

D²L²

Research Cluster Digitalization, Diversity and Lifelong Learning. Consequences for Higher Education

(previously: DDLL)

Previous development

Scientific framing

First projects and outlook

Summary of a report published in print in German

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Research cluster "Digitalization, Diversity and Lifelong Learning.
Consequences for Higher Education" (D²L²) of the FernUniversität in Hagen

Overall responsibility

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Foreword

What does the university of the future look like? Or more concretely: What potential is there today to further develop progressive teaching and active learning in higher education on the basis of the technologies available now? What research questions are associated with this? A starting point and at the same time a goal is certainly to accommodate students with their skills and interests in order to optimally prepare them for their respective educational goals in an environment that will place high demands on them due to technical developments and in particular digitalization. At the same time, it is precisely these technical developments and digitalization that provide universities with tools that create possibilities for more personalized learning. If the particularities of each and every student can be accommodated in such a way that the best possible form of learning can be created for all, effort and success can come close to an optimal relationship. This is exactly the goal of D²L².

In D²L² we try to track student characteristics that are relevant to learning with methods from learning analytics. In addition to socio-demographic variables, these include in particular factors such as previous knowledge and abilities for self-control and self-regulation, but also the question of how to set up an optimal learning group with respect to diversity. For adapted and adaptive learning platforms, this knowledge can then be used to provide optimal personalized learning guidance. In order to bring these results and developments to bear in the long term in higher education organizations and society, the organizational conditions for success will also be examined.

At present, we still lack basic research to be able to implement the right evidence-based measures. This research can only be carried out successfully in an interdisciplinary team and is linked to a number of prerequisites. It requires a research concept based on access to the diversity of students' learning paths and the boundary conditions of their learning environments. The research team must be able to carry out its work from different disciplinary perspectives, from educational science, psychology, and sociology to computer science, taking into account economic and legal perspectives. The FernUniversität is uniquely suited to offer the conditions for this research. With an extremely diverse student body of about 78,000 students at present, the FernUniversität has more students than any other German university, and all of them operate in a digital environment in which learning takes place. The necessary research perspectives are represented by the research of the Hagen professors. Where supplementary technical expertise is appropriate, corresponding cooperations have been established in the research cluster presented here, or will be further developed in the future. It can be said that there is no better place in Germany than Hagen to carry out this type of research.

At a very early stage for the newly founded research cluster, this report shows how this research is currently conceived, how concrete scientific goals are formulated in initial projects, and, to some extent how corresponding research has already begun. This may be too early and may require indulgence if sufficient consistency has not yet been achieved, but we would like to offer to be transparent at a very early stage, both within the university and for a broader research landscape, with what has been planned and done, and to be open for others to join. The report also wants to be seen as a concrete contribution to what is covered elsewhere by a large number of terms such as "digital university," "digital learning," or "digital education".

With the assumption of the scientific management of this research cluster on 1 May 2019, I am already placing such great trust in my colleagues after the previous build-up phase that I assume that the research cluster will become a success story for university research and the FernUniversität in Hagen. The scientific environment offered by the students of the FernUniversität in Hagen is a great starting point for this. If we had not made it a research topic ourselves at the FernUniversität, every other research group would have to try to win the FernUniversität as a cooperation partner.

Hagen, August 2019

Friedrich W. Hesse

1 Starting point

In September 2016, the FernUniversität in Hagen developed a concept for the establishment of a research cluster "Digitalization, Diversity and Lifelong Learning. Consequences for Higher Education" for the former Ministry for Innovation, Science and Research of North Rhine-Westphalia. The concept had previously been adopted unanimously by all university committees.

On the basis of this concept, the university was initially allocated additional funds for a limited period of 5 years to establish the research cluster. With the adoption of the 2018 Budget Act the state funds pledged to finance the research cluster have been converted into permanent funding.

During the initial phase of the research cluster, the overall scientific management was carried out by the President of the FernUniversität, Prof. Dr. Ada Pellert.

Prof. Dr. Dr. Friedrich W. Hesse, founding director of the Leibniz Institute for Knowledge Media (IWM), at the time vice president of the Leibniz Association and holder of the chair for Applied Cognitive Psychology and Media Psychology at the University of Tübingen, was initially a supporting partner and consultant. On May 1, 2019, he became scientific head and founding director of the research cluster.

A founding advisory board consisting of internal and external members was formed in 2017. The office commenced work in mid-November 2017.

At present, the first scientific projects have been established and first results have been achieved, as described in more detail below. However, the initial period was also used to develop and agree on a joint scientific framework (see Section 3), which will be continuously refined and serves as a basis for any further development of D²L².

2 People, Structures and Activities

Scientists from various disciplines of the FernUniversität and associated faculty cooperate within the research cluster and bring together educational, psychological, economic, business informatics, legal and computer science perspectives.

The office is the only formal structure anchored in the president's office to date. In the following, the status quo as well as ideas for further development are presented.

Founding Director and Scientific Head

During the start-up phase of the research cluster, the overall scientific management was carried out by President Prof. Dr. Ada Pellert. From the ranks of the participating professors, an executive board initially consisting of 4 professors was formed, which represented the interdisciplinary approach and made the first decisions in agreement with the president.

Prof. Dr. Dr. Friedrich W. Hesse, external consultant from the end of 2017 until the end of April 2019, took over the role of scientific head and founding director on May 1, 2019 for a period of 5 years. At the end of his term of office, it is planned to transfer the position to a professor at the FernUniversität. The founding director reports to the president of the FernUniversität in Hagen.

Administrative Director and Office

Dr. Stephanie Steimann, who took up her duties in November 2017, is responsible for administrative management. The scientific and administrative management is supported by an office, which was filled in March 2018.

Founding Advisory Board

In the summer of 2017, a founding advisory board consisting of internal and external members was formed. The advisory board has met three times since then and advises the scientists on the development of the research cluster. After the implementation of Prof. Hesse as scientific head, the president became a member of the founding advisory board.

The advisory board consists of President Prof. Dr. Ada Pellert, Vice-president for Research and Young Researchers Prof. Dr. Andreas Kleine, Chair of the Senate Prof. Dr. Luise Unger, Chair of the University Council Dr. Manfred Scholle and two external members, Prof. Dr. Christiane Spiel and Prof. Dr. Dieter Timmermann.

In the course of the envisaged institutionalization of the research cluster, the founding advisory board will be converted into a scientific advisory board.

Executive Board

Professors from all faculties of the FernUniversität in Hagen are involved in the research cluster D²L². With their different points of view and approaches they ensure the establishment of not only disciplinary, but also integrated research approaches that lead to sustainable results.

The professors with responsibility for projects financed by the research cluster and thus in the executive board are:

- Prof. Dr. Ulrike Baumöl (Chair of Information Management)
- Prof. Dr. Jörg Desel (Chair of Software Engineering and Theory of Programming)
- Prof. Dr. Uwe Elsholz (Chair of Lifelong Learning)
- Prof. Dr. Jörg Haake (Chair of Cooperative Systems)
- Prof. Dr. Stefan Stürmer (Chair of Social Psychology)
- Prof. Dr. Claudia de Witt (Chair of Education Theory and Media Education)

Associated Faculty

To further expand its expertise, the research cluster cooperates with other professors at the FernUniversität in Hagen as well as with scientists from other institutions – at present these are: Prof. Dr. Oliver Christ (FernUniversität), Prof. Dr. Christoph Igel (German Research Center for Artificial Intelligence), Prof. Dr. Kathrin Jonkmann (FernUniversität), Prof. Dr. Stefan Smolnik (FernUniversität), and Prof. Dr. Barbara Völzmann-Stickelbrock (FernUniversität).

Prof. Dr. Niels Pinkwart (Humboldt-Universität zu Berlin, Principal Investigator at the Einstein Center Digital Future and at the Weizenbaum Institute for the Networked Society) and Dr. Benedikt Fecher (Alexander von Humboldt Institute for Internet and Society) will be associated in autumn 2019.

Scientific Staff

Scientific staff at various levels of qualification form the backbone of D²L². They are currently either completely or partially financed by D²L² or just assigned to D²L² projects. All are currently employees of the participating professors of the FernUniversität in Hagen or of cooperating partners.

Events

From the outset, the research cluster has brought together people with a common interest in its topics, organized conferences and guest lectures or invited the interested university public to be informed about the state of development.

In February 2019 an internal colloquium of young D²L² scientists chaired by Prof. Hesse was established, in addition to regular meetings at professorial level.

Public events planned in 2019 are:

October 10th, 2019: "Future of Work in Digital Change - Competences, Qualification and Continuing Education," Symposium in Düsseldorf, Presentation of the results of a cooperative study with the Fraunhofer Institute for Digital Media Technology (IDMT)

November 14th, 2019: "Artificial Intelligence and Diversity in Higher Education," conference in Hagen - Opening of the AI.EDU Research Lab and first public presentation of the cooperative project with the German Research Center for Artificial Intelligence (DFKI)

Cooperation

In the research cluster "Digitalization, Diversity and Lifelong Learning. Consequences for Higher Education," the FernUniversität in Hagen cooperates with other relevant institutions.

At present these are the German Research Center for Artificial Intelligence (DFKI), the German Institute for Adult Education - Leibniz Centre for Lifelong Learning (DIE) and Fraunhofer Institute for Digital Media Technology (IDMT, Ilmenau).

In addition, D²L² is in the process of establishing further cooperations with other universities and selected relevant institutes - joint project are on their way with the Humboldt Universität zu Berlin and the Alexander von Humboldt Institute for Internet and Society as described below.

3 Scientific Framework ¹

Educational institutions like schools and universities have a responsibility to prepare students for the complex requirements of personal and professional environments. Several trends in educational science have addressed this challenge. First, it has become evident that learners should be granted a highly active role in planning, monitoring, and evaluating their own learning process. Self-regulated learning (Boekaerts, 1999; Elsholz & Rohs, 2014) is an important building block in the **empowerment** of students. Second, there is an increased awareness that educational institutions should not merely transmit scientific knowledge, but that procedural skills rather than declarative knowledge are needed to master the transition from academic education to professional work. Over the last years, great efforts have been made to develop lists of teachable **21st Century skills** such as communication, cooperation, critical thinking, or collaborative problem solving (Dede, 2010; Graesser et al., 2018; Hesse, Care, Buder, Sassenberg, & Griffin, 2015). Third, the flexibility of learners, but also of educational institutions, has been identified as a key requirement in today's society. For educational institutions, this means that they must flexibly respond to the backgrounds, needs, and requirements of various stakeholders (e.g., students, governing bodies, industries). There is an enormous amount of variability and **diversity** among these stakeholders (both across and within stakeholder types), and this multitude of interests should be taken into account through tailored offerings of educational institutions (**adaptivity**).

Research in D²L² responds to these trends, particularly emphasizing the third trend (**diversity** and **adaptivity**). Assessing diversity and creating adaptive learning ecologies creates both methodological challenges (how to measure diversity) and organizational challenges (how to provide for adaptive content). **Digital technologies** play an important role in addressing these challenges.

Conceptual Framework

A conceptual framework built on Buder and Hesse (2016) was developed in order to describe how educational technologies have to take into account the diversity of stakeholders. The starting point of this framework is the notion of informational environments, defined as the multitude of online and offline contexts from which individuals draw information that pertains to their learning (see Fig. 1).

¹ We would like to thank Dr. Jürgen Buder from the Leibniz Institute for Knowledge Media in Tübingen for his cooperation in the development of the framework concept.

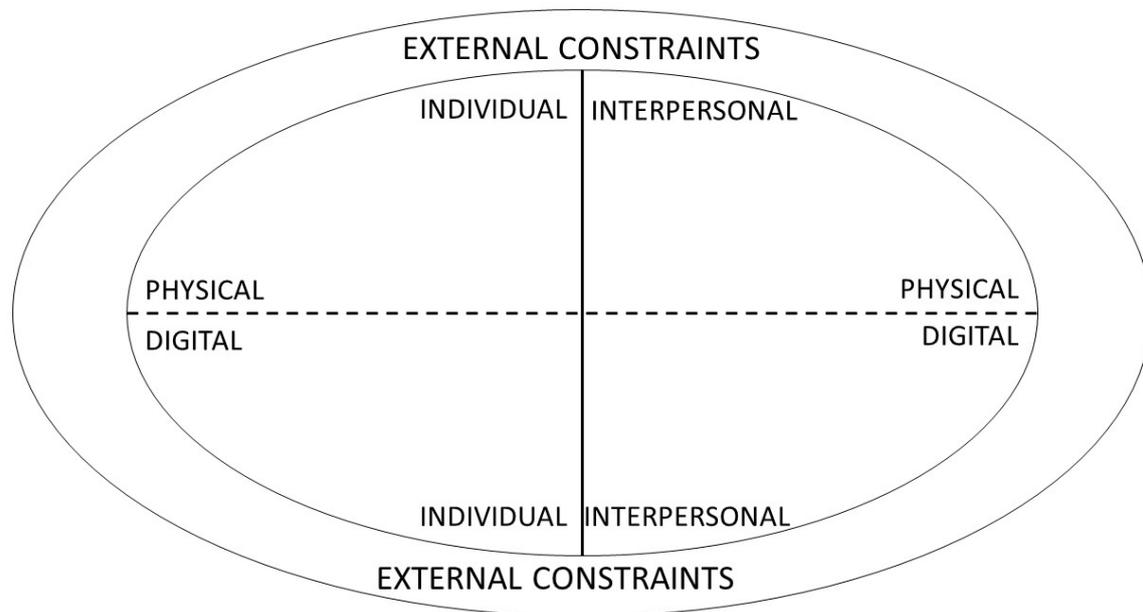


Fig. 1: Informational Environment

Figure 1 is a schematic depiction of a student's informational environment. The shape of the environment is characterized by external constraints (such as a type of educational institutions, legal frameworks, regulation of access to resources, technical infrastructure, institutional policies, or the needs of policy-makers and industries). A student navigates his or her informational environment during learning activities. The informational environment itself can be described by two dichotomies: a first dichotomy refers to a distinction between individual learning activities (such as reading a book) and interpersonal learning activities (such as discussions in a MOOC). A second dichotomy refers to a distinction between the physical parts of the informational environment (such as lecture halls, cafeterias, classrooms) and the digital parts of the informational environment (accessible via digital devices). Buder and Hesse (2016) have identified two characteristics about the interplay between the physical and digital parts of an informational environment. First, information from a digital environment cannot be accessed directly, but must be mediated over a so-called **cognitive interface**. The design of such a cognitive interface (e.g., its ability to adapt to a learner) plays a crucial role in the success of digital technology usage for learning. Second, the boundary between physical and digital parts of an informational environment becomes increasingly blurry over time. Via sensor technologies and context-aware designs, the digital environment can gain access to information from the physical environment (such as geo-location). Moreover, there is an increasing tendency for physical objects to become digitally enriched and connected (Internet of Things).

Figure 1 can help to distinguish between different facets or levels of diversity. First, diversity is a crucial variable on the **individual level** (corresponding to the left part of Fig. 1). On the individual level, learners can be diverse with regard to many demographic, cognitive, social, motivational, or emotional variables, such as educational background, academic goals, personality, intelligence, working memory capacity, situational cognitive load, achievement motivation, skills, competencies etc. An educational institution that responds to diversity with adaptivity has to know which of these individual learner variables are related to outcomes, and in what ways. Moreover, it has to develop strategies to account for differences among individual learners.

Second, diversity is an important concept on an **interpersonal level** (right part of Fig. 1). When a group acts as an entity, for example in a collaborative learning setting, the diversity of its group members leads to a certain degree of homogeneity or heterogeneity with respect to relevant variables. There is considerable research in the learning sciences, in social psychology, and in organizational psychology on how group heterogeneity affects group and individual outcomes. However, there is a remarkable dearth of research on the question of how the design of instructional technologies or cognitive interfaces can and should adaptively respond to differences in group heterogeneity.

Third, diversity can also be found on an **institutional level** (peripheral rim of Fig. 1). Educational institutions are facing diverse external constraints set by policy-makers and industries, encompassing technological, legal, and organizational considerations. Addressing this diversity of external constraints in a way that simultaneously adapts to the needs and interests of stakeholders (students, governing bodies, organizations) poses a challenge that educational institutions have to meet.

General Research Strategy

The goal of research in D²L² is to address the question of how adaptivity can be employed in order to address the different facets of diversity (on the individual level, on the interpersonal level, and on the institutional level). On each of these levels, instantiations of a general research strategy (depicted in Fig. 2) will be undertaken.

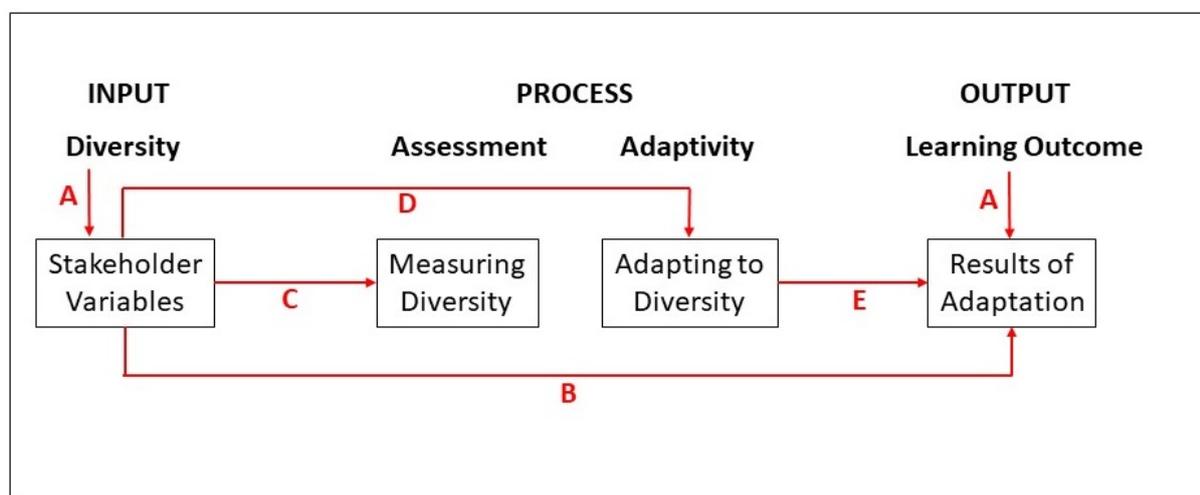


Fig. 2: General Research Strategy

The general research strategy takes the form of an input-process-output model. The input side comprises variables on which stakeholders can be diverse (e.g., differences among students with regard to socio-economic status; groups with homogeneous vs. heterogeneous ability levels; institutions with different legal frameworks). Process variables refer to the assessment of diversity and to interventions that adaptively respond to diversity. Both processes (assessment, adaptivity) can greatly benefit from the use of digital technologies. For instance, methods of learning analytics can be employed to assess learner variables in non-obtrusive ways. Moreover, responding to diversity can be accomplished by the design of adaptive cognitive interfaces. Outcomes of these

adaptations must be evaluated (e.g., learning outcomes on the individual level; quality of group decisions on the interpersonal level; student dropout rates on the institutional level).

More specifically, the relations among the variables within the general research strategy lead to five types of research goals (see the arrows A-E in Fig. 2):

- Goal A – Identifying sets of important input variables and output variables
- Goal B – Identifying meaningful input-output relations (e.g. between self-efficacy and persistence on the individual level; between access to resources and dropout on the institutional level)
- Goal C – Developing frameworks of how to capture stakeholder variables (e.g., by means of learning analytics on the individual and interpersonal level)
- Goal D – Developing frameworks for adaptive response (e.g., how to design a cognitive interface that adapts to individual/situational differences in working memory load)
- Goal E – Developing evaluative frameworks on how to measure the effectiveness and efficiency of adaptive responses.

4 Project "AI.EDU Research Lab - Methods of Artificial Intelligence in Higher Education

An interdisciplinary project carried out by Prof. Dr. Claudia de Witt (FernUniversität in Hagen) and Prof. Dr. Christoph Igel (German Research Center for Artificial Intelligence); Team: Christina Gloerfeld and Silke Wrede (FernUniversität), Dr. Milos Kravcik and Dr. Xia Wang (DFKI)

The FernUniversität in Hagen (FeU) and the German Research Center for Artificial Intelligence (DFKI) have begun an in-depth dialogue on current research, development, and transfer topics with the aim of identifying topics for joint projects. The AI.EDU Research Lab is the initial cooperation project.

Motivation

Current technological developments, especially methods of artificial intelligence, have the potential to discover new insights from enormous data bases (e.g. educational data mining) and to create dynamic systems to support learners individually in their development and during their studies. In order to best accompany students in their studies, prevent dropouts, and increase individual academic success, the initial AI.EDU Research Lab project brings together existing data with artificial intelligence methods, evaluates them and develops personalized recommender and support systems. These visualize the students' own strengths and at the same time support successful learning planning.

Accordingly, the focus is on empowering students to be responsible for their own learning, in particular self-regulation and -awareness in dealing with algorithmized systems and evaluations. At the same time an ethical framework for universities will be developed which creates a proactive space for the use of AI methods.

Topic

In the AI.EDU Research Lab, artificial intelligence methods are used to investigate how successful study can be individually and personally promoted, and how students' responsibility for their own learning can be supported. This includes thinking about students' judgment and our responsibility towards future generations when designing algorithmic teaching and learning processes. For these purposes, the first step is to examine which parameters determine a successful or unsuccessful study based on the available database, and how these parameters are subsequently taken into account in the possible concrete applications of AI methods for improving study. A central research question relates to how learning processes sustainably support the methods of AI and to what extent recommender systems can develop and accompany students' cognitive learning strategies in particular. The extent to which students are able to use their learning strategies purposefully is an expression of their self-regulatory abilities. Another research question therefore concerns the extent to which AI methods - such as machine learning (ML) and learning analytics (LA) - support students' self-regulation.

As a further subsection of the project, which simultaneously covers the scope of action, ethical questions for the collection, use, and evaluation of data will be uncovered and developed in the form of guidelines. A comprehensive question lies in the ethical framework conditions to which

the use of AI methods in research and teaching must be subject in order to fulfill our responsibility towards future generations. At the same time, research will be carried out into how students' judgment in using an AI-based system can be strengthened in terms of protecting their personal data, autonomy and responsibility. By formulating the research interests this way, the tension between adaptive, instructive (intelligent) systems and students' self-regulation becomes visible and, ultimately, a recognition of the impact of AI methods on personalized higher education is gained.

Goals

In order to explore these cognitive interests, the AI.EDU Research Lab project implements the following scenarios demonstrating the AI potentials:

Scenario 1 - Knowledge-Based Expert System for Personalization of Learning: Recommender for Individual Learning Strategies

The scenario deals with the implementation of a knowledge-based expert system for personalized assistance with one's own learning process. A recommender system accompanies students on a voluntary basis in their learning process and supports them in optimizing their learning strategies. Particular importance is attached to the fact that, despite its assistance function, the system contributes to the learner's autonomy and personal responsibility. The following research objectives and activities are foregrounded:

- Theoretical elaboration and selection of the cognitive learning strategies to be promoted within the framework of course-related modules
- Creation of domain, didactic and learning models as a basis for a knowledge-based expert system (recommender system)
- Personalization of learning opportunities to promote the development of students' own learning strategies
- Use and evaluation of the knowledge-based expert system to support the development and use of cognitive learning strategies

Scenario 2 – Self-Regulated Learning in Study Process

In this scenario the primary aim is to increase the number of successful students at the FernUniversität in order to reduce the drop-out rate. Artificial intelligence methods, especially ML and LA, are exploited to identify factors for success and failure in the study process, to promote self-regulation skills, and provide the best possible support for students to achieve their individual study goals in a bachelor's and master's program. The following research goals and activities are foregrounded:

- Identification of factors for success and failure in (distance) studies on the basis of panel survey data and critical phases in study processes on the basis of ECTS monitoring
- Identification of students' individual goals
- Linking empirically determined factors with theories and models for self-regulation. Development of a useable SRL model on this basis
- Use and evaluation of AI methods to foster self-regulation in the course of the study along the identified factors/the developed model
- Visualization and sustainable documentation of acquired competencies

- Recommendations to support the definition and achievement of individual goals, as well as their adaptation or determination of follow-up goals
- Verification of whether AI methods are at all suitable for promoting learning strategies and self-regulation
- Development of an ethical self-commitment as a framework for action for AI methods in research and teaching in order to create transparency and awareness, and to strengthen the students' ability to judge.

Scenario 3 - Development of Ethical Guidelines and their Teaching in AI-Based Studies

In addition to the implementation and research of the two scenarios, the development of ethical guidelines for AI-based distance learning is another work package. In the scenarios, it is planned to sensitize the students to the effects of the AI methods and to make the processes transparent.

Partners and Competences

- Prof. Dr. habil. Claudia de Witt, Chair of Education Theory and Media Education, Faculty of Humanities and Social Sciences, FernUniversität in Hagen, provides extensive experience in designing, implementing and evaluating learning environments for learners with high diversity in higher education and in corporate learning, focusing on the transfer of theoretical approaches into the conception and design of technology enhanced learning environments. The research focus contributes the theoretical and media-educational foundations for developing APLE.
- Prof. Dr. habil. Christoph Igel, Principal Researcher and Scientific Director of the Educational Technology Lab of the German Research Center for Artificial Intelligence (DFKI) in Berlin. Since 2013, Professor Igel has chaired the Intelligent Education Networks research group of the National Digital Summit of the Federal Government. In 2009, Professor Igel was selected by representatives from business and science as the Chief Learning Officer among the leading figures in Germany. He is the head of the Educational Technology Lab at the DFKI.
- Center for Media and IT at the FernUniversität in Hagen: provides access to large scale data sets, Moodle learning environment and related learning support tools

Contributions to the Research Cluster

Within this research area, which addresses the issues of diversity and adaptivity at different levels, the AI.EDU Research Lab focuses on the individual level and examines the emergence, development and promotion of self- as well as methodological competence as crucial prerequisites for a successful education. On the one hand, it is about fundamental research on significant factors that affect the named competences and thus the study success. On the other hand, (semi) automated interventions are developed and tested with methods of artificial intelligence to support this.

5 Adaptive Personalized Learning Environment facilitating self-regulated learning and domain-related learning in higher (distance) education

An interdisciplinary project carried out by Prof. Dr.-Ing. Jörg M. Haake, Chair of Cooperative Systems, Faculty of Mathematics and Computer Science, Prof. Dr. habil. Claudia de Witt, Chair of Education Theory and Media Education, Faculty of Humanities and Social Sciences, FernUniversität in Hagen; Team: Dr. Niels Seidel, Heike Karolyi, Mandy Goram, Dr. Dirk Veiel

Motivation

Most learning environments are designed for an idealized student. In reality, students enter institutions of higher education with their personal background, including various experiences, preferences and capabilities. While in the past most students were assumed to have similar characteristics due to seemingly standardized high school teaching, in the recent past the diversity of students has increased significantly because of expanded access to university studies, increased cultural diversity due to migration, and life-long learning.

Universities try to address such diversity by personalizing learning environments, which tailor information, visualization and means of interaction to the needs of the individual student. However, current personalization approaches focus mostly on administrative issues like personalizing time schedules and reminders, and to some extent employ face-to-face counseling strategies. While the latter is difficult to implement in distant study programs, the former seems insufficient to address the learning needs of a large number of students, who are characterized by an increasing diversity.

Evidence-based adaptive personalization approaches, which focus on improving students' learning of meta-cognitive and cognitive competences, which take into account diversity, and which rely on the analysis of large-scale data sets of learner data, are currently an open issue.

Topic

In this project, we aim to develop methods for designing, using and evaluating an adaptive personalized learning environment (APLE) for distance study programs. The APLE is intended to increase personal learning success by addressing two sets of competences: *self-regulated learning* as a meta-cognitive activity, which drives the *actual learning behavior* related to acquiring competence in the domain of study, and competences in the domain of study itself.

In the envisioned APLE, the development of both sets of competences is supported by a number of adaptive tools, which offer personalized support and communicate students' perception of their own learning levels (learning awareness). Instead of implementing static adaptation behavior, the project focuses on employing learning analytics approaches to identify adaptation policies and to evaluate their effectiveness.

The solutions to be developed in an iterative research process will be realized within the framework of stable preliminary product prototypes as an extension of the Moodle learning platform used at the FernUniversität. They will be used and evaluated with the usual student numbers at the FernUniversität in bachelor's modules in educational science (BW) and computer science (INF). The

evaluation with cohorts of 500 (BW) and 1100 (INF) in principle allows the use of quasi-experimental research designs with a high external validity. The application in two subjects allows the identification of possible subject-specific similarities and differences with regard to design, use and effect.

Goals

APLE aims to improve personal learning success in distance learning with current technologies such as learning analytics and data mining to generate recommendations for relevant next learning steps and learning materials, to promote reflection and awareness about individual learning processes, to support social learning, and to address the perception of unwanted learning behavior and learning difficulties.

1. Design and evaluation of an adaptive personalized dashboard to support the development of self-regulated learning competency:
Here we aim to develop a theory-based adaptive learning process focusing on self-regulated learning, a corresponding adaptive dashboard to facilitate this process, and appropriate evaluation methods.
2. Design and evaluation of an adaptive personalized learning environment to support the acquisition of competencies related to a domain of study:
Here we aim to develop a theory-based adaptive learning process suited to the domain of learning, a corresponding adaptive learning environment to facilitate this process, and appropriate evaluation methods.
3. Design and evaluation of the combination of both types of adaptive personalization approaches in a complete APLE:
Here we aim to develop a combined adaptive learning process, a corresponding adaptive dashboard facilitating this combined process, and to capture suitable visualizations and appropriate evaluation methods.
4. Assessment of the feasibility of data- and evidence-driven approaches and suitability of individual methods to achieve a truly dynamic, emergent adaptive learning environment.

Partners and Competences

- Chair of Cooperative Systems, Faculty of Mathematics and Computer Science, Prof. Dr.-Ing. Joerg M. Haake, provides extensive experience in designing, using and evaluating collaborative learning environments and context-adaptive collaborative workspaces. In this project, previously developed concepts and implementations of collaborative learning environments offering scripting, awareness, and group formation support can be extended with adaptation mechanisms to achieve an APLE.
- Chair of Education Theory and Media Education, Faculty of Humanities and Social Sciences, Prof. Dr. habil. Claudia de Witt, provides extensive experience in designing, implementing and evaluating learning environments for learners with high diversity in higher education

and in corporate learning, focusing on the transfer of theoretical approaches into the conception and design of technology-enhanced learning environments. The research focus contributes the theoretical and media-educational foundations for developing an APLE.

- Center for Media and IT: provides access to large scale data sets, Moodle learning environment and related learning support tools
- Dr. M. Saarela, University of Jyväskylä: expertise in learning analytics and educational data mining with a focus on cluster analysis techniques.

Contributions to the research cluster

In this project, we focus on improving personal learning success with respect to both self-regulated learning and domain-related learning, by means of digital support for the individual learning process based on individual and others' learning behavior.

At the level of the individual process model, we analyze which variables of individual learners may impact the acquisition of both types of competences. Using relevant theories, we formulate hypotheses regarding effective design of the cognitive interface of the APLE. Learning analytics based methods for collecting individual variables will be developed and used to identify types of learners and related beneficial adaptations. Measures for assessing competence gain will be developed and used to assess adaptation effectiveness.

6 Diversity Adapted CSCL in Higher Distance Education (DivAdapt)

A project carried out by Prof. Dr. Stefan Stürmer, Faculty of Psychology, Chair of Social Psychology, FernUniversität in Hagen; Team: Dr. Natalia Reich-Stiebert, Jan-Benett Voltmer, Jennifer Raimann, Tobias Burkhardt, Dr. Björn Fisseler

Motivation

In many countries around the world, educational systems are currently characterized by two developments: first, increasing socio-demographic diversification of learners (through migration, demographic change, lifelong learning), and secondly, increasing proliferation of distance education programs and online learning environments. Collaborative learning (i.e., situations in which two or more people work together to resolve a learning task) plays an increasingly important role in online learning. The overarching objective of DivAdapt is to explore whether and how learner diversity impacts Computer-Supported Collaborative Learning (CSCL) and how diversity effects can be managed through adaptive support systems. The project brings together two areas of research that currently exist in relative isolation from one another: on the one hand psychological and educational research on CSCL, and on the other hand, (social) psychological research on the influence of team diversity on group processes and group performance. The project builds on a multi-methodological approach combining basic research with applied perspectives and technological developments in the context of Higher Distance Education. For research on diversity effects, this context is particularly interesting because distance education programs are particularly attractive for students differing on multiple theoretically relevant dimensions (e.g., socio-demographic characteristics, life situations, educational biographies). Research on diversity in higher distance education is also publicly relevant, since in many societies higher distance education serves an important function in helping to create equal educational opportunities for traditionally underrepresented social groups.

Topic

Collaboration in teams has task-related and socio-emotional aspects. While task-related aspects concern communication, coordination, the establishment of norms and goals, and the exchange of knowledge among team members, socio-emotional aspects concern team members' emotions, mutual trust, and relationship quality. Although much of the research on diversity effects has been conducted in the context of face-to-face workgroups in industrial organizations or enterprises, there exists an increasing body of studies investigating the effects of social categorical diversity in virtual teams. In a nutshell, this research suggests that sociodemographic diversity may influence both task-based and socio-emotional collaboration processes. In recent years, numerous educational-technological platforms and tools have been developed facilitating collaborative learning in educational context (discussion boards, wikis, blogs, vlogs, etc.). However, so far, the socio-psychological nature of CSCL, especially socio-emotional and task-related processes that facilitate or prevent learning gains in multisocial CSCL groups through their influences on the motivation and coordination of learners have received little systematic attention. The present project is designed to fill this gap in the research literature and to contribute to the development of scientifically and empirically informed interventions.

Goals

A first aim is to investigate whether and how multisocial (socio-demographic) diversity of learners in virtual learning groups (e.g. diversity in terms of gender, age, economic status, migration background) has an impact on CSCL outcomes. To investigate these questions, laboratory and virtual field experiments test theoretical assumptions of a working model. This model specifies a temporal sequence of four major steps that learners have to take towards effective learning, with different task-related and socio-emotional processes coming into play at each step.

Building on the outcomes of the empirical tests of the working model, the project's second aim is to develop methods for managing diversity effects (i.e., reducing negative and promoting positive effects). Previous CSCL research documents the effectiveness of collaboration scripts. However, these scripts mostly refer to the task-related aspects of collaboration, largely ignoring the diversity of learners in CSCL groups. DivAdapt will systematically explore the potential of "diversity enriched scripts" to address diversity effects on task-related and socio-emotional processes fostering better individual learning outcomes and better learning group performances.

A third and final aim is to identify individual and group parameters that can be used for an adaptive design of diversity interventions (e.g., Mirroring Systems and / or Guiding Systems). For effective learning, the development of adaptive support systems is particularly relevant since rigid and inflexible interventions that do not take learners' competencies and expectations into account may lead to losses in motivation commitment.

Partners and Competences

- Prof. Dr. Stefan Stürmer, Chair of Social Psychology, Faculty of Psychology, Principal Investigator
- Natalia Reich-Stiebert, M.Ed., research assistant (50%)
- Tobias Burkhardt, M.A., Data Manager of the Faculty of Psychology: Coordination of data vault and pseudonymization procedures, support in the compilation of data processing directories and research data management
- Dr. Björn Fisseler, Media Specialist in the Faculty of Psychology: Implementation of research-relevant Moodle plug-ins for didactic elements, support in the compilation of log file data and social network analyzes

Contributions to the research cluster

With regard to overarching objectives of the research cluster, the project plays a pivotal role in advancing our understanding of learner diversity in computer-supported learning. First, the project investigates the impact of diversity on CSCL at both the individual level and the group level. For this purpose, the project analyses student self-report data, object test data as well as digital data (e.g., logfile data) and group data (group learning outcomes) using both individuals and CSCL groups as units of analyses. Second, the project addresses different dimensions of diversity. Although the project's main focus is on socio-demographic diversity, all empirical investigations also include measures tapping on other diversity dimensions potentially relevant for learning in CSCL groups (individual differences in competencies, personality dimensions). This approach will also

allow us to compare the relative relevance of different diversity aspects with regard to CSCL processes and outcomes at the individual and the group level. Accordingly, the project not only has a strong potential to relate and cross-fertilize other projects in D²L² but also promises to produce knowledge with practical applications for designing adaptive interventions to manage learner diversity in a broad range of educational contexts and online learning environments.

7 Permeability Between Vocational Training and Bachelor's Degree - From IT Specialist to Bachelor's Degree in Computer Science Through Adapted Study Design

An interdisciplinary project carried out by Prof. Dr. Jörg Desel, Chair of Software Engineering and Theory of Programming, Faculty of Mathematics and Informatics, Prof. Dr. Uwe Elsholz, Chair of Lifelong Learning, Faculty of Humanities and Social Sciences, FernUniversität in Hagen; Team: Dr. Len Ole Schäfer, Carsten Thorbrügge, Hoai Nam Hunyh

Motivation

We observe an ever-increasing diversity of students in terms of their professional and educational profile. In context of the Lifelong Learning society, more and more students with professional competences enter the system of higher education. Particularly IT specialists have a professional background which involves previously acquired professional skills that are not sufficiently valued in higher education institutions.

There are initiatives in Germany that aim to recognize specific professional experience, but there is a lack of information about the recognition and evaluation processes, which are based primarily on expert judgements. The main instances of recognition are individual and blanket recognition processes. Nevertheless, an adapted study design to identify previously acquired professional skills and adjust the module system are still an open issue in the higher education landscape. Furthermore, interactions between the three elements of recognition are still unknown.

Topic

Therefore, this project aims to develop a permeability concept to identify IT specialists' acquired competences and transfer them into recognition and crediting procedures. The permeability concept will take into account three elements. First, blanket recognition, which will focus on formal competences of IT-specialists. Second, individual recognition, addressing informal and non-formal competences within a competence portfolio and third, adaptive learning paths, which split and cancel specific modules for IT specialists. In this context, it is possible to reduce the duration of the study program by up to 60 ECTS credits. This kind of reduction expresses a genuine appreciation and recognition of the student's educational path by considering the relevant competences of IT specialists. Our theoretical design will clarify terms and concepts, such as differentiation between recognition and crediting, the term *permeability*, equivalence testing, and disparities between vocational training and higher education. We will inform our study by conducting expert interviews with IT specialists that have a bachelor's degree in computer science at the FernUniversität in Hagen. Our research design consists of two quality assurance procedures. First, we will combine elements of cognitive pre-testing with procedures of the qualitative pre-test interview. The major cognitive pre-testing techniques are paraphrasing, thinking aloud, and comprehension probing. The qualitative pretest interview techniques are internal confrontation, external confrontation and polarization. The combination of these pre-testing tools is highly valuable for improving the expert interview. We will differentiate our sample by selecting IT specialists who focus on application development and IT specialists who are specialized in systems integration. Our analysis method will be an expert interview because IT specialists have expert knowledge of their educational path and

their development of specific competences. The FernUniversität in Hagen is extremely suitable for executing this research project with regard to the diversity of its students. The proportion of students with professional competences is higher than at other university in Germany and distance learning provides a high degree of flexibility and adaptivity of study materials.

Goals

The Permeability project will advance the recognition of prior learning competences of IT specialists by referring to educational science and social science methods. Furthermore, we will build up a theoretical framework that will clarify terms in the context of recognition, crediting, permeability, equivalence and professional competences. By implementing blanket recognition mechanisms, we will focus on the formal competences of IT specialists. With the competence portfolio in mind, we will establish crediting procedures to consider informal and non-formal competences. The main goal of our research project will be the advancement of crediting and recognition processes by shortening the study of IT specialists by up to 60 ECTS. Moreover, the research project will be a pilot study for other subjects. Thus, reflection and generalization are a constant part of the project. Furthermore, the pilot study will be constantly evaluated.

Partners and Competences

- Prof. Dr. Jörg Desel, Chair of Software Engineering and Theory of Programming, Faculty of Mathematics and Computer Science, provides extensive experience as a co-founder and long-standing spokesperson of the e-Learning specialist group of the Gesellschaft für Informatik (German Informatics Society) and he is committed to the permeability between computer science vocational training and academic studies.
- Prof. Dr. Uwe Elsholz, Chair of Lifelong Learning, Faculty of Humanities and Social Sciences, provides extensive experience on the permeability between vocational education and higher education, the recognition of professionally acquired competencies and the transition of professionally experienced students into a degree program

Contributions to the research cluster

This project will contribute to the research cluster by addressing the framework concept in three ways. First, the project will be a pilot study considering the diversity of the FernUniversität in Hagen with regard to the professional competences of IT specialists. Second, we will focus on adaptivity in the context of adapted study design and adaptive learning paths. Third, this project will focus on the academic success of IT specialists by referring to three levels of inquiry. First, we will relate to the individual level by considering individual recognition procedures. Second, we will refer to the group level by establishing blanket recognition and third, we will take into account the institutional context by referring to the legal framework with regard to recognition and crediting. We will investigate competence acquisition of IT specialists that have a bachelor's degree in computer science by applying educational science and social science methods and theories.

8 Project: "Educational Ecosystems and Data Law in the Digital Transformation"

An interdisciplinary project carried out jointly by Prof. Dr. Ulrike Baumöl, Chair of Information Management, Faculty of Business Administration and Economics (project coordination), Prof. Dr. Stefan Smolnik, Chair of Business Information Systems, Faculty of Business Administration and Economics and Prof. Dr. Barbara Völzmann-Stickelbrock, Chair of Civil Law, Commercial Law, Intellectual Property Law, Copyright, and Civil Procedure Law, Faculty of Law, FernUniversität in Hagen; Team: Alina Bockschecker, Jana Hochberg, Cathrin Vogel.

On the basis of current challenges for higher education, the Educational Ecosystems and Data Law in the Digital Transformation project develops new higher education formats which address the mobile online society. A full description of this project is coming soon.

9 Planned cooperation project with Humboldt-Universität zu Berlin: "Learning Analytics for Diversity-Inspired Adaptive Learning".

An interdisciplinary project carried out by Prof. Dr.-Ing. Jörg M. Haake, Chair of Cooperative Systems, Faculty of Mathematics and Computer Science, Prof. Dr. Niels Pinkwart, Chair of Computer Science Education / Computer Science and Society, Faculty of Mathematics and Natural Sciences, Humboldt-Universität zu Berlin

Motivation

Adaptive learning environments are seen as a promising approach for a solution to dealing with the increasing diversity of students at higher education institutions (HEI). Such environments aim to tailor information, visualization and means of interaction to the needs of the individual student.

However, to facilitate acquisition and training of social and collaboration skills as well as methods based on a division of labor, teaching and learning scenarios in HEI include not only individual learning settings but also group learning scenarios.

Furthermore, adaptation must be analyzed on different time-scales: while short- and medium-term analyses may be appropriate for immediate adaptation in a course, long-term analyses of student data are required to identify dynamic changes in emerging student profiles and to assess their consequences for design and adaptation of curricula and courses.

While the potential of learning analytics for enabling effective adaptive personalization of collaborative learning environments seem high, today methods for designing, using, and evaluating such functionality are open issues.

Topic

In this project, we aim to develop methods for designing, using, and evaluating adaptive personalized tools as part of a larger adaptive personalized learning environment (see the APLE project). We focus on three lines of research, which could benefit from learning analytics:

1. Diversity-Inspired Adaptive Assessment:

Current computer-based adaptive testing approaches focus on selection and sequencing of given, manually constructed tasks. However, successful adaptation would benefit from a large number of assessments with varying properties matching the diversity of students. Manual construction of such a variety is costly and time-consuming. Automatic generation of assessments with certain properties, such as feedback types, solution hints, contextualization, and variety is an open issue, as is the selection of suitable assessment instances from a large, automatically generated pool of assessments and respective quality assurance processes.

2. Diversity-Inspired Adaptive Support for Collaborative Learning:

Current approaches for group learning already support group formation and facilitation to some extent. However, the definition of group formation criteria for a given group learning

setting and a potentially changing diversity of learners is an open issue, as is support for dynamic reconfiguration or repair of dysfunctional teams, especially in distance learning settings. In addition, it is not clear how existing approaches for facilitation of group learning, such as scaffolding, scripting or nudging, can be employed effectively in diverse learning groups.

3. Emergence of Student Profiles:

Current approaches to learner modeling do assume a static structure of a learner profile, while the current approaches of data analytics and cluster analysis provide the means for dynamic formation of classes or types of learners. How emergent learner profiles can be supported is an open issue. Likewise, whether classes or types of learners remain stable or change over time and student generations, and the implications of the findings for curricula, course design, and adaptation are as yet unknown.

The solutions to be developed in an iterative research process will be realized within the framework of stable preliminary product prototypes, which will be integrated into the adaptive personalized learning environment provided by the APLE project as an extension of the Moodle learning platform used at the FernUniversität. They will be used and evaluated with the usual student numbers at the FernUniversität in bachelor modules of computer science (INF) first. The evaluation with cohorts of 1100 (INF) allows in principle the use of quasi-experimental research designs with a high external validity. Use in other subjects at a later stage allows the identification of possible subject-specific similarities and differences with regard to design, use, and effect.

Goals

Within the three lines of research sketched above, we aim at the following goals:

1. Diversity-Inspired Adaptive Assessment: what adaptation options exist in the selection of assessment classes, generation and parametrization of individual assessments, and feedback or solution hints?
 - a. Development of a method and Moodle plugin for personalized selection of e-assessments that affords adaptation to both the preferences/properties of the learner as well as to the needs of the learning process (e.g. confirming acquired competence by repeated testing over time). In this context, we will also analyze the impact of recommendations or instructions on self-regulated learning behavior.
 - b. Development of a method and tool for automatic creation of contextualized e-assessments that contribute to a large pool of adaptable e-assessments, which can be used by the Moodle plugin developed in (a).
 - c. Development of a method for adapting the selection, feedback type, solution hints, and contextualization afforded by a particular e-assessment according to the learner's learning history, behavior, and performance. The method will be integrated in the Moodle plugin developed in (a).
2. Diversity-Inspired Adaptive Support for Collaborative Learning: can group formation and repair mechanisms based on learner profiles contribute to higher learning success?

- a. Development of a method for dynamic group formation and repair based on learner profiles and the properties of the group task.
 - b. Development of a method for adapting collaboration support functionality (e.g., scripting, nudging, instructions) provided by the group learning environment according to group task and the needs of the group (as encoded in a group profile).
 - c. Design and implementation of an adaptive group learning environment to be integrated and tested in the adaptive personalized learning environment provided by the APLE project.
3. Emergence of Student Profiles: does diversity change over time, and if so, what is the potential impact on learner profiles, learner classification and adaptation of courses and curricula?
- a. Repeated data acquisition of learner data available at the FernUniversität as a basis for repeated analysis of student diversity. The data collection is available for different types of analysis.
 - b. Data analysis at regular intervals (e.g. semester or year) using different clustering approaches, etc. to identify classes of learners and analyze changes over time with respect to the emergence of clustering as well as changes in learners' membership in clusters.

Partners and Competences

- Chair of Cooperative Systems, Faculty of Mathematics and Computer Science, Prof. Dr.-Ing. Joerg M. Haake, provides extensive experience in designing, using and evaluating collaborative learning environments and context-adaptive collaborative workspaces. In this project, previously developed concepts and implementations of collaborative learning environments which offer scripting, awareness, and group formation support will be extended with adaptation mechanisms to achieve adaptive assessment and adaptive collaborative e learning support.
- Chair of Computer Science Education / Computer Science and Society, Faculty of Mathematics and Natural Sciences, Humboldt-Universität Berlin, Prof. Dr. Niels Pinkwart, provides extensive experience in adaptive assessment, parametrized group formation algorithms, didactical design of learning environments and learning analytics. In this project, previously developed concepts and implementations of adaptive assessment and group formation algorithms as well as experience in learning analytics will provide the basis for adaptive assessment, adaptive collaborative e learning support, and data analytics for emergent student profiles.
- Center for Media and IT: provides access to large scale data sets, Moodle learning environment and related learning support tools such as the FernUniversität's group formation app.
- Dr. M. Saarela, University of Jyväskylä: expertise in learning analytics und educational data mining with a focus on cluster analysis techniques.

Contributions to the research cluster

In this project, we focus on improving personal and group learning success with respect to both self-regulated learning and domain-related learning, by means of digital support for the individual and group learning process based on individual and others' learning behavior.

At the level of the individual process model, we build on results from the APLE project. We analyze which variables of individual learners may impact the selection and adaptation of e-assessments in terms of feedback types, solution hints, contextualization, and other aspects.

At the level of the group process model, we analyze how group profiles matching the needs of group tasks can be formed and maintained on the basis of individual learner profiles as well as how adaptation of collaboration support functionality provided by the group learning environment to group tasks and the needs of the group can benefit individual and group learning success.

Using relevant theories, we formulate hypotheses regarding effective design of the cognitive interface of the respective support tools to be embedded in the APLE. Learning analytics based methods for collecting individual and group variables will be developed and used to identify types of learners and groups and related beneficial adaptations. Measures for assessing competence gain will be developed and used to assess adaptation effectiveness.

At the level of the institutional process model, we contribute the beginning of a large long-term data collection and insights from cluster analysis and the emergence of clustering behavior.

10 Planned cooperation project with Alexander von Humboldt Institute for Internet and Society (HIIG): "Organizational Adaptivity for Digital Teaching and Learning Innovations in the German Higher Education Context (OrAL)"

Project Management: Dr. Benedikt Fecher, Head of the research program "Learning, Knowledge, Innovation" of the Alexander von Humboldt Institute for Internet and Society

Motivation

The Organizational Adaptivity for Digital Learning Innovation in the German Higher Education Context (OrALI) project interrogates the organizational conditions for the implementation of digital teaching innovations in the context of German higher education. Adaptivity is understood in this context as the ability of the university organization and its members to cope with novel intra- and extra-organizational realities for teaching. We find major gaps with regards to the implementation of typical teaching innovations in functionally different types of higher education institutions. For the successful implementation of teaching and learning innovations, evidence is therefore needed not only in relation to the learning subjects, but also in relation to the learning ability and adaptability of higher education institutions with specific subject profiles and regional contexts. The project aims to provide this for relevant fields of innovation (currently didactics, teaching evaluation, transfer and practice), based on an exploratory, multi-method case study design — thereby taking the particularities of different types of higher education into account in order to create the best possible environment for teaching.

Accordingly, the focus is on the ability of universities to learn and adapt (i.e. organizational learning). The project aims to gain fundamental insights that will stimulate further research. Nevertheless, an important pillar of the project is the transfer of empirical results into actionable knowledge.

Topic

The project is of an organizational sociological nature and is based on the concepts of "learning organization" and "change management". These approaches were initially used in the entrepreneurial context and since the 1990s have been increasingly applied in university research. An organization is understood to be a learning organization if it is adaptable, i.e. if it can react to internal and external changes. The introduction of digital teaching innovations represents both an external (e.g. political expectation) and an internal stimulus (e.g. new learning and information needs of students). According to the concept of organizational learning, it is not the organization as an institutional form that learns, but the organization as a sum of its members who interact productively together and make use of the material resources available to them.

The core of the project is a case study approach in which the introduction of digital teaching innovations in three innovation fields (didactics, teaching evaluation, transfer and practice) in the German university context is investigated. A central question here is which conditions prevail for the introduction of teaching innovations at universities and how these promote or hinder the introduction of these innovations. OrALI thus targets organizational identity, design, and workflows in a comprehensive manner. It envisages close cooperation with the other projects in the D2L2

network in order to identify the best possible case studies for sustainable future teaching technologies.

Even though the focus is on public institutions in Germany, international cases and private universities are also examined. The selection of the three fields of innovation is based on a first literature review and the personal expertise of the project participants. The design of the procedure provides for changeability of the innovation fields - in the exploratory conception phase with interviews, literature review and document analysis. We believe that an exploratory approach at the beginning of the research project is suitable to externally validate the pre-selection and to identify relevant (future) phenomena.

Goals

OrALi aims to:

1. Enrich the evidence base for the organizational adaptability of German higher education institutions. Different methods – both quantitative and qualitative – are used for this purpose, which are adapted to the respective problem area.
2. Provide insights into change processes at different types of higher education institutions. This is achieved by consciously selecting relevant and representative cases for the introduction of teaching innovations.
3. Produce actionable knowledge for sustainable design processes. In particular, a transfer phase, which will begin soon after the start of the field phase, will serve this purpose, during which the results will be discussed in stakeholder workshops and translated into action principles.
4. Broaden the perspective of higher education research. Theoretical approaches from various disciplines, in particular organizational sociology (learning organization) and innovation management (change management), will serve this purpose.

Partners and Competences

- Dr. Benedikt Fecher heads the Knowledge & Society research program at the Alexander von Humboldt Institute for Internet and Society. He has a background in organizational management and science and higher education research. His research on governance of science and innovation, with a particular focus on digitization, serves as a fertile basis for OrALi.
- Prof. Dr. Wolfgang Schulz is a research director at the Alexander von Humboldt Institute for Internet and Society, a member of the directorate of the Hans-Bredow Institute and appointed professor for Media Law and Public Law including Theoretical Foundations at Universität Hamburg. He has a particular interest in knowledge governance, which is at the core of OrALi.
- Dr. Dr. Thomas Schildhauer is a research director at the Alexander von Humboldt Institute for Internet and Society, founder and director of the Institute of Electronic Business and executive director for the Berlin Career College at the Central Institute for Postgraduate Studies and Further Education at Berlin University of the Arts. His research interests include innovation in higher education, in particular MOOCs.

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- Prof. Dr. Elisabeth Mayweg is Junior Professor for Digital Knowledge Management in Higher Education at the Institute of Educational Sciences at the Humboldt-Universität zu Berlin. She conducts research into the effects of various forms of digitalization in teaching-learning contexts in higher education.

Contributions to the research cluster

In this project we investigate the organizational conditions for the introduction of digital teaching innovations. The project aims to generate fundamental findings for university research, which we would like to publish at a high level. Further, the project serves to a certain extent as a mirror for the other studies in D²L², by looking at the organizational and not the subject level. We thus hope to make a complementary and fruitful contribution to the research cluster. By involving relevant stakeholders from science and higher education management as well as from science policy at an early stage, we hope to create knowledge for action and thus make a significant contribution to the practical relevance of the cluster.