., Wade, V., & Albert, D. (2003). Applying Competence Prerequisite Structures for eLearning and Skill Management. *Journal of Universal Computer Science*, 9, 1428–1436.

[\[DOC\]](#)

Self-Regulated Learning (SRL)

- iClass-Project

Intelligent Distributed Cognitive-based Open Learning System for Schools

<http://css.uni-graz.at/projects/iclass>

URL gives access to general information about the project.

- iClass-Tools

<http://css.uni-graz.at/projects/iclass/cbksttools/>

Access to SRL-Supporting Tools (Demos).

Don't worry, there is no risk to open the tools.

Background information and further references regarding SRL-iClass-Tools you can find here:

Nussbaumer, A., Steiner, C., & Albert, D. (2008). Visualisation Tools for Supporting Self-Regulated Learning through Exploiting Competence Structures. *Proceedings of the International Conference on Knowledge Management (IKNOW 2008), 3-5 September 2008, Graz, Austria (pp. 288-296)*. [[PDF](#)]

Steiner, C.M. Nussbaumer, A., & Albert, D. (2009) Supporting Self-Regulated Personalised Learning through Competence-Based Knowledge Space Theory, *Policy Futures in Education*, 7(6), 645-661. <http://dx.doi.org/10.2304/pfie.2009.7.6.645>

- iClass Handbook: CbKST concepts

<http://iclass.wikispaces.com/3+Resources>

and click on [iClass Handbook CbKST concepts 2007-11-07.doc](#)

- ROLE-Project

Responsive Open Learning Environments

<http://www.role-project.eu/>

The vision of ROLE is to empower learners to build their own responsive learning environment, which supports them to be aware of their own learning process and to reflect this process. ROLE is user-centred in the way that an individually adapted composition of the learners' own learning environments will be made possible. To this end and infrastructure will be provided which can easily be used by learners. ROLE's generic framework uses an open source approach, interoperable across software systems and technology, as well as extendible with new learning tools. Hence any tool created by an individual is available from a pool of services and tools to all learners via the internet.

- **ROLE-Widget Bundles & Tools**

<http://www.role-project.eu/Showcases>

- **ROLE-references**

Nussbaumer, A., Berthold, B., Dahrendorf, D., Schmitz, H.-C., Kravcik, M., & Albert, D. (2012): [A Mashup Recommender for Creating Personal Learning Environments](#). Conference ICWL 2012, Springer In Popescu, E., Li, Q., Klamma, R., Leung, H., & Specht, M. (Eds), Advances in Web-Based Learning – ICWL 2012, Lecture Notes in Computer Science, vol. 7558 (pp 79-88), Berlin: Springer, 2012.

Nussbaumer, A., Scheffel, M., Niemann, K., Kravcik, M., & Albert, D. (2012): [Detecting and Reflecting Learning Activities in Personal Learning Environments](#). Workshop ARTEL 2012, CEUR-WS, In: Proceedings of the 2nd Workshop on Awareness and Reflection in Technology-Enhanced Learning (ARTEL 2012), CEUR Workshop Proceedings, vol 931.

Berthold, B., Dahn, I., Kiefel, A., Lachmann, P., Nussbaumer, A., & Albert, D (2012): [ROLE Learning Ontology – An Approach to Structure Recommendations for Self-regulated Learning in Personalized Learning Environments](#). [Conference LINQ 2012](#), In Stracke, C. M. (Eds), Proceedings of the European Conference of Learning Innovations and Quality (LINQ 2012), Brussels, Belgium, 2012.

Kroop, S., Berthold, B., Nussbaumer, A., & Albert, D (2012): [Supporting Self-Regulated Learning in Personalised Learning Environments](#). Workshop WCLOUD 2012, In Proceedings of the International Workshop on Cloud Education Environments (WCLOUD 2012), Guatemala, 2012.

Effie Lai-Chong Law, Hans-Christian Schmitz, Martin Wolpers, Ralf Klamma, Marcel Bertold, Dietrich Albert (2012): Responsive and Open Learning Environments (ROLE): Requirements, Evaluation and Reflection. [Interaction Design and Architecture\(s\) Journal](#) (IxD&A), Special Issue on Exploring the future of Technology Enhanced Education: Visions, Practical Implementations and Impact of Glocalities, 2012.

Sylvana Kroop, Alexander Nussbaumer, Dietrich Albert (2013): [Evaluation on Students' and Teachers' Acceptance of Widget- and Cloud-based Personal Learning Environments](#). In: Special Issue "Cloud

Education Environments". J.UCS. Journal of Universal Computer Science.

- **ImREAL-Project**

Immersive Reflective Experience-based Adaptive Learning

<http://www.imreal-project.eu/>

The popularity of immersive simulated environments for experiential learning is growing; they will be a key part of tomorrow's technologies in the area of adult training. The major challenge is to effectively align the learning experience in the virtual environment with the 'real-world' context and 'day-to-day' job practice. ImREAL's goal is to develop a novel conceptual framework and innovative semantic-enhanced intelligent services to extend existing simulated environments with adaptive meta-cognitive scaffolding in a cost-effective way.

- **ImREAL-Reference**

[Hetzner, S.; Steiner, C.; Dimitrova, V.; Brna, P.; Conlan, O.:](#)

[Adult self-regulated learning through linking experience in simulated and real world: A holistic approach.. - in: Lecture notes in computer science 6964 \(2011\) , S. 166 - 180](#)

- **NEXT-TELL-Project**

NEXT Generation Teaching, Education and Learning for Life

<http://www.next-tell.eu/>

The NEXT-TELL project is supposed to develop intelligent and highly connected tools and services to support formative e-assessment and learning analytics in the classroom. Thereby, the project covers the entire educational circle from planning to teaching, testing, evaluating, providing formative feedback, reconsidering and re-planning one's own teaching.

- **NEXT-TELL-Tools**

<http://sandbox.next-tell.eu/>

A variety of accessible tools and online platforms are available through the above sandbox portal:

1x1 Ninja – is one of the tools developed for schools. It is a handy and “gamified” online tool for practicing the multiplication table. The target group is 7 to 8 years of age. In the background CbKST services are working, aiming at the provision of smart, competence-based support and feedback: <http://css-kmi.tugraz.at/1x1ninja/>

myClass – is a very simple online platform for teachers that established a kind of electronic class book on the one hand, on the other hand, is a central core that links a variety of CbKST-related tools and services as well as other tools and platforms (e.g., e-Portfolios or open learner models; cf. <http://www.eee.bham.ac.uk/bull>). The URL of myClass is <http://css-kmi.tugraz.at/myClass/login.php>, login is “demo1” or <http://css-kmi.tugraz.at/myClass/classes.php>, login is “demo1”

- **NEXT-TELL-Videos**

<http://www.youtube.com/user/NEXTTELLproject?feature=watch>

If clicking does not work, please copy the URL into your browser

There is a promotional video on YouTube showing the scope and the achievements of Next-Tell:

One of the highlights of Next-Tell is supporting learning in virtual worlds (OpenSim / Second Life). TUGraz developed a Chatlog Analysis Tool on the basis of CbKST to analyse activities and achievements of entire classes in the virtual world and to equip teachers with the possibility to make use of educational sessions in the virtual world for formative assessment and feedback. One scenario is a mystery question on an OpenSim island named Chatterdale:

There is a movie on YouTube explaining the Chatterdale quest:

<http://www.youtube.com/watch?v=sD8Prip1Vpk>

The following movie illustrates the use/connection of OpenSim together with the Chatlog Analyzer and the Open Learner Model platform (developed by the University of Birmingham):

<http://eeevle.bham.ac.uk/nexttell/aied2013/>

- **NEXT-TELL-Key Reading**

Key reading (in addition to the 80Days papers):

Reimann, P., Kickmeier-Rust, M. D., & Albert, D. (2013). [Problem Solving Learning Environments and Assessment: A Knowledge Space Theory Approach](#). Computers & Education, 64, 183–193
<http://www.sciencedirect.com/science/article/pii/S0360131512002977>

Game-Based Learning (GBL)

- **ELEKTRA-Project**

Enhanced Learning Experience and Knowledge Transfer

<http://css.uni-graz.at/projects/elektra/elektra.html>

http://www.learningfrontiers.eu/?q=tel_project/ELEKTRA

- **ELEKTRA-Reports**

<http://css.uni-graz.at/publicdocs/publications/USAB2006.pdf>

<http://css-kmi.tugraz.at/mkr/files/2007%20ECGBL.pdf>

- **ELEKTRA-Trailer**

<http://www.takomat.com/en/games/game-research.html>

- **80Days-Project**

Around an Inspiring Virtual Learning World in **Eighty Days**

<http://www.eightydays.eu/>

- **80Days-Game-Prototype**

<http://css-kmi.tugraz.at/80Days/downloads.html>

The game prototype can be downloaded - but it is a large file: 750MB

- **80Days-Authoring-Tool**

<http://storytec.de/index.php?id=2&L=1>

One of the achievements from 80Days is a authoring tool for serious games involving features of interactive storytelling and (optionally) CbKST-based adaptive features. The tool named Storytec was developed by TU Darmstadt.

- 80Days-Book

http://books.google.at/books/about/An_Alien_s_Guide_to_Multi_Adaptive_Educa.html?hl=de&id=OKZJnHKdchQC

The 80Days book explains the design, application, and theoretical background of adaptive educational computer games on the basis of Competence-based Knowledge Space Theory (CbKST). The book covers the developments of micro level adaptation and the research and application in the field of educationally meaningful interactive and adaptive storytelling.

- 80Days-Movies

<http://css-kmi.tugraz.at/80Days/movies.html>

There are 4 promotional movies on the project's website explaining the ideas and achievements of the project.

- 80Days-Key-Readings

Kickmeier-Rust, M. D., & Albert, D. (2010). [Micro adaptivity: Protecting immersion in didactically adaptive digital educational games](#). Journal of Computer Assisted Learning, 26 (2), 95-105.

Kickmeier-Rust, M. D., Mattheiss, E., Steiner, C. M., & Albert, D. (2011). [A Psycho-Pedagogical Framework for Multi-Adaptive Educational Games](#). International Journal of Game-Based Learning, 1 (1). 45-58.

Augustin, T., Hockemeyer, C., Kickmeier-Rust, M. D., Podbregar, P., Suck, R., & Albert, D. (2013). [The simplified updating rule in the formalization of digital educational games](#). Journal of Computational Science, 4(4), 293-303.

- TARGET-Project

Transformative, Adaptive, Responsive and EnGaging Environment

<http://www.reachyourtarget.org/>

TARGET aims at accommodate personalisation and adaptation to respond to specific learning needs and contexts within the business processes and human resources management systems of organisations by means of a serious game platform.

- TARGET-References

Kopeinik, S., Nussbaumer, A., Bedek, M., & Albert, D. (2012) Using CbKST for Learning Path Recommendation in Game-based Learning. In G. Biswas et al. (Eds.). Proceedings of the 20th International Conference on Computers in Education. Singapore: Asia-Pacific Society for Computers in Education.

- GaLA-Network

Gaming and **L**earning **A**lliance
Network-of-Excellence for Serious Games
<http://www.galanoe.eu/>

GaLA is a *Network of Excellence* on serious games that has been launched by the European Union in October 2010 in the context of technology-enhanced learning, in the 7th Framework Programme for research. Serious games are computer games infused with pedagogical aims. Drawing the inspiration from military training and business simulations, serious games technologies and applications have spread in school education and in corporate training. Currently, they are deemed as very promising due to their appeal towards new generations and their ability to provide multimedia knowledge acquisition tools that are compelling and personalisable.

Other CbKST-related Applications & Projects

- CULTURA-Project

CULTivating **U**nderstanding and **R**esearch through **A**daptive Learning
<http://www.cultura-strep.eu/home/>

- ELeGI-Project

European **L**earning **G**RID Infrastructure
<http://wundt.uni-graz.at/projects/elegi/elegi.php>

- GRAPPLE-Project

Generic **R**esponsive **P**ersonalized **L**earning **E**nvironment
www.grapple-project.org/

- **INNOVRET-Project**

INNovative **O**nline **V**ocational Training of **R**enewable **E**nergy
Technologies

<http://www.innovret.com/>

- **MedCAP-Project**

Competence Assessment for Spinal Anesthesia

<http://css.uni-graz.at/projects/medcap/>

- **PKSIRT-Project**

Probabilistic **K**nowledge **S**pace and **I**tem **R**esponse **T**heories: Towards a
Unified Test Theory

<http://wundt.uni-graz.at/projects/pksirt/pksirt.html>

- **SRbT-Project**

Surmise **R**elations **b**etween **T**ests

<http://wundt.kfunigraz.ac.at/projects/srbt/Welcome.php>

- **TRAILS-Project**

Personalised and Collaborative **TRAILS** of Digital and Non-Digital
Learning Objects

<http://wundt.uni-graz.at/projects/Trails/Welcome.php>

- **weSPOT-Project**

working **e**nvironment with **S**ocial and **P**ersonal **O**pen **T**ools for Inquiry
based Learning

<http://portal.ou.nl/web/wespot/home>