



# adila

Agder Digital Learning Arena

## D-TEL2015

Symposium on Advances in Digital Technologies  
for  
University Teaching and Learning

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Campus Grimstad, Nov.30, 2015.

## Book of Abstracts



UNIVERSITY OF AGDER



**adila**  
Agder Digital Learning Arena

Innovation in Learning  
Through Digital Media



## Background

Technology in education is fast evolving, causing a paradigm shift to more student-centred, adaptive personalized learning systems. The increasing computing power and the availability of faster communication networks afford students and teachers more opportunities. That includes the integration of multimedia and learning analytics into educational practice. The challenge remains however, that advances in technology are not fully exploited to provide the best possible learning experience.

This symposium provides a platform to discuss the challenges ahead and showcase current research work both at University of Agder and partner institutions.

## Main topics

- Design and development of ICT tools for teaching and learning
- Visualisation and simulation in engineering education
- Digital assessment
- Open and distance education, computer supported collaborative learning & MOOC
- New e-Learning specification and learning technology standards
- Mobile learning & Gamification of teaching and learning

## About ADILA

ADILA (Agder Digital Learning Arena) project is an interdisciplinary initiative supporting research collaboration between different faculties and the Pedagogisk Utviklingssenter, Centre of Educational Development (PULS) in the area of digital media supported teaching and learning. ADILA intends to contribute in how to think about the future of education, in order to meet the learning challenges of the future. ADILA undertakes research studies to address the ever-shifting teaching and learning paradigms.

# Project members



**Assoc. Prof. Gunnar Horn**  
**ADILA Project Manager & Director of PULS**

**Research Interests:** Storytelling; The Performing Teacher; Teaching and Learning in Higher Education; ICT supported learning activities.



**Prof. Bjørn Erik Munkvold**  
**Professor,**

**Research Interests:** E-Collaboration and Virtual Work; Information Management; Information Systems; Organizational Adoption and Diffusion of ICT.



**Prof. Frank Reichert**  
**Dean & Rector Elect**

**Research Interests:** Future Education and Digital Learning Experiences; Mobile Communication and Computing; Rapid prototyping; Ubiquitous, Next Generation Networks



**Prof. Oddgeir Tveiten**  
**Professor**

**Research Interests:** Exploring Blended Learning in Practice (Future Learning Lab); Communication, Globalization and Development; Global Journalism.



**Prof. Arne O. Øyhus**  
**Professor**

**Research Interests:** Rural Development and Natural Resource Management in a Societal Perspective; Entrepreneurship, Microfinance, Small Business Development.



**Prof. Pauline Vos**  
**Professor**

**Research Interests:** Mathematical Education; E-Learning and Mathematics; Alternative Formats for the Assessment of Mathematics.



**Prof. Dag Gjerløw Aasland**  
**Vice Rector for Research**

**Research Interests:** The Role of Ethics in the Economy



**Prof. Andreas Prinz**  
**Head of Department**

**Research Interests:** System Modeling; Language Modeling and Domain-Specific Languages; System Integration; Future Education



**Assoc. Prof. Christian Webersik**  
**Associate Professor**

**Research Interests:** Sustainability Studies; Development Management; Research Methods in Social Sciences; E-teaching



**Assoc. Prof. Ghislain Maurice Isabwe**  
**ADILA Project Secretary**

**Research Interests:** Interaction Design and Human Computer Interaction; Mobile Technology for Education; Online and Distance Education; Collaborative Learning.



**Prof. Roger Såljø**  
**ADILA Project Scientific Leader**

**Research Interests:** Learning, development, literacy, learning and ICT/media, virtual learning environments, learning and materiality, sociocultural and pragmatic perspective on learning, communication and interaction



**Prof. Astrid Birgitte Eggen**  
**Head of Department**

**Research Interests:** School Development; Assessment of Learning Content; Assessment in Higher Education; Curriculum Understanding



**Renée P. Schulz**  
**PhD Research Fellow**

**Research Interests:** ICT Tools for Education from a Teacher's Perspective; Innovative ICT Concepts for Learning and Teaching; Interaction Design, Gamification.



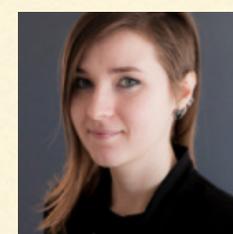
**Godfrey Mayende**  
**PhD Research Fellow**

**Research Interests:** Distance Learning; eLearning; Collaborative and Cooperative Learning.



**Erik Adalberon**  
**PhD Research Fellow**

**Research Interests:** Use of Facebook in Higher Education; Learning Arenas; Learning and Social Capital.



**Aleksandra Lazareva**  
**PhD Research Fellow**

**Research Interests:** Computer-Supported Collaborative Learning; Blogs for Education; Student Engagement; Online Learning environments; Collaboration scripts.



**Ninni Marie Hogstad**  
**PhD Research Fellow**

**Research Interests:** Visualisation and simulation in mathematics education; development of digital technology for mathematics education.



**Dianah Nampijja**  
**PhD Research Fellow**

**Research Interests:** Mobile Learning in Informal Contexts, ICT4D, Climate Change, and Education for Sustainable Development.

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# D-TEL2015 Abstracts

## On Supporting Inquiry-Based Learning with Online Labs

Ton de Jong  
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Email: [a.j.m.dejong@utwente.nl](mailto:a.j.m.dejong@utwente.nl)

Education is on the edge of a number of interesting changes in which technology plays a pivotal role. These changes revolve around a movement towards more active, collaborative, and contextual learning. Technology concepts that go together with these changes are simulations and online labs, modeling and design tools, shared objects, cognitive scaffolds, visualizations, adaptively, touch-based interfaces, and gamification. In this presentation, I will make a tour through these developments and will demo examples of new developments. In the presentations, there will be a focus on online labs and the Go-Lab project ([www.golabz.eu](http://www.golabz.eu)). This involves inquiry learning supported by online scaffolds. Experimental studies assessing the effectiveness of online labs and scaffolds will be presented.

## Development of a task-driven mobile teaching tool using the human-centred design process and gamification

Renée Schulz  
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Norway

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These days, more and more digital learning and teaching opportunities emerge into the world of higher education. We argue that innovative technology is widely missing in teaching situations and that the use of mobile technology can be one way to enhance the teaching support in higher education. The focus of this research is on the teachers' needs and requirements since we found that they are as important stakeholders as the students. This means that the teachers' needs, especially their teaching motivation will be regarded. This topic regarding teachers' needs deals with the initial and ongoing motivation as well as behavior and attitudes toward current or upcoming ICT systems for education. The main aspect of the project is to specify issues about current systems and analyze requirements for enhanced future e-learning systems. This analysis will spent special attention on requirements for an enhanced teacher motivation. Preliminary results lead to the conclusion that the two major issue areas are the task design and distribution in the courses and the interaction support between students and teachers. Another finding is that gamification can be one method to increase not only the students' motivation, but also the teacher's motivation.

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## **Designing Engaging Computer-Supported Collaborative Learning (CSCL) Environments: Online Tutor as a Provider of Adaptive Support**

Aleksandra Lazareva  
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Norway

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There has been much research on the use of digital tools and their affordances in education. However, many students still experience problems navigating in online learning environments. Moreover, not everyone has the necessary set of skills to effectively collaborate with the peers online. Collaboration scripts – certain prompt supporting effective collaborative interactions among students – have been implemented to address these problematic issues. However, collaboration scripts may be a challenge as they may interfere with students' internal scripts and thus impede natural collaborative interactions. Recently the focus has been in the area of adaptive scripting. Online tutor is capable of providing adaptive support for the learners. What are the necessary skills of a successful online tutor? How to train tutors and provide support to them?

## **Using digital tools for collaborative visualization of integrals by engineering students**

Ninni Marie Hogstad  
University of Agder  
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Several researchers state that many engineering students are visual learners, while mathematical instruction tends to be very symbolic and verbal. Technology brings many opportunities for visualizations. In our research we investigate how we can support students' use of visualizations in a technological environment. The technological environment consists of engineering students, a mathematical task, a digital visualization tool, pen and paper. By inserting mathematical formulas in the tool, the tool generates graphical representation and a kinematic simulation of moving objects. The students are asked to find these formulas to make the simulation run according to the task.

## **Use of ICT in the examination of pre-service teachers**

Erik Yves H. Adalberon  
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This PhD project is centered around a relatively new kind of examination used in teacher education, where case methodology and video is combined. Instead of a traditional written school examination, some students at the University of Oslo is offered a digital take-home exam with exer-

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cises are based on a video-example presenting a real classroom situation. This innovation presents many possibilities, but also some challenges, and this study will try to describe different sides of the examination method through an analysis of student responses, exam papers, and the judgement of assessors.

**Mobile Learning for Enhancing Livelihoods in Developing Regions. The Case of Mobiles for Development Projects in Uganda.**

Dianah Nampijja  
University of Agder

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The influx of modern technologies has revolutionised information sharing, making it possible to effectively offer learning possibilities even for communities outside formal education. Using social constructivists qualitative approaches, this study explores the role of mobile learning in supporting livelihoods among small holder farmers in Uganda. Conceptualising a framework to guide mobile learning for development is the ultimate aim of this PhD project.

**Practice what we Preach: Flipping the Classroom in an Interaction Design Course**

Ghislain Maurice N. Isabwe

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Flipping the classroom is an approach to education in which most of the passive learning activities take place out of the classroom. This allows students to be more active during class time, through problem-based learning activities. It also gives teachers the opportunity to clarify concepts, give immediate feedback on students' work and provide better support to students regarding higher order cognition. This work presents how we implemented the flipped classroom methodology in a master level course on interaction design. Our study on students' perceptions indicates that flipped classroom promotes active learning and students feel more engaged while collaboratively working in groups. Students learned more by solving challenges and explaining to each other the course concepts. However, some of the students are not used to this way of teaching and learning. They come to class unprepared, hence not able to complete the given tasks during class time. Students prefer a combination of self-study out of the classroom plus traditional lectures and group activities in class. Flipping the classroom increases learning achievement, but this involves more work for teachers and students in comparison to traditional teaching and learning.

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## **PULS / Digital University**

Gunnar Horn  
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An outline of the activities of the Pedagogical Development Centre (PULS) at the University of Agder in the field of ICT and learning is given. The four main activities of PULS are: basic university pedagogy, national and international cooperation, research and development, as well as seminars and consultations. All activities are strongly influenced by the fast development of ICT-supported teaching and learning. Examples are given of the main PULS activities, such as practical workshops and the Centre's own research within ICT-supported teaching and supervision. PULS is strongly involved in the Digital University (DDU), a project of the University of Agder, where PULS has a leading role, as well as in supporting projects run by faculty staff members from all over the university, as PULS itself is the owner of several projects.

### **Kivi – Kvalitet I videoforelesning – Quality in Video Lectures**

Martin Gaustad  
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Norway  
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Kivi is a university educational development project that deals with the quality of video lectures. The background for the pro-

ject is to take a closer look at findings from selected studies to bring out the underlying criteria for good and short video lectures. The Kivi project will test out different criteria for planning, production and use of short videos at the University of Agder. Data related to various aspects of the productions are collected; and these findings will be evaluated and compared with findings from other studies.

The goal of the project is to find a set of criteria for good and short video lectures with a special focus on the video didactic aspect.

We will present the project, and give information about the online course that is developed for the project participants.

The Kivi-project is managed by the Pedagogical Development Centre (PULS) at the University of Agder, and it is partially funded by Norgesuniversitetet. The project period ends 31 December 2016. More information about the project is available at the website [www.videoforelesning.no](http://www.videoforelesning.no)

### **Student 2.0**

Andreas Prinz  
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The classical model of higher education studies is the sink-or-swim model, where students with good study skills become swimmers, whereas students without those skills will not be able to keep up with the teaching and ultimately sink (they fail).

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This model cannot handle students enrolling with poor study strategies. However, with opening up higher education for everyone, it seems clear that many students will have learned to learn before entering higher education.

The presentation discusses how students can be enabled to swim in the context of higher education by teaching study strategies. In addition, to explain and show examples of good study strategies, the focus is on the teaching of good study habits and the ICT tools required for achieving good results in doing so.

### **T-Flip: Test-Driven Skills Development in Programming**

Morten Goodwin  
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Most teaching of programming is centered on traditional classroom situations with lectures, hand-ins, and evaluations by the teacher. On the other hand, the predominant methods in the software industry are vastly different. Software development is now driven by unit- and system-testing rather than by manual evaluations. This agile test-driven development encompasses automatic evaluation of the correctness of the code, but despite the overwhelming similarities between the industry condition and needs in a teaching environments, test-driven development is not used as a teaching tool.

This talk is on how we take the agile development approach from the industry down to the classroom in a project called T-FLIP, [tflip.uia.no](http://tflip.uia.no).

It shows how students work in a realistic software development environment. In their daily learning they are becoming practically familiar with how they are going to work when they start in the industry. They are automatically tested in an interactive environment, are encouraged to work on assignments especially adapted to their competency level, and work in peer-evaluation situations.

### **FrontScraper - Improving Assignment Marking using Knowledge Metrics**

Nils Ulltveit-Moe  
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Norway

Email: [nils.ulltveit-moe@uia.no](mailto:nils.ulltveit-moe@uia.no)

This talk presents an improved assignment marking methodology based on knowledge metrics supported by the tool Front Scraper. The methodology is based on the information theoretic epistemology developed by the American philosopher Fred Dretske, where all mental facts are representational facts and all representational facts are facts about informational functions. The tool improves the precision, consistency and marking speed when marking student exams. It allows marking of individual sub-assignments instead of marking each exam from top to bottom. The methodology utilizes a knowledge metric which

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allows for coarse-sifting the students' answers in sequence from the most comprehensive ones and to the least comprehensive or empty answers. It also allows similar answers from students being marked together. The improvement in marking speed and precision comes both from an improved workflow as well by reducing the cognitive load in terms of mental context switching during assignment marking.

### **Can Robots Grade?**

Donna Kidwell  
University of Texas, Austin  
USA

Email: [donna.kidwell@webstudent.com](mailto:donna.kidwell@webstudent.com)

Advances in machine learning hold the promise of addressing challenging in assessing, grading and offering feedback to students, especially in courses with large enrolments. Open essay questions encourage reflection and give the students an opportunity to articulate synthesis of a subject, but grading large numbers of essays is time consuming. Similarly, constructing thoughtful quizzes and instructional tools can provide useful learning tools for students, but require time from already busy faculty. This session will look at recent experiments and advances in machine learning applied to assessment – is the technology advanced enough? How do our students respond to automated grading? This session asks, “can we leverage machine learning to help our faculty save time and allow them to focus on the students?”

### **New e-Learning specification and learning technology standards**

Donna Kidwell  
University of Texas, Austin  
USA

Email: [donna.kidwell@webstudent.com](mailto:donna.kidwell@webstudent.com)

Learning analytics relies on rich and valid data on student learning experiences. This session will investigate some of the emerging standards for capturing this data. We'll look at best practices in currently available data from an LMS/VLE and video statistics. We'll then look beyond that data and into the horizon using new standards that aim to help us capture and describe data on the learning action of students. Let's talk about some of the challenges in describing and working with learning data that would help us understand the actions students take as they do the true work of learning.

**Credits:** This book of abstracts was compiled and edited by Mrs Katharina Pätzold, Mrs Ernestine Gipenzi and Dr. Ghislain Maurice Isabwe.



30<sup>th</sup> of November 2015, AMFIET, Campus Grimstad, University of Agder



PROGRAM

08:30	<b>Registration</b>
09:00	<b>Welcome to UiA</b> Vice Rector Prof. Marit Aamodt Nielsen
09:20	<b>Keynote Speech</b> <i>On Supporting Inquiry-Based Learning with Online Labs</i> Prof. Ton de Jong, University of Twente, Netherlands
10:15	<b>Break &amp; Group Photo</b>
10:30	<b>PULS / Digital University Engagement</b> Assoc. Prof. Gunnar Horn
10:45	<b>KIVI - Quality in Video Production</b> Senior Engineer Martin Gaustad
11:00	<b>4 Ph.D. Project Presentations</b> (5 minutes pitch per project)
11:30	<b>Ph.D. Projects Panel Discussions</b> Chair: Dean Prof. Dr.-Ing. Frank Reichert
12:00	<b>Lunch Break</b>
13:00	<b>Parallel Sessions</b>
a)	<b>Design and Development of ICT Tools for Teaching and Learning</b> Chair: Assoc. Prof. Maurice Isabwe
b)	<b>Visualisation and Simulation in Engineering Education</b> Chair: Prof. Pauline Vos
c)	<b>Digital Assessment</b> Chair: Assoc. Prof. Stefanie Hillen

d)	<b>Open and Distance Education CSCL &amp; MOOC</b> Chairs: Prof. Andreas Prinz & Prof. Oddgeir Tveiten
e)	<b>New e-Learning Specification and Learning Technology Standards</b> Chair: Dr. Donna Kidwell & Senior Engineer Sven K. Haaø
f)	<b>Mobile Learning &amp; Gamification of Teaching and Learning</b> Chair: Assistant Prof. Rune Andersen
14:00	<b>Coffee &amp; Tea Break</b>
14:15	<b>Presentations by Session Chairs + Q&amp;A</b>
15:30	<b>Coffee &amp; Tea Break</b>
15:45	<b>Plenary Session</b>
	<b>Flipping the Classroom in the Interaction Design Course</b> by Assoc. Prof. Maurice Isabwe
	<b>Student 2.0</b> by Prof. Andreas Prinz
	<b>FrontScrapper Digital Assessment Tool</b> by Assoc. Prof. Nils Ulltveit-Moe
	<b>T-Flip: Test-Driven Skills Development in Programming</b> by Assoc. Prof. Morten Goodwin

17:15	<b>Can Robots Grade?</b> by Dr. Donna Kidwell, University of Texas, Austin, USA
17:30	<b>Digitized Services for Informal Learning @ Work – Integration with Formal Teaching and Learning Services?</b> by Mr. Tor Arne Bellika, CEO Innovation Performance AS
17:15	<b>Closing Remarks</b> Vice Rector Prof. Dag G. Aasland
17:30	<b>End of Symposium</b>
18:00 - 21:00	<b>SOCIAL EVENT &amp; DINNER</b> University of Agder, Campus Grimstad Room: Uglandstua
	<b>Keynote Speech: On Supporting Inquiry-Based Learning with Online Labs</b> Prof. Ton de Jong, University of Twente, Netherlands
	<b>Abstract</b> - Education is on the edge of a number of interesting changes in which technology plays a pivotal role. These changes revolve around a movement towards more active, collaborative, and contextual learning. Technology concepts that go together with these changes are simulations and online labs, modelling and design tools, shared objects, cognitive scaffolds, visualisations, adaptivity, touch-based interfaces, and gamification. In this presentation I will make a tour through these developments and will demo examples of new developments. In the presentations there will be a focus on online labs and the Go-Lab project ( <a href="http://www.golabz.eu">www.golabz.eu</a> ). This involves inquiry learning supported by online scaffolds. Experimental studies assessing the effectiveness of online labs and scaffolds will be presented.