Overview: Challenge-Based Learning in Higher Education

In an era marked by rapid technological advancements, global connections and complex societal challenges, the landscape of higher education is constantly evolving. Traditional methods of teaching and learning focusing on knowledge transfer are being re-examined, and educators are seeking innovative teaching approaches to enable students to face today's and future demands with the necessary attitudes, skills and knowledge. Challenge-based learning (CBL) emerges as a pedagogical framework that confronts students with complex real-world problems. By engaging, investigating and acting around challenges, by phrasing questions, collecting information and constantly reflecting on the process, students relate to the challenge, practice critical thinking and collaborative problem-solving. This paper aims to provide an overview of challenge-based learning and its implementation in higher education institutions.

Understanding Challenge-Based Learning

Challenge-Based Learning starts with the identification of a complex and open-ended social challenge and aims to develop an open-ended contribution towards a (possible) solution. The process is more important than the result, the challenge too complex to be completely solved. Usually, students and staff from different disciplines work together, often including a collaboration with a societal partner with a shared interest and relation towards the challenge.

ENGAGE: Students engage with the challenge by understanding it from various perspectives and asking relevant questions the specify certain aspects.

INVESTIGATE: Teachers guide students through a scientific research process, providing access to resources and data and supporting with research expertise.

ACT: Students develop solution approaches, test, apply and evaluate them.

During the whole process, research and data as shared and all involved actors reflect on the process.

CBL therefore changes the role of teachers from a traditional transfer of knowledge to co-researcher and process guide. Beside collaborative work and research methods CBL also requires the acquisition of reflection skills, which are also a crucial part of education for sustainable development (UNESCO 2017) as well as promotion of active learning methods, e.g. Design Thinking.

Background

Challenge-Based-Learning as a term was first introduced by Apple in 2008, as a concept for high schools that actively involves technology and that resulted from a ten-year research project with schools, universities and other research institutions. Apple introduces CBL as follows (Nichols, Cator, Torres 2016).

Since then, Challenge-Based Learning has also entered higher education contexts and discourse, first in engineering (Ruijten-Dodoiu 2022; Leijon, Gudmundsson et al. 2022), recently also in other disciplines. The increasing implementation of Challenge-Based Learning in higher education is also promoted by the European Universities Initiative of the European Commission (Craciun, Kaiser et al. 2023). Today and in higher education, Challenge-Based Learning still refers to a multidisciplinary approach that encourages students "to work actively with peers, teachers and stakeholders in society to identify complex challenges, formulate relevant questions and take action for sustainable development" (Rådberg, Lundqvist et al. 2020). It marks a student-centered active learning approach that focuses on examination and innovation in a real-world setting (Duch, Groh, Allen 2001).

The following examples give a broad overview of CBL across disciplines within the InclusU network:

How does sustainable transformation work?
Seminar Series

EUROPA-UNIVERSITÄT VIADRINA FRANKFURT (ODER)

viadrina master **European Studies**

Dr Amelie Kutter, Researcher for European Studies

Seminar Series since Winter Term 2022/23

MA level Students

In a seminar series, students explore different aspects of sustainability transformation in the local context of the federal state of Brandenburg. With a challenge-based learning approach as well as applied political and social science, seminar participants identify the challenges of sustainable transformation in Brandenburg. They explore specific topic areas and relevant multi-level governance invoved here and they survey the perspectives of stakeholders in the region on problems as well as solutions. Excursions and interviews with local change makers are part of the teaching format. The results are provided to the follow-up seminar for research continuation and, after the end of the seminar series, also to the wider public

Credits: Eva Greiner
Wind turbine nacelle at the New Energie Forum in Feldheim

The seminar series is supported by Viadrina's Center for Teaching and Learning and is part of the 'Forum Sustainability' initiative, which Dr Amelie Kutter and Dr habil. Elsa Tulmets are promoting at the European University Viadrina.

Excursions and Interview Partners:
- Sustainability Department of the State Governent of Schleswig-Holstein
- Brandenburg Ministry of Agriculture, Environment and Climate
- Brandenburg Sustainability Platform
- New Energies Forum in Feldheim
- Grünheide citizens' initiative
- NABU Brandenburg

...and others.

Seminar Collaboration:
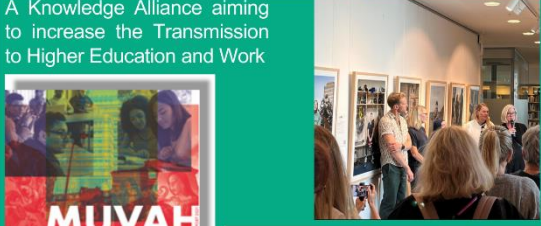- Dr. Anja Hennig
- Roland Kant
- Dr. habil. Elsa Tulmets

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Muvah

MALMÖ UNIVERSITY

Faculty of Education and Society

Teresa Tomasevic & Anna Singhateh

since 2014

A Knowledge Alliance aiming to increase the Transmission to Higher Education and Work

MUVAH
VÄGAR TILL ARBETSLIVET VIA GRUNDLÄGGANDE OCH HÖGRE UTBILDNING I MALMÖ
– EN BRED KARTLÄGGNING OCH UPPFÖLJNING AV TVÅ ELEVKULLAR

Muvah is a Knowledge Alliance between the City of Malmö and Malmö University.

Initiated in 2014, this long-term collaboration addresses the societal challenge that too few Malmö citizens have a stable employment. Muvah aims to understand, map and follow up young people's journey through education as well as factors influencing students' choices in the transitions between different types of education and work. The goal is to explore the impact of different interventions and to widen recruitment and participation. With a focus on research and by producing at least one report a year, the project aims to promote strategic decisions as well as priorities and results in a joint professional learning and operational development based on research.

Partners

City of Malmö

INCLUSU

Mediation & Dispute Resolution

MRU

Law School

Prof Dr Agne Tvaronavičienė

2023 Sept - Dec/ Feb - Jun

undergraduate & graduate students

Learning through Experience

This Challenge-Based Learning format deals with the Fundamentals of Mediation, for example in Family Disputes, and with Alternative Dispute Resolution.
In collaboration with the International Academy of Dispute Resolution and the Lithuanian Chamber of Mediators, students learn through experience in an effective learning process, which involves real-life cases. During the process. the students worl in teams and practice cooperation in learning as well as reflection of their experience.
The partners suggest topics for research, they mentor the students, provide role plays as well as workshops and feedback to he students. They are also actively involved in the students' final exams.

Credits: Mykolas Romeris University

Partners

INADR
International Academy of Dispute Resolution

Lithuanian Chamber of Mediators

INCLUSU

University Residence Project

Université de Lille

School of Engineering

Teaching Staff from the School of Engineering

5-days Challenges & two 6-month Internships

1 Challenge-Based Learning, 95 Students, 11 proposed projects

This Challenge-Based Learning Course is is a joint initiative of the University of Lille with the CROUS of Lille and the company Clésence. Its aim is to solve complex problems.
Within this course, students developed a type of intergenerational residence to be built with New Technologies and as a contribution to Sustainable Development.
Research, Workshops as well as internships secure a combination of various perspectives and expertise from inside and outside of university as well as access to new technologies and hands-on collaborative and practical approaches to learning.

Scientific Article Describe the context, the scientific challenges, the perspectives	Physical Prototype Visual Elements of realization and functioning	Business Plan Marketing orientation including energy and environment	Video focusing on the functionality of the deliverable	Group Debate Plenary presentation & open discussion

Partners

Clésence

RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

les Crous

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Viadrina Campus Challenge

EUROPA-UNIVERSITÄT VIADRINA FRANKFURT (ODER)
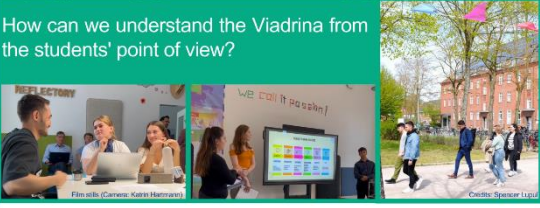
Faculty of Business Administration & Economics	**How can we understand the Viadrina from the students' point of view?**

Film stills (Camera: Katrin Hartmann) · Credits: Spencer Lugui

Lorenzo Skade, Yanis Hamdali, Prof Dr Albrecht Söllner & Prof Dr Jochen Koch

The Viadrina Campus Challenge is a joint teaching format of the Chair of General Business Administration, in particular International Management, and the Chair of Corporate Management and Organisation. It is implemented in cooperation with the ER-Lab (Entrepeneurship Research Lab).

By applying theories and methods from design thinking, students explore the so-called customer journeys. They work in teams to develop creative and realisable solutions for real university-related challenges faced by students from their enrolment to graduation. Participants conduct interviews, obtain feedback and develop prototypes for solutions, which they then present to the public.

Summer Term 2023

Introduction Design Thinking (Judith Franke, Student & Coach)	Excursion to LEUPHANA Universiiy Lüneburg	internal mid-term Presentation of Team Projects	Public Presentation & Discussion of Prototypes

MA Students

Partners: ERLab · CAMPUS FOUNDERS · LEUPHANA UNIVERSITY LÜNEBURG · Center for Teaching and Learning

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Human Resource Management

MRU

Faculty of Public Governance and Business	Social partners presented real situations for case analysis, which we solved with students and looking for the best solutions based on existing knowledge of the subject. External partners were also invited to several lectures to share their knowledge with students in the field of human resource management tasks and responsibilities. By interacting with the organizations, students were able to ask questions and explore the organizations in the context of their subject of study and personal career planning. The teacher's role was to be a mentor.

Prof. Dr. Aistė Dromantaitė

Students were able to determine the directions of their research and decisions based on their existing knowledge, and also had the opportunity to act on their understanding of their decisions.

2023 Sept - Dec/ Feb - Jun

During the course, student performance was assessed in several ways: research and implementation plans, a video of a possible solution situation, student reflection journals after the sessions, and a final reflection document on the e-learning platform.

BA Students in II year

Credits: Mykolas Romeris University

Partners: Avia Solutions Group · TELTONIKA · ASOCIACIJA PADĖKIME VAIKAMS

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Learning Organisation!?
The Viadrina as a Real-World Lab

EUROPA-UNIVERSITÄT VIADRINA FRANKFURT (ODER)

Center for Teaching and Learning (ZLL)

In this practical seminar, the participants use a challenge-based learning approach to address the question of how they can strengthen student participation at Viadrina.
Who actually decides what at the university? How do new professorships or degree programmes come about? (Where) Is student participation required? Which knowledge is accessible?

Niki Kasis, acad. staff ZLL

Through research, by attending meetings of governance and student representative bodies, as well as in dialogue with various stakeholders of Viadrina and its networks, participants phrase further questions, make processes and tensions transparent and identify possibilities of co-creation., They continuously reflect on their own studies and eventually formulate concrete needs or possible solutions.

LERNENDE ORGANISATION? Die Viadrina als Reallabor · Praxisseminar · Anmeldung über Moodle · ERFORSCHEN - VERNETZEN - GESTALTEN · 6 ECTS - Dozentin: Niki Kasis - kasis@europa-uni.de · Zentrum für Lehre und Lernen

Networking and mutual feedback between students from different faculties and different semesters with and without experience in university engagement are a central component and goal of this course.

each Semester (since WiSe 2022/23)

Learning Organisation: The concept of the learning organisation refers to the interaction of individual and shared experience and knowledge in an organisation. The organisation as a whole collects, conveys and disseminates information and data and creates the structures that enable its members to transform these into knowledge, new insights and action competence (Jensen 2005, Kezar 2005)

Real-World Lab: Academics and (local) practitioners work together and integrate their respective knowledge into research-based learning and practical application in a real-life context. During the process, the participants reflect on their roles and the conditions of the real-world laboratory, evaluate the process and adapt it if necessary. Real-world laboratories are regarded as learning settings for education for sustainable development and sustainability research as well as a training ground for practical skills. (Wanner et al. 2020, Bellina et al. 2019, Singer-Brodowski et al. 2018)

BA- and MA- Students of all faculties

Partners: KUKURYKU! · FRANKFURT SŁUBICE · Caritas · ART AN DER GRENZE NA GRANICY 23.04. - 07.05.2022

Further Collaboration:
- Central Gender Equality Officer of Viadrina
- student Initiatives and Councils
- Culture Coordinator

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A Multi-Sensory Book for the Deaf and Hard of Hearing

MRU

Faculty of Public Governance and Business	**Development of a Prototype**

Mykolas Romeris University students, under the guidance of their professor in "Technology Innovation Management and Communication" developed a prototype of an innovative, new-generation multisensory educational book. The project began with a product's needs analysis, followed by inter-organizational cooperation and the search for required resources. The book is designed to meet the needs of deaf and hard of hearing students, as well as those who are visually impaired, have reading difficulties or prefer audio books and videos.

Prof. dr. Agota Giedrė Raišienė

September – December, 2023

The product will be presented at the Vilnius Book Fair in 2024 in the section dedicated to new technologies that enable the adaptation of books for different reading needs.

MA students in Electronic Business Management

Credits: Mykolas Romeris University

Partners

Lithuanian Sign Language Translation Center
https://lgkvc.lrv.lt/lt/

LKD Lithuanian Society of the Deaf

mediapark Mediapark web and mobile solutions

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Zofia Pociłowska
in Context of the BLMK Museum collection

EUROPA-UNIVERSITÄT VIADRINA FRANKFURT (ODER)

Culture Coordination University/ City	In this collaborative seminar with the Brandenburg State Museum of Modern Art (BLMK), the students worked on an exhibition about the Polish sculptor and concentration camp survivor Zofia Pociłowska. Findings from travelling to places where the artist worked and from conversations with her family were incorporated into the exhibition concept.
Constance Krüger & Linn Kroneck	
Winter Term 2022/ 23	An exchange with students from the University of Zielona Góra complemented the interdisciplinary, cross-border character of the project.
BA & MA Students at the Faculty of Social & Cultural Sciences	

Credits: Katharina Link, BLMK

Partners

brandenburgisches landesmuseum für moderne kunst

Funded by:

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Kick-Off for Studying

EUROPA-UNIVERSITÄT VIADRINA FRANKFURT (ODER)

Center for Teaching and Learning (ZLL)

The Kick-Off Week prepares first-year students from all faculties for their studies at Viadrina. Workshops promote an academic mindset, teamwork, project management, presentation skills and creative methods. A social program encourages participants to get to know the campus and city as well as fellow students and to explore diverse forms of student engagement. During the Kick-Off enables students to work in a practice-oriented way, to organise themselves and to understand the specific perspective of their own study subject through introductory sessions as well as in interdisciplinary exchange with other students.

academic staff & Peer-Tutors of the ZLL

In 2023, participants went through a challenge-based learning format addressing the question of what an ideal physical learning space looks like. With academic literature research, surveys and design thinking methods, and by involving their own experiences they developed ideas for redesigning the open learning and writing space GD03 in the Gräfin Dönhoff building as a space or hub for practice-orientated teaching, learning and collaborative work.

beginning of winter term each year

First-year students

Credits: Heide Fest

Partners

viadrina · FRANKFURT SLUBICE · AStA Allgemeiner Studentischer Ausschuss · jura wiwi kuwi and the Student Councils (Fachschaftsräte)

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DAAD Deutscher Akademischer Austauschdienst
German Academic Exchange Service

Université de Lille

MALMÖ UNIVERSITY

MRU MYKOLAS ROMERIS UNIVERSITY

EUROPA-UNIVERSITÄT VIADRINA FRANKFURT (ODER)

Uniwersytet Wrocławski