

Designing higher Education
Curricula for **A**gility, **R**esilience
& **T**ransformation

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About DECART

The **DECART** research and innovation project is an international cooperation partnership initiative funded under the European Commission's ERASMUS+ programme (2022-1-FR01-KA220-HED-000087657). The project unites higher education institutions in France, Iceland, Indonesia, Lithuania, and South Africa. The primary project goal is to provide guidelines to design innovative curricula that leverage the transformative capacities of 21st century education systems in engineering and business. The project will also identify leadership models to help educational stakeholders to thrive in an increasingly turbulent socioeconomic context.

RWTH as a new member



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At the end of 2023, the Bridge Professorship Gender and Diversity in Engineering (GDI) from RWTH Aachen University joined the DECART cooperation partnership.

With more than 45,000 students, RWTH is one of the largest technical universities in Germany. The university is a member of the TU9 University Alliance, the IDEA League and the ENHANCE Alliance. Important facts and figures about RWTH Aachen University, current statistics, trends and developments can be found here:

<http://tinyurl.com/RWTHdecart>

RWTH complements the partnership as an Integrated Interdisciplinary University of Science and Technology.

The teaching and research activities of the Bridge Professorship Gender and Diversity in Engineering pursue the goal of promoting sustainable, innovative, and future-oriented research and development. This is achieved by integrating perspectives of diversity and heterogeneity at different levels in organisations as well as in research and development processes. The implementation is characterised by a participatory and interdisciplinary approach.

The 17 Sustainable Development Goals (SDGs), which are the core of the 2030 Agenda of the United Nations, map the environmental, social and economic aspects of sustainable global development. The GDI incorporates the context of the SDGs into its teaching and research activities.

Carmen Leicht-Scholten, political scientist by training, is professor for Gender and Diversity in Engineering at the Faculty of Civil Engineering and professor at the Faculty of Arts and Humanities at the RWTH Aachen University.

The GDI will support the DECART project with its expertise. This includes:

- Conceptualization and further development of courses on sustainability and social responsibility in engineering education
- Expertise in responsible research and innovation (RRI) with a focus on STEM
- Elective Master's course on resilience and socio-technical systems
- Research on resilience in engineering education
- Research focus in engineering education

RWTH has an expertise in systems resilience, especially in educating engineering students to design resilient systems/infrastructure. RWTH is also keen to contribute to WP3 curriculum transformation and leadership. RWTH will be strongly engaged in WP4, to reach its German and EU networks. Overall RWTH will be a strong actor in the DECART collaboration.

Warm welcome to Carmen Leicht-Scholten, Clara Lemke, and Ann-Kristin Winkens!

Spotlight on the German accreditation system

The German accreditation system provides for three different types of procedures

- Program accreditation
 - o Bachelor's and Master's degree programs at state or state-recognized higher education institutions in Germany
 - o Successful accreditation procedure → Temporary accreditation
- System accreditation
 - o Internal quality assurance system of a university
 - o University receives the right to award the seal of the Accreditation Council itself for the study programs it has examined
- Alternative procedures

Program and system accreditation characterised by a two-stage system:

- Organization of the assessment and preparation of an accreditation report with a conclusion and evaluation recommendation in accordance with the standards laid down by an accreditation agency commissioned by the higher education institution
- At the request of the university, the Accreditation Council decides on the accreditation of a study program or an internal quality management system of the university
- The decision is made on the basis of the accreditation report, whereby a justified deviation from the expert recommendation is possible

More information:

<https://www.akkreditierungsrat.de/en/welcome-german-accreditation-council>

Second project meeting in Reykjavik, Iceland

It was wonderful to meet all these dynamic people in person and also some online at our first onsite meeting at RU campus in Reykjavík. Participants came from all six partner institutions in the program, a total of 12 persons onsite and 7 persons were online for parts of the program. The working days were 21 and 2 June, with plenty on the agenda both days. The purpose of the meeting was to review the management of the project and all the four working packages, and then focus on curriculum design, inventive curricula and potential VUCA scenarios that may affect



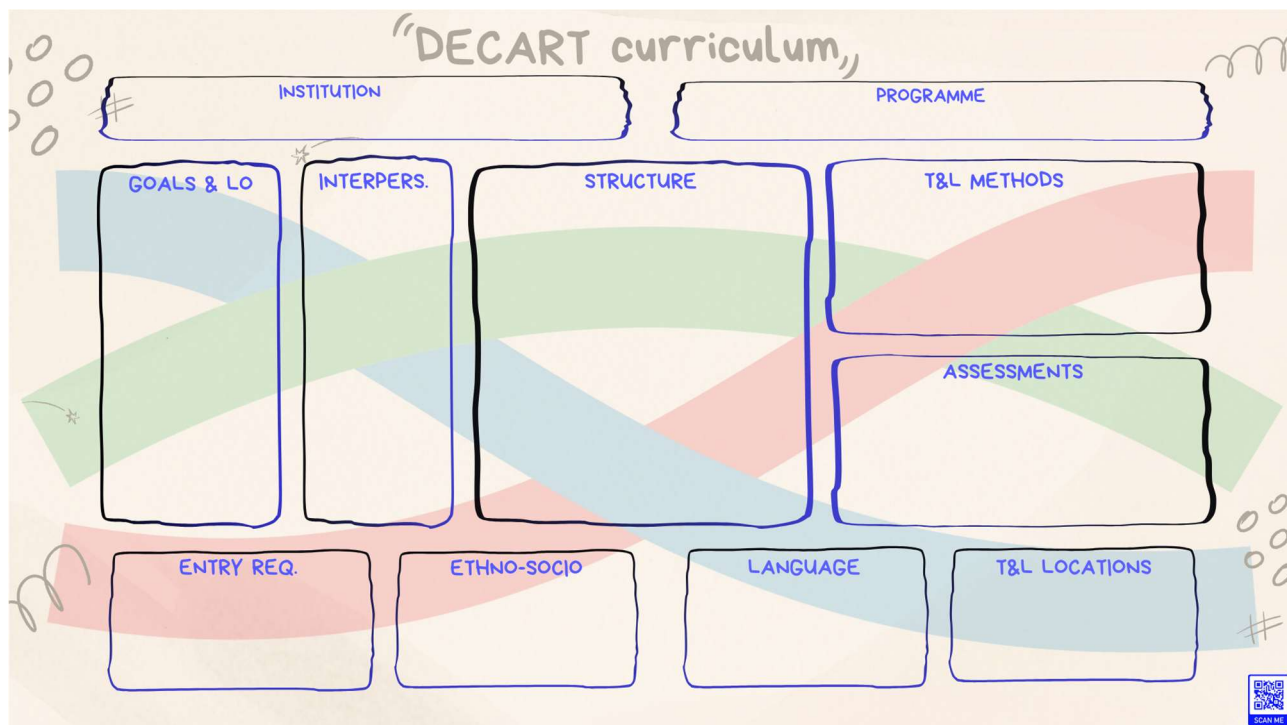
curricula. And of course to experience the RU campus first hand. The RU campus is one large building, dynamic and bright, and its architecture mimics our solar system, with the Sun in the centre and the radial extensions named after the planets. To break up the normal agenda at the meeting we had an informal barbecue on RU campus at the end of the first day, using the grill on the RU balcony. That event provided a good opportunity for informal chat.

The DECART group at the Project Meeting 2 at RU campus, June 2023.

Photo: Reykjavik University, CC BY-NC-SA licence

Curriculum canvas

Based on an initial survey among the six DECART partners, we have a harmonized understanding of what “curriculum” means, our analysis revealed nine common components that were inherent in the majority of the descriptions.



Canvas: S. Rouvrais, CC BY-NC-SA licence



Photo: S. Rouvrais, CC BY-NC-SA licence

Resilience – Work package 2

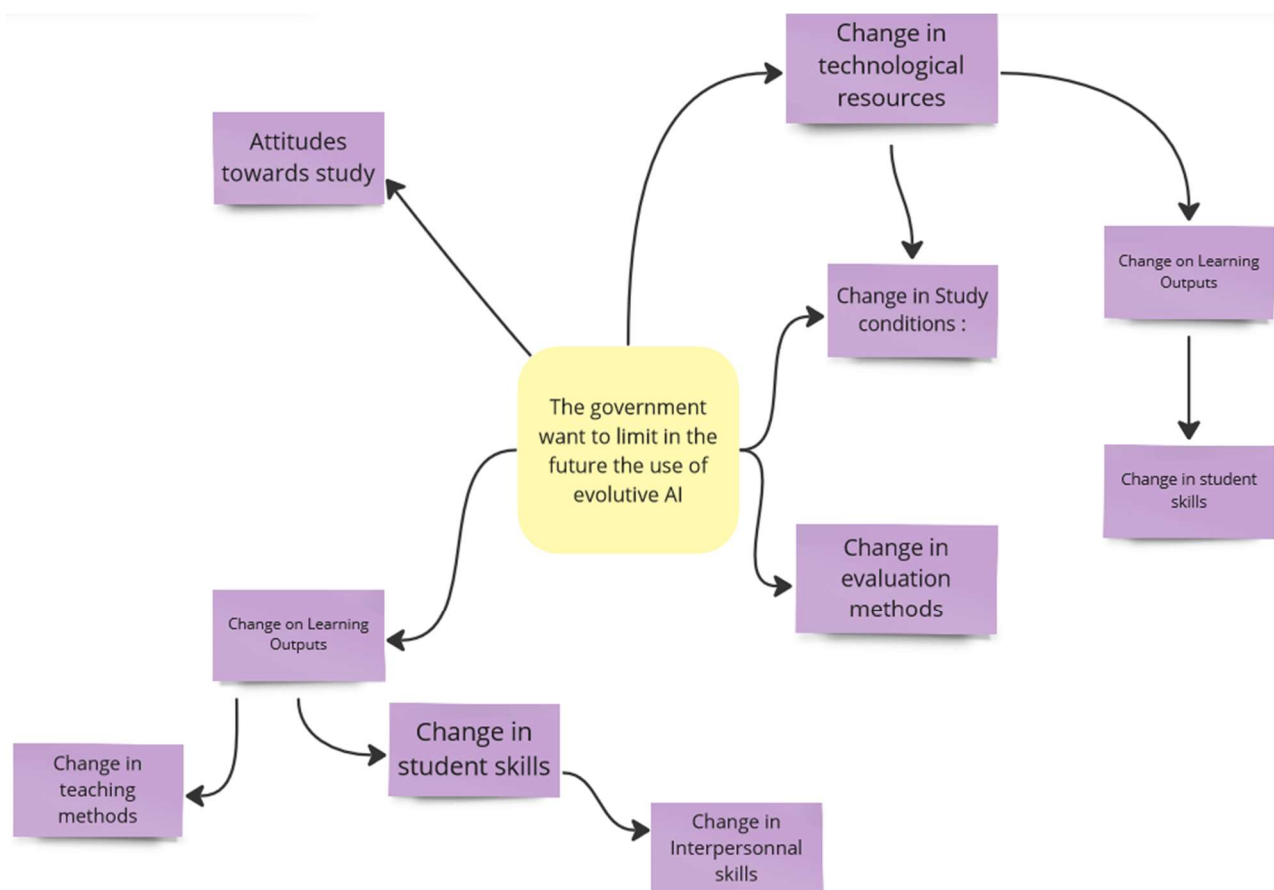
WP2, jointly led by IMT Atlantique and RWTH, focuses on defining resilient curricula in two ways: 1) providing insights on the properties of a resilient curriculum, and (2) by the creation by DECART participants of a serious game simulating via role play the process of resilient curricula design improving therefore HEI resilience in the face of crises.

The PM2 meeting in Reykjavik in June 2023 was devoted to clarifying the concept of resilience and resilient curricula. Joanne Gardner Le Gars, from Rennes School of Business in France, provided an overview on organizational resilience presenting a multi-faceted construct of resilience combining (Gardner Le Gars & Waldeck, 2022)

1. Resilience stimuli: distinct trigger events: extra or intra-organizational / foreseen or unforeseen perturbations
2. Resilience sources: organizational capacities and employee capabilities
3. Resilience phases: a three-phase, cyclical process (pre-emptive/ proactive/ recovery)
4. Resilience context: diverse organizational systems: a spectrum of more/less complex organizational configurations

The PM3 meeting in November 2023 in Rennes highlighted the methodology which will be used in the design of a serious game using Action Design Research (ADR) approach. The purpose of ADR is to generate a design knowledge through learning from the intervention of building and evaluating a serious game dedicated to an organizational problem. The serious game design will be driven by the theory on resilience (in contrast to a design driven by practice) and consist of designing a serious game consisting of three phases corresponding to three properties of resilience (McManus et al., 2008)

- Building situational awareness
- Identifying keystone vulnerabilities
- Building adaptive capacity



Mindmap: R. Waldeck, CC BY-NC-SA licence

The tasks of designing a serious game (SG) during 2024 will be to develop game mechanisms and content addressing the three listed properties of resilience.

Erasmus Days October 2023



Photo: Tahan Sihombing, CC BY-NC-SA licence

The Erasmus Days were celebrated in ITD Indonesian campus and IMTA French campus. It was an opportunity to communicate with target groups, faculty and students. As recalled by the erasmusplus.eu website, “this seventh edition, held from 9 to 14 October 2023, highlighted Europe’s cultural diversity and the many learning opportunities it offers. 6 days to make Europe shine! An excellent way to promote the richness of European mobility and the successes of the Erasmus+ programme”.

Third project meeting in Rennes, France

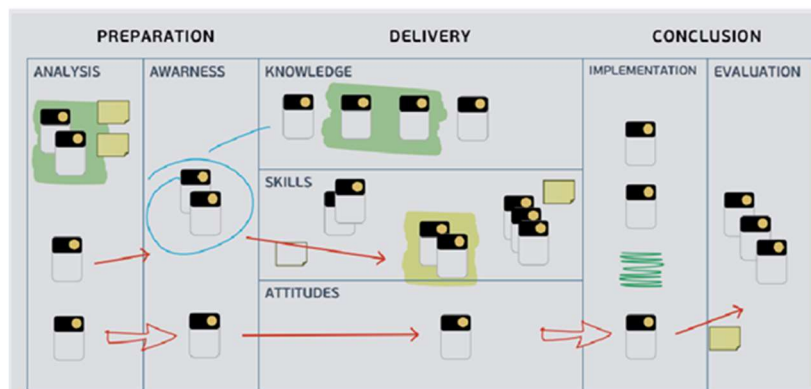
The third project meeting (PM3) was held in Rennes, middle of Bretagne, France for three days, 28-30 November 2023. The main tasks on the agenda were curriculum design and potential VUCA scenarios (WP1) and curriculum resilience (WP2). And of course effective discussions on the management of DECART, joint publications and the progression of the project. Part of the meeting was online to facilitate participation by members that were unable to attend in person. These project meetings are indeed splendid and necessary, and this meeting in Rennes was another wonderful opportunity to work together and enjoy fruitful discussions about our work. Eleven members participated on site and four online. Also on the agenda was the introduction of the RWTH-GDI group and we learned about the Learning Battle game for curriculum design.

The main goals were to:

- know about RWTH-GDI group
- discover the Learning Battle game for curriculum design
- have a consensus on DECART curriculum components
- share some ideas on curriculum design



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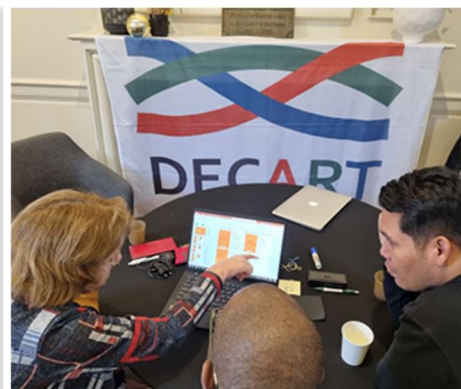


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Publications

Aligned with its dissemination strategy, DECART members already published conference papers:

- VUCA and Resilience in Engineering Education: Lessons Learned. S. Rouvrais, A-K. Winkens, C. Leicht-Scholten, H. Audunsson, C. Gerwel-Proches. In Proceedings of the 19th International CDIO Conference, hosted by NTNU, Trondheim, Norway, June 26-29, 2023.
- Dispositions as an Important Component in Computing Curriculum in IT Del. Arlinta Barus, Inggriani Liem, Tahan Sihombing, Arnaldo Sinaga, Eka Sinambela, Sari Silalahi. In Proceedings of the 2023 IEEE International Conference on Data and Software Engineering (ICoDSE), hosted by Institut Teknologi Del, North Sumatera, Indonesia, September 7-8, 2023.
- *Intégrer la compostabilité de projet dans les programmes de formation de l'enseignement supérieur. Quelques pistes pour une mise en œuvre facilitée.* Gilles Jacovetti. Questions de Pédagogie dans l'Enseignement Supérieur/, Lausanne University, June 2023, Lausanne, Switzerland.

After Norway, Indonesia, and Switzerland, there will also be an opportunity to meet DECART presenting members in 2024 in Tunisia, Switzerland, and France!

- CDIO 2024: paper to submit “Factors that may impact curriculum design in higher education in a VUCA world”. The main theme of the conference is “Engineering education in the Era Of AI”. The CDIO approach has been adopted by many engineering schools worldwide, the conference is a strong opportunity to reach programme leaders.
- SEFI 2024: paper to submit “Examining best practices in curriculum design: Insights for Engineering education”. The 52nd Annual Conference of the European Society for Engineering Education (SEFI) is Europe’s premier academic meeting for sharing and discussing research and teaching practices in Engineering Education. It is a unique opportunity to exchange research and educational innovations, and to meet colleagues from across Europe and the globe.
- Rochebrune 2024: IMTA submitted a preliminary WP2 workshop paper dealing with the design process of organizational resilience serious games for “*les journées de Rochebrune. Rencontres interdisciplinaires sur les systèmes complexes artificiels et naturels*”. If accepted, a collaborative workshop will be held. <https://rochebrune.cirad.fr/>.

Be ready for the first DECART multiplier event at the CDIO 2024 conference. There will be a 2 hour workshop on curriculum design, focused on an EU dreamed nomadic MSc semester! And be aware that IMTA will host the very first Program for Higher Educators in February 2024, four days of deep collaborations on curriculum design!



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