Vision & ambitions
Transformative education and research

Convergence is a partnership between Delft University of Technology, Erasmus Medical Centre and Erasmus University Rotterdam. The alliance's mission is to contribute to solving societal challenges through deep and systematic substantive connection between alpha, beta, gamma and medical sciences and engineering.

December 2023

Convergence
Crossing Boundaries

TUDelft Erasmus MC Erasmus University Rotterdam

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Strengthening the knowledge ecosystem

The university is increasingly evolving as *Civic University* (Goddard, 2016). A place where staff and students work together and, in co-creation with other parties, **address societal issues**. They do so by using disciplinary insights in teaching and research and, if so needed, challenging and combining them with other insights, with a continuous focus on societal impact.

The School of Convergence aspires to expand, strengthen and anchor this knowledge ecosystem.
Both in sustainable (continuous and inclusive) and engaged (participatory and impactful) ways. Education and research are informed by the complementarity of our institutions (alpha, beta, gamma, medical and engineering) and physical proximity of our institutions and social partners. The school is thus the (physical) location where our knowledge, experience and expertise are brought in, brought together, built up, expanded and secured, anchored in appropriate relationships with social partners. In this way, boundaries between institutions and disciplines are crossed to form transdisciplinary and transformative perspectives on social issues and achieve scientific breakthroughs. **This includes the role of scientists in a society** where, on the one hand, there is a great need for science-based knowledge, and on the other hand, scientific knowledge is challenged. Therefore, investing in relationships with social partners and an ongoing dialogue with society is both necessary and challenging at the same time. It is also a prerequisite for joint innovation in a social context with complex societal issues.

Transdisciplinary and transformative education and research

Major societal issues are not infrequently 'wicked problems', meaning that there is disagreement about the problem and about the solution, and also that no definitive answer can be found. They are value-laden and difficult or impossible to structure, let alone 'tame'. Dealing with these issues requires specific expertise. Both inter-/transdisciplinary and transformative education and research are needed to develop this expertise and experience.
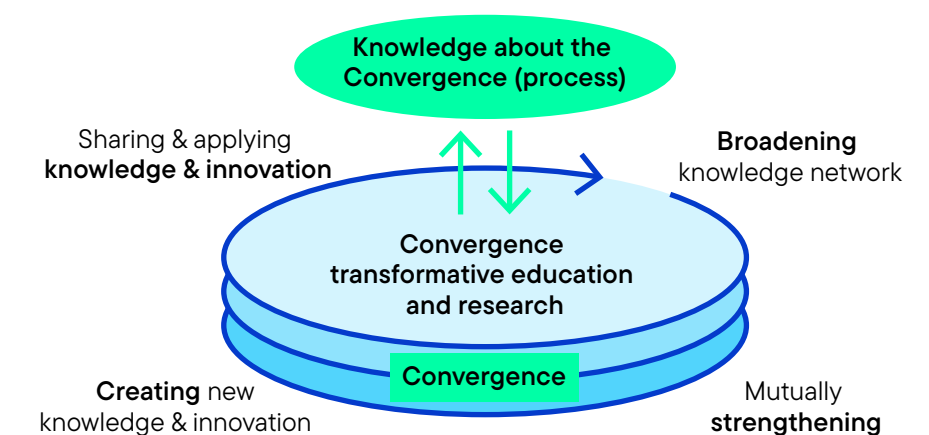
Transdisciplinary and transformative education and research involve a continuous interaction; broadening, deepening and converging different types of scientific and non-scientific knowledge. The starting point for interpreting or addressing a societal challenge is to seek out different insights and knowledge with broad variety, not only in terms of disciplinary knowledge, but also for partners with competing values and interests (see figure 1: broadening and deepening knowledge network). At this stage, academics make choices with involved actors about the kind of knowledge, partners and institutions to involve and to what extent. This is a precarious process because for wicked issues, it is not clear in advance what knowledge is needed. Rather, the knowledge involved will also influence how the issue and solution directions are defined.
Complex and wicked issues require knowledge about 'what is' - system knowledge -, knowledge about 'what could be' - target knowledge -, and knowledge about 'how we get from where we are to where we should be' - transformation knowledge (Pohl, 2022). This requires bringing together both empirical, pragmatic, normative and value-based disciplines

(Jantsch, 1972), as well as non-scientific, experience-based and contextual knowledge (Horlick-Jones & Sime, 2004, p. 445). **As such, it is at the intersection of fundamental, applied and mission-driven research.**

Since wicked issues arise from complex, non-linear, dynamic and networked contexts, the direction in which these contexts and implemented solutions move or jointly evolve will have to be continuously monitored. New knowledge and innovation is thus not the end of a linear process, but a point in a continuous process of broadening, deepening, building and sharing/translating (figure 1).

Figure 1 Transformation model

Embedding

The School of Convergence **supports initiatives that, in co-creation with social partners, operate at this level** and creates knowledge/expertise/experience on how to work transdisciplinarily and transformatively. This includes, for example, methods that converge knowledge from different disciplines and stakeholders towards, among others, academically sound and socially recognised problem definition/framing, solutions (policy, technology, practices), new scientific knowledge, and mutual learning (Mitchell et al, 2015). Building on existing research practices within institutions, Resilient Delta (with 'Gluon researchers') and Healthy Start (with 'HS Fellows') are exploring how to apply this in research. Both the Gluon researcher and the Fellow involve a member of the research team who, more than others in the team, has particular expertise in converging disparate and potentially conflicting forms of knowledge. This is an alternative approach to existing practices, where the dissemination of this expertise is divided among several participants. Such 'Convergence expertise' is likely to be found (in transdisciplinary research) in the disciplines of e.g. systems engineering, spatial and industrial design, as well as in various transformative education modules. **The diverse forms of transdisciplinary/transformative expertise are relevant to Convergence.** This will provide us with a more accurate understanding of how to collaborate successfully (and how not to). It also creates knowledge on how stake-holder engagement can shape Convergence (e.g. via Impact @ the Core) and develops appropriate pedagogical-didactic approaches for this form of education (see Figure 1 Transformation model: Building new knowledge and innovation).

Apart from the five programs under the banner of Convergence, many different initiatives, programmes and projects are already running in our institutions. Some are already convergent (through the involvement of two or more Convergence institutions), while others have transdisciplinary/transformative potential to join Convergence in the short or medium term. **The School of Convergence provides space for these initiatives to further develop and thus contribute to the broader knowledge ecosystem.** At TU Delft, this could include JIP and Q5 initiatives, and at EUR Impact @ the Core, RASL and Erasmus Initiatives. In almost all cases, these are inter- or transdisciplinary, often inter-faculty projects or trajectories that lend themselves perfectly for the inter-institutional level to gain traction.

In addition to strengthening what is already happening at the Convergence level and providing for more structural embedding, the School of Convergence ensures knowledge building and application of the knowledge gained for relevant societal parties and our own institutions. In this way, transdisciplinary/transformative knowledge and innovation is also embedded elsewhere.

The Convergence scholar and student

Convergence education is committed to developing appropriate pedagogical and didactic approaches. Within Convergence research, methods and methodologies are developed that enable convergence. This requires extra attention to certain **skills and attitudes** of the academics and students who engage in it. In addition to the desire to

contribute to solving societal issues (engagement), the ability to reflect on the limits of one's own and others' knowledge and recognition of the strength and vulnerability of proposed interventions, Convergence requires academics and students broadening, deepening and building knowledge through:

- relating to different academics and non-academics, working with them on an equal footing/reciprocally and demonstrating their added value (and what does not add value);
- working in teams with other areas of expertise, knowledge and experience, because they see these as necessary for addressing and putting complex/wicked challenges on the agenda;
- looking for tensions between values and interests of different forms of knowledge, identifying these and outlining substantiated options for the issues and possible solution directions.

Also, it enables them to apply their accumulated (meta) knowledge on convergence and innovations in research and education and when collaborating with societal partners.

To foster an organic interaction between the School of Convergence and the faculties in a sustainable way, staff and students are (temporarily) seconded to both their own department and the School of Convergence. In this way, **the School of Convergence becomes a learning and initiating community in which knowledge exchange between one's own knowledge area and Convergence knowledge is at the centre.**

Preconditions: facilities and valuation

To build a sustainable knowledge ecosystem, students, teachers and researchers need to be supported and valued. This means: an appropriate infrastructure in financing and facilities, physical and virtual spaces to work together and an appropriate HR policy that recognises and rewards Convergence staff. Such as by **recognising and rewarding Convergence teaching and research within faculty career paths.** The latter implies different performance criteria for assessing commitment and performance. Finally, the School of Convergence also calls for professional support for staff and students participating in the social debate. Social issues are often controversial; participating in this debate can thus have far-reaching consequences for the academics involved. Building up expertise in this area is thus a crucial precondition for a successful School of Convergence.

Resources

Advisory board

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Goddard, J., Hazelkorn, E., Kempton, L., & Vallance, P. (Eds.). (2016). The Civic University. Edward Elgar Publishing. https://doi.org/10.4337/9781784717728

Hoffmann, S., C. Pohl, and J. G. Hering (2017) Methods and procedures of transdisciplinary knowledge integration: empirical insights from four thematic synthesis processes. Ecology and Society 22(1):27 https://doi.org/10.5751/ES-08955-220127

Horlick-Jones, T., & Sime, J. (2004). Living on the border: knowledge, risk and transdisciplinarity. Futures, 36(4), 441-456.

Jantsch, E. (1972). Towards interdisciplinarity and transdisciplinarity in education and innovation. In L. Apostel, G. Berger, A. Briggs, & G. Michaud (Eds.), Interdisciplinarity, problems of teaching and research in universities (pp. 97-121). OECD Publications.

Mitchell, C., Cordell, D., & Fam, D. (2015). Beginning at the end: The outcome spaces framework to guide purposive transdisciplinary research. Futures, 86-96.

Pohl, C. (2022). Three types of knowledge tool: A tool for tailoring research questions to (societal) knowledge demands. https://doi.org/10.5281/zenodo.7015070

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At the request of the Convergence Executive Board, the Advisory Group prepared this strategic vision. It serves as a guide for the continued development of Convergence into a School of Convergence. The advice and recommendations were presented to the Convergence Executive Board on December 13, 2023, and were received positively.