Open Research Online

The Open University's repository of research publications
and other research outputs

Responsive Open Learning Environments: Outcomes of Research from the ROLE Project

Edited Book

How to cite:

Kroop, Sylvana; Mikroyannidis, Alexander and Wolpers, Martin eds. (2015). Responsive Open Learning Environments: Outcomes of Research from the ROLE Project. Cham, Switzerland: Springer International Publishing.

For guidance on citations see FAQs.

Version: Version of Record

Link(s) to article on publisher's website:
http://www.springer.com/gp/book/9783319023984

oro.open.ac.uk

Responsive Open Learning Environments

Sylvana Kroop • Alexander Mikroyannidis •
Martin Wolpers
Editors

Responsive Open Learning Environments

Outcomes of Research from the ROLE Project

Springer Open

Editors
Sylvana Kroop
ZSI Vienna Centre for Social Innovation
Vienna
Austria

Alexander Mikroyannidis
The Open University
Milton Keynes
United Kingdom

Martin Wolpers
Fraunhofer Institute for Applied Information
    Technology (FIT)
Sankt Augustin
Germany

Acknowledgement

Contents

List of Authors: Members of the ROLE Consortium

Dietrich Albert is professor of psychology at University of Graz, Austria, senior scientist at the Knowledge Technologies Institute at Graz University of Technology, and key researcher at the Know-Center, a competence centre for knowledge management in Austria. His research topics cover several areas in cognitive psychology, mainly focusing on knowledge and competence structures and their applications. He has been involved in more than two dozen EU-funded research projects on technology-enhanced learning (e.g. ROLE, NEXT-TELL, and 80Days).

Evgeny Bogdanov is a post-doctoral researcher in Computer Science at REACT group of Ecole Polytechnique Fédéral de Lausanne (EPFL) in Switzerland. He received his Ph.D. degree in Computer Science from EPFL in August 2013. His research interests are in the area of widgets and widget bundles with focus on portability and interoperability. He is currently involved in the European Go-Lab project that started in December 2012.

Kerstin Borau is a certified German and English teacher at the School of Continuing Education of Shanghai Jiao Tong University. She obtained her M.A. in English Linguistics at Saarland University with a thesis on First Language Acquisition that received the highest grade. Her current research focuses on non-linear learning, mobile learning and on exploring new methods for language learning, such as using Web 2.0 services in innovative ways to increase active participation.

Teresa Connolly works at the University of Oxford on the EU FP7 funded BioFresh project. She has extensive professional experience in research and teaching in the areas of Geographic Information Systems (GIS), Academic Practice, Educational Technology and Open Educational Resources (OER). Teresa has worked as a Lecturer in OER on the OpenLearn project and on a variety of EU-funded technology-enhanced learning (TEL), projects (including ROLE) at the Open University. She also has worked on the JISC/HEA funded Open Resource Bank for Interactive Teaching (ORBIT) project at the University of Cambridge. Teresa has also carried out a number of consultancies for UNESCO, the Imperial College NHS Trust and the UK Higher Education Academy (HEA) where she is an Associate.

Ingo Dahn leads the Knowledge Media Institute of the University Koblenz-Landau in Koblenz since 2001. With a habilitation in Mathematical Logic from Humboldt University Berlin, he started his career teaching mathematics and doing research in non-standard logics and model theory. In the late 1980s he moved to artificial intelligence, in particular automated and interactive theorem proving. This led to his work on textbook personalisation and e-Learning after he joined the Artificial Intelligence group in Koblenz in 1998. Major areas of interest in e-Learning are technical standards, conformance testing, and content recommender systems. He was involved in numerous European projects, e.g. ROLE, TAS3, and RadioActive Europe.

Daniel Dahrendorf obtained a M.Sc. degree in computer science and a Staatsexamen in computer science and mathematics from Saarland University. After graduation he started to work at IMC in the Innovation Labs department, where he was involved in national and international research projects as a researcher and senior software engineer. His research areas and main expertise are Web Application Development, Product Management, Social Software, Learning Management Systems, MOOCs and Personalised Learning Software. Currently he manages the development of IMC's new learning interface for open online courses and cooperate learning scenarios.

Diana Dikke is working as a research professional for IMC AG conducting research in the fields of competency-based personnel development and learning management, self-regulated learning with web applications, virtual learning environments, and inquiry-based learning with online labs. Ms. Dikke is also an experienced specialist in research project and learning software marketing, especially in using web instruments for dissemination activities, as well as web platform administration.

Denis Gillet leads the Coordination and Interaction Systems Group at the Swiss Federal Institute of Technology in Lausanne (EPFL), where he received his Ph.D. in Information Systems in 1995. His research interests include Technologies Enhanced Learning (TEL), Human–Computer Interaction (HCI), Engineering Education, as well as Dynamic Coordination of Distributed Systems and Devices. His current research focus is on the design and deployment of social media platforms for Science Technology Engineering and Mathematics (STEM) Education and

Knowledge Management (KM). Denis Gillet is Associate Editor of the *International Journal of Technology Enhanced Learning*. He has been an Executive of previous European research projects on Technology-Enhanced Learning and is currently the Technical Coordinator of the Go-Lab Integrated European initiative investigating online labs federation and exploitation for inquiry-based learning at school.

Sten Govaerts is a post-doctoral researcher at École Polytechnique Fédérale de Lausanne (EPFL) in Switzerland in the Real-time Coordination & Distributed Interaction Systems (REACT) Group. He is currently responsible for the technical work package of the Go-Lab project (http://www.go-lab-project.eu/) that aims to open up remote science laboratories and their online labs for large-scale use in education. He finished his Ph.D. at KU Leuven (Belgium) in the Human–Computer Interaction (HCI) research group under supervision of Prof. Erik Duval in 2012. His research interests include user experience design, information visualisation, ubiquitous computing and findability applied to both the technology-enhanced learning domain and contextualised music.

Bodo Von der Heiden studied computer science at the RWTH Aachen University until 2008. During his studies he was involved in programming of children programming language, called "Blopp". From 2009 to 2011 he was a research assistant in the field of knowledge management at the Center for Learning and Knowledge Management and Department of Information Management in Mechanical Engineering at RWTH Aachen University. Here he was engaged in the development of a knowledge map in the EU-sponsored project ROLE. Since 2011 he works at edudip GmbH in the development of a portal for online seminars, so-called webinars.

Erik Isaksson has a Master of Science degree in Information and Communication Technology from the Royal Institute of Technology (KTH), Stockholm, Sweden. After graduating in 2009, he has worked within the Knowledge Management Research (KMR) group as a research engineer at Uppsala University, Sweden, primarily with Web technologies and Linked Data, and how these can be applied to Technology-Enhanced Learning (TEL). Currently, he works within KMR, now as a Ph.D. candidate at KTH, in projects related to TEL as well as Cultural Heritage. Among earlier work experience, he has worked as an ICT consultant, with assignments mostly involving software development. Research interests include metadata, the Web, information systems, security and, in particular, how these can be integrated with usability and interoperability in mind.

Sylvana Kroop is senior researcher and manages R&D projects in the field of Technology-Enhanced Learning (TEL) at the Centre for Social Innovation (ZSI) in Vienna, Austria. She is senior lecturer at the University of Vienna. In her past (1991–2001) she worked as executive assistant CEO in the private sector where she managed five hotels in Berlin/Germany and surroundings. In 2000 she became part of the research and teaching staff of the Media Faculty at Technical University of Berlin. As full-time researcher in TEL she gained more experience in R&D projects at Bauhaus University Weimar, Germany. Since 2005 she works at University of Vienna. In 2012 she has been elected for the Advisory Board of the Ferdinand Porsche University of Applied Sciences in Vienna, the only Distance University in Austria, where she supports development and innovation. Her research is focused on ICT-based innovative pedagogical approaches and the relation between technological and social innovations in higher education and workplace learning.

Mikael Laaksoharju is a junior lecturer and director of studies in the Division of Visual Information and Interaction at the Department of Information Technology, Uppsala University. His research focuses on developing processes that integrate human values in interaction design practice.

Effie Lai-Chong Law is Reader at the Department of Computer Science of the University of Leicester (UK) and Visiting Senior Researcher of ETH Zürich (Switzerland). She obtained her Ph.D. in psychology from the University of Munich (LMU), Germany. Her research domains are human–computer interaction (HCI) and technology-enhanced learning (TEL) with a specific focus on usability and user experience (UX) methodologies. Effie has been chairing two international HCI projects: MAUSE "Towards the Maturation of Usability Evaluation" and TwinTide "Towards the Integration of Trans-sectorial IT Design and Evaluation" in which researchers more than 20 European countries have been involved. Effie has also assumed a leading role in a number of interdisciplinary EU-funded research projects on various TEL topics such as game-based learning, CSCL, and personalised learning environments. She is an editorial board member of Interacting with Computers.
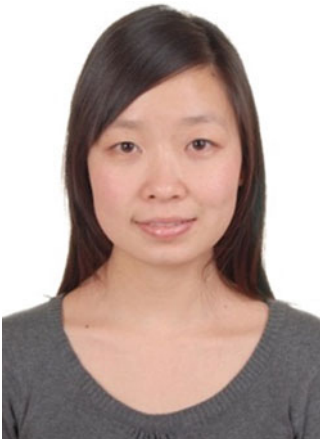
Na Li is a Ph.D. student at the Coordination and Interaction Systems Group of the Swiss Federal Institute of Technology in Lausanne (EPFL). She received her Bachelor and Master degrees from Tongji University in 2007 and 2009, respectively. Her research interests include trust and reputation systems, technology-enhanced learning, and social media platforms. More specifically, she is interested in the design and development of social media platforms with application to learning environments, as well as information filtering in such platforms using trust and reputation models. She has been

working on the European research projects on technology-enhanced learning, such as Responsive Open Learning Environments (ROLE) and Global Online Science Labs for Inquiry Learning at School (Go-Lab).

Thomas Lind is a Ph.D. student in the Division of Visual Information and Interaction at the Department of Information Technology, Uppsala University. In his research he is identifying pitfalls and key principles for facilitating user adoption of IT in large governmental organisations

Alexander Mikroyannidis is a post-doctoral researcher in the Knowledge Media Institute of the Open University UK. His research areas of interest are related with knowledge management and applications of Semantic and Social Web technologies in Technology-Enhanced Learning (TEL). Recently, he has been investigating self-regulated learning and the challenges involved in the adoption of personal learning environments by the lifelong learner. He has also been working on the production of online courses and open educational resources, delivered through various educational platforms, such as interactive eBooks. Dr. Mikroyannidis has contributed to several projects of the 5th, 6th, and 7th Framework Programme of the European Community, including FORGE (ICT-2013-610889), weSPOT (ICT-2012-318499), Euclid (ICT-2012-296229), ROLE (ICT-2009-231396), OpenScout (ECP 2008 EDU 428016), DEMO-net (ICT-2006-27219), CASPAR (ICT-2005-33572), and PARMENIDES (IST-2001-39023).

Alexander Nussbaumer is member of the interdisciplinary Cognitive Science Section (CSS) of the Knowledge Technologies Institute at the Graz University of Technologies, Austria. Before that he joined the Cognitive Science Section of the Department of Psychology at the University of Graz. In the context of these affiliations he has been participating in EC-funded projects on technology-enhanced learning and cultural heritage (e.g. iClass, GRAPPLE, CULTRUA, and ROLE). Having a background in computer science, his research interests include the integration of psychological research and technical application with a focus on competence-based knowledge representation models and their applications for learning purposes in adaptive and self-directed learning contexts.

Matthias Palmér received his Ph.D. in media technology from Royal Institute of Technology (KTH) with a focus on technology-enhanced learning and semantic web. After graduating from KTH in 2012 Matthias co-founded the company MetaSolutions which has a focus on how modern web architecture and linked open data can be used to create services and web applications for collaborative information management. Previously Matthias worked for Uppsala University within several EC-founded projects such as LUISA and ROLE as well as served as the technical lead of the development of the Uppsala University Student Portal. Matthias is an active developer and continues to be involved in the design and development of several open source projects.

Sarah León Rojas received a M.A. in Media Informatics from the Cologne University of Applied Sciences. She currently works as a research associate in the User-centred Ubiquitous Computing (UCC) group at the Fraunhofer Institute for Applied Information Technology FIT. Her work focuses on human–computer interaction and interface design as well as the analysis and visualisation of usage data.

Maren Scheffel studied at the University of Edinburgh, UK, and the University of Bonn, Germany, where she received an M.A. in Computational Linguistics. She is currently working as a research associate at the Fraunhofer Institute for Applied Information Technology FIT as a member of the "Context and Attention in Personalised Learning Environments" department that aims to support teachers and learners in universities and at the workplace by providing technical solutions. Additionally, she is a Ph.D. candidate at the Open University of the Netherlands. Her research focuses on the application of linguistic methodologies to the analysis of usage data, i.e. inferring higher level information such as patterns and key actions from low level data.

Manuel Schmidt is working in the e-learning project of Festo at the Festo Learning Centre which provides the entire e-learning services for the Festo Group worldwide. Mr. Schmidt's tasks are the provision and operation of the international learning management system at Festo, production of e-learning contents and the future development of e-learning at Festo. Mr. Manuel Schmidt studies business sciences at the university of cooperative education Saarland (ASW), his Diploma Theses dealt with

e-learning in intercultural settings. He already gained EU project experiences in the Symphony project.

Hans-Christian Schmitz is a member of the Institut für Deutsche Sprache (IDS, Institute of German Language, Mannheim/Germany) where he searches for traces of grammar in very large corpora. Before he joined the IDS, he was a member of the Fraunhofer Institute for Applied Information Technology, there serving as the project manager of the ROLE project, among others. Hans-Christian earned his Ph.D. in computational linguistics at the University of Bonn. He has substituted for professors several times, in different areas, namely computational linguistics, German language studies and computer science.

Simon Schwantzer holds a diploma in Computer Science from the University of Kaiserslautern (Germany). Since 2010, he works as research professional at the innovation labs department of the IMC information multimedia communication AG in Saarbrücken. His focus areas are collaborative learning environments, social learning, and real-time collaboration systems.

Ruimin Shen has been working in the Department of Computer Sciences of Shanghai Jiao Tong University since 1991, and worked as a visiting professor at Waseda University between 1997 and 1998. Currently, he serves as a member of the Ministry of Education's Expert Committee on Long-Distance Education. He is the director of the Intel-SJTU Long-Distance Education Research Center and dean of the School of Continuing Education of Shanghai Jiao Tong University. As a member of Education Ministry Distance Education Committee, Ruimin Shen is in charge of the regulation of several Chinese

E-Learning Technology Standards. In 2006, Premier Minister Wen Jiabao awarded Prof. Shen with the National Award for Science & Technology Progress.

Carsten Ullrich the deputy director of the Centre for e-Learning Technology (CeLTech) at the German Research Center for Artificial Intelligence (DFKI), and an associate researcher in the e-learning lab of Shanghai Jiao Tong University, China. He received his Ph.D. in Computer Science (Saarland University) in 2008. That year, he became an associate researcher at SJTU, China, where he investigates web-based and mobile learning in adult education. From 2009 to 2013, he was the SJTU leader of the European IP ROLE. In 2013, he became the deputy director of CeLTech. Dr. Ullrich's research covers technology-supported e-learning, with a focus on personalisation and learner-support. He has published numerous papers on adaptivity (Semantic) Web-based learning and mobile learning. He is a frequent speaker in conferences and innovation fairs.

Katrien Verbert is an assistant professor at the Eindhoven University of Technology. She obtained a doctoral degree in Computer Science in 2008 at the University of Leuven (KU Leuven), Belgium. She was a post-doctoral researcher of the Research Foundation—Flanders (FWO) from 2009 until 2012 at KU Leuven. Her research interests include content models, content reusability, context-aware recommendation, visualisation and personalisation, and applications thereof in healthcare, science information systems and technology-enhanced learning. In that respect, she is currently involved with the RAMLET IEEE LTSC standardisation project that has developed a standard to enable interoperability of content packaging specifications for learning resource aggregations. She was involved in the EU FP7 project ROLE that is focused on contextual recommendation in responsive open learning environments. She co-organised several workshops and special issues in this area. She also co-established the dataTEL Special Interest Group of EATEL that is focused on data-driven research for learning analytics.

Helmut Vieritz studied Physics and Sociology at the Humboldt University and Freie Universität of Berlin. After receiving his diploma, he worked at the Berlin Institute of Technology and Stuttgart University. His activities focus on Web development in E-Learning and Multimedia. In the MUMIE project, he paid attention to the processing of mathematical content with Semantic Web technologies. Currently, he is working at the RWTH Aachen University. Besides teaching informatics in large classes, his research focuses on usage-centred Web development with inclusive design. He was responsible for the DFG-research project (Integrated Accessibility Models of User Interfaces for Web and Automation Systems) in collaboration with the Stuttgart University.

Michael Werkle is responsible for quality management at Festo learning Centre as well as national and international research projects, especially in context of further education and learning with new media. He works for Festo in this areas since 2005 and has put his experiences into practice in different projects. From 2003 to 2006 he studied business sciences (core area: human resources management) at the University of Applied Sciences in Saarbrücken. In 2011 he finished his second degree (extra-occupational) in vocational studies and economic education at Saarland University in Saarbrücken.

Martin Wolpers holds a Ph.D. in electrical engineering and information technology from the Leibnitz University Hannover. He is head of the research department "Context and Attention in Personalised Learning Environments" at FRAUNHOFER. He also holds the title "visiting professor" at the Katholieke Universiteit Leuven, Belgium. He has been strongly involved in a number of highly successful European Projects, e.g. coordinator of the ROLE project as well as partner in OpenDiscoverySpace, OpenScout and NaturalEurope projects. He is vice-president of

the European Association of Technology Enhanced Learning (EATEL) and president of the MACE Association, result of the *successful coordination of the eContent + project MACE. His research interests focuses on the im*provement of Technology-Enhanced Learning by relying on new and emerging technologies. This includes work on infrastructures for information processing, knowledge management and provision as well as contextualised attention metadata and information elicitation (among others).

Fridolin Wild is research associate at the Knowledge Media Institute of the Open University of the UK. Fridolin's research happens at the interface of the digital and the real, where learning, thinking, and cognition meet information systems. His research fields encompass awareness, engagement, and collaboration at scale. Fridolin is and has been the principal investigator and work package leader of several large EC-funded and nationally-funded projects, amongst others: TELL-ME, TELmap, STELLAR, LTfLL, ROLE, iCamp, ProLearn, Edukapp, cRunch. Fridolin is the voted treasurer of the European Association of Technology Enhanced Learning (EATEL) and the managing editor of the *International Journal of Technology-Enhanced Learning*.

List of Authors: External Experts and Commentators of Chapters

Graham Attwell is an Associate Fellow, Institute for Employment Research, University of Warwick and a Gastwissenschaftler at the Insititut Technik und Bildung, University of Bremen. His experience includes technology-enhanced teaching and learning and web-based learning environment development, specialised in research and development into pedagogies for Technology-Enhanced Learning. Graham is a consultant to OECD and UNESCO on open content development and a consultant to the European Centre for Vocational Education and Training (CEDEFOP) on virtual communities and knowledge harvesting. He has experience in national and international programme evaluation in relation to innovations in learning, including use of ICT to support learning. His recent work has focused on research and development of new applications and approaches to e-Portfolios and Personal Learning Environments and use of social software for learning and knowledge development.

Jon Dron is researching with the Technology Enhanced Knowledge Research Institute and teaches in the School of Computing and Information Systems at Athabasca University, Canada. He also holds an honorary faculty fellowship in the Centre for Learning and Teaching, University of Brighton, UK. Jon has received national and local awards for teaching and research, and is a regular conference keynote speaker. His research is cross-disciplinary, straddling social, pedagogical, technological, systemic and philosophical boundaries of technology, learning and education. He used to sing for a living.

Sheila MacNeill has recently taken up a post as a Senior Lecturer in Blended Learning at Glasgow Caledonian University. Previous to this post she was an Assistant Director for Cetis (www.cetis.ac.uk) where her main areas of interest and work were around the user experience of using and implementing technology for teaching and learning. A key area of work during her time at Cetis centred around the development and support of approaches to distributed learning environments, particularly the underlying models and architectures for the sharing of widgets and apps. In September 2013 Sheila was named the ALT Learning Technologist of Year, 2013. Sheila regularly blogs about the use and potential of educational technology in her blog: howsheilaseesit.wordpress.com.

Martin Ebner is currently head of the Department for Social Learning at Graz University of Technology and therefore responsible for all university-wide e-learning activities. He holds an Assoc. Prof. on media informatics and works also at the Institute for Information System Computer Media as senior researcher. His research focuses strongly on e-learning, mobile learning, learning analytics, social media and the usage of Web 2.0 technologies for teaching and learning. Martin gives a number of lectures in this area as well as workshops and talks at international conferences. For publications as well as further research activities please visit the website: http://martinebner.at

Carlo Giovannella graduated in Physics and is an expert of complex systems, nowadays can be considered a 'Designer for the experience' and expert in the technology-enhanced learning, interaction design, computer-mediated communication, design and management of processes, process and product innovation. Since 2013 is the Scientific Director of the Creative Industries Area at the Consorzio Roma Ricerche. He is member of the Dept. of Educational Science and Technology of the University of Rome Tor Vergata, where he is chairing the ISIM_garage (Interfaces and Multimodal Interactive Systems). He has edited more than ten books and special journal issues and published almost 200 papers in Physics, Photography and communication, Technology-Enhanced Learning and Design for the Experience. He is the scientific editor of the *Journal IxD&A* and has been scientific and artistic chair of six editions of 'Interfacce' and co-chair of several conferences and workshops (ICALT 2012, HCIEd2008, CHItaly 2009, DULP 2009, DULP@ICALT2010, DULP@ICALT2011, Horizon 2020: Smart City Learning @ARV13, etc.).

Marco Kalz is Associate Professor at the Welten Institute—Research Centre for Learning, Teaching and Technology at the Open University of the Netherlands. Marco is a fellow of the Interuniversity Center for Educational Sciences (ICO) and the Dutch research school information and knowledge systems (SIKS). He is the chair of the special interest group on Technology-Enhanced Assessment (SIG TEA) of the European Association of Technology-Enhanced Learning (EATEL). Besides European projects he was and is regularly involved in educational innovation projects at the Open University of the Netherlands and in cooperation with other partners. His research interest lies on the use of pervasive technologies and formative assessment to support self-directed lifelong learning. He has more than 30 peer-reviewed journal publications and conference papers in the TEL field.

Jürgen Mangler is researcher at the Workflow Systems and Technology Group of the University of Vienna in Austria. His current research is focused around business processes, and their automated enactment through workflow management systems. Specific research topics include: motivating humans when dealing with strictly predetermined processes and activities; measuring how skills and competencies change when humans work in process controlled environments; how to automatically recover from errors (self-healing). In the past he was working as a security researcher at Secure Business Austria (SBA), as well as TEL researcher and still operates a custom SOA LMS at the Faculty of Computer Science, University of Vienna. He has contributed to projects in the 6th and 7th Framework Programme of the European Commission, currently ADVENTURE (FP7-ICT-2011-C 231396) in the Factories of the Future (FoF) Theme.

Margit Pohl studied Computer Science and Psychology in Vienna. She is associate professor at the Vienna University of Technology where she works at the Institute for Design and Technology Assessment/HCI group. She is mainly interested in the cognitive aspects of the interaction of humans with computers. Her most important research interests are E-Learning, Cognitive Psychology and Visualisation. She has conducted many projects in the area of E-Learning and Visualisation. Her main current research project is CVAST—Center for Visual Analytics Science and Technology.