



From testing to prospects – *virTUos* at TU Dresden

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Abstract

This anthology marks the conclusion of the *virTUos* project – virtual teaching and learning at TU Dresden in an open source context, which was funded between 2021 and 2025 by the Foundation for Innovation in Higher Education as part of the "Strengthening University Teaching through Digitalization" funding line. The volume brings together key developments and findings from the subprojects, traces their diverse disciplinary perspectives, and shows how new ideas and solutions took shape in collaborative work with our partners. As a supplement to the already published Open Educational Resources (OER), the documented Open Educational Practices (OEP), and the *virTUos* Prospectives white paper, it offers a coherent framework and an overarching conceptual classification.

Der vorliegende Sammelband markiert den Abschluss des Projektes *virTUos* – virtuelles Lehren und Lernen an der TU Dresden im Open Source-Kontext, das zwischen 2021 und 2025 im Rahmen der Förderlinie „Hochschullehre durch Digitalisierung stärken“ durch die Stiftung Innovation in der Hochschullehre gefördert wurde. Der Band führt zentrale Entwicklungen und Erkenntnisse aus den Teilprojekten zusammen, zeichnet deren fachlich vielfältige Perspektiven nach und zeigt, wie sich im kollaborativen Arbeiten mit unseren Partner:innen neue Ideen und Lösungen formten. Als Ergänzung zu den bereits publizierten Open Educational Resources (OER), den dokumentierten Open Educational Practices (OEP) sowie dem Whitepaper der *virTUos*-Prospektiven bietet er einen zusammenhängenden Rahmen und eine übergreifende konzeptionelle Einordnung.

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1. Project developments

The higher education landscape is facing fundamental challenges that go far beyond the need for pure digitalization. There is still a need to promote a resilient and flexible university culture that not only follows and keeps pace with global and national developments, but also offers opportunities for active participation. The *virTUos* project was designed to address the question of how collaborative, interdisciplinary, and transdisciplinary teaching and learning in project structures can contribute to this under the conditions of the digital transformation of the educational landscape.

One of the success factors of *virTUos* was the broad-based interdisciplinary collaboration organized within the structure. Nine individual projects were located in four different faculties (Linguistics, Literature, and Cultural Studies; Carl Gustav Carus Faculty of Medicine; Mechanical Engineering; Economics) and the Center for Interdisciplinary Learning and Teaching (ZiLL) and were supported by the practice and transfer partners, Dresden International University (DIU) and the Saxon State Library – Dresden State and University Library (SLUB). This division was strategically motivated: it ensured that the didactic and technological concepts developed were tested under a maximum variety of requirements. This is because the challenges in the Medical Faculty, for example in establishing clinical simulations and examination courses, are fundamentally different from the requirements of the humanities for virtual excursions or media competence development. At the same time, *virTUos* tested a new approach to collaboration between central and decentralized structures at TU Dresden, which generated far-reaching added value through close cooperation between departments, the ZiLL, and external partner institutions – which was shared with the public: While the Hybrid Labs (2022 and 2023) were more project-oriented workshops open to a topic-specific audience, the conferences "Spaces & Learning Worlds – Perspectives on the Design of University Teaching" (DIU, November 2023) and "OER Dissemination – Symposium of the *virTUos* Project" (SLUB, November 2024) conferences addressed a national and international audience.

Each subproject pursued specific goals and addressed different needs: DigitalHerrnhut and ExDiMed were based at the Faculty of Language, Literature, and Cultural Studies (SLK). DigitalHerrnhut focused on the use of virtual excursions as learning venues for international teaching and learning collaborations. The added value of these excursions lies in particular in overcoming barriers, giving students access to special historical or cultural contexts that are physically difficult to access. ExDiMed (Experimental Space for Digital Media Competence) was dedicated to teaching basic media skills to humanities scholars and, in particular, to the question of how they can be introduced to programming more easily and in a self-learning module. The trial was conducted over several semesters with great success, including in the master's program "Digital Humanities." At the Carl Gustav Carus Medical Faculty, the TelePresence and HybParc subprojects focused on different problem areas: TelePresence aimed to provide training opportunities even when physical presence is impossible, limited, or inefficient in everyday clinical practice, in order to maintain high training standards through flexible digital support. HybParc (hybrid interactive self-learning, training, and examination courses) aimed to modernize assessment and training tools in order to offer students flexible, individual learning paths and thus be able to tailor learning content and training intensity more closely to their individual needs. PraktikaHybrid at the Faculty of Mechanical Engineering, very similar in its basic approach to the TelePresence subproject, dealt with hybrid co-presence in real experimental settings and the question of how the relevance of physical experiences can be conveyed in digitally supported internship environments. The Faculty of Economics was home to the subproject

DikoLint (digital, collaborative learning in international teaching) project, which further developed the concept of virtual collaborative learning (VCL) and thus collaborative learning under digital conditions in international contexts, cooperating closely with DigitalHerrnhut. Two developments at the Center for Interdisciplinary Learning and Teaching (ZiLL), Tutoring Hybrid and sTUDents, formed the framework. With these two projects, ZiLL took on a central

role in scaling the didactic solutions developed from the individual projects. Tutoring Hybrid focused on the professionalization and standardization of hybrid support structures and student teaching contexts by developing, testing, and implementing programs for tutors. *sTUDents* (student-oriented digital learning and teaching) ensured that all developments in *virTUos* were actively shaped by students according to the principle of "students as partners" and that digital skills were addressed across disciplines. This approach, which makes students partners in development, testing, and evaluation, showed that working on an equal footing guarantees acceptance, practical relevance, and target group relevance of the developed offerings. The successful implementation of digital solutions in such divergent subject cultures, with the involvement of university didactics, revealed the strengths and weaknesses of specific solutions in stress tests – and is thus one of the central findings of *virTUos*: We must open up spaces for experimentation in the academic context and work together on a progressive culture of error.

2. Prospects

These experiences have led to the development of prospects for digital teaching at TU Dresden. Originally referred to as the HYBRID strategy, we now see it as a comprehensive orientation for a university that wants to develop into a flexible, didactically sound, and inclusive learning and living space. The prospects identify various fields of action: orchestrated networking, cultural and social change, work-life-learn balance, society and community, didactics, campus life, study organization, and teaching room equipment. The key messages, which are also addressed in the sub-project reports, are summarized here for better understanding.

Universities are flexible learning spaces. Therefore, blended learning formats should be used widely as a combination of face-to-face and digital formats. The expansion of asynchronous teaching and learning offerings creates temporal and spatial flexibility, which on the one hand promotes the compatibility of studies and other commitments, and on the

other hand creates the conditions for, for example, a consistent and more interactive project orientation in face-to-face courses. To ensure learning success, didactically sound approaches are pursued and further training is offered for teachers. Against the backdrop of the opportunities that have opened up over the past two years through generative AI (GenKI), adaptive learning systems for personalized learning paths, flexible teaching design, and automated feedback should also be considered in the future. Universities also promote lifelong learning through barrier-free access to continuing education opportunities and their recognition.

The organization of studies is geared towards individual flexibility. This includes the simplification and digitization of administrative processes (process, course, and exam management) in central systems. Greater modularization is supported by flexible "container" and project modules to promote interdisciplinary and practical teaching. In addition, barrier-free borrowing of teaching materials is guaranteed. The aim of these measures is to enable students to complete their studies within the standard period of study despite impairments, especially in cases of particular hardship.

Equal opportunities and inclusion are key principles for universities. Communication is open, respectful, inclusive, accessible, and gender-neutral. An onboarding semester for all students is recommended, which includes content on good scientific practice and conflict resolution. To anchor diversity issues, the representatives for inclusion, equality, and students with disabilities are mandatorily involved in teaching development.

The university is a networked education and research space where the goal is collaboration in "communities of practice." Regular exchange with external partner institutions (business, politics, society, schools) will be established to better coordinate knowledge transfer. Campus life is designed to be sustainable, inclusive, and lively—green, car-free in core areas, with weather-protected outdoor workspaces and bicycle-friendly infrastructure.

3. Thanks

The success of *virTUos* is inextricably linked to the extraordinary commitment of numerous stakeholders. In addition to the university management of TU Dresden and the teams at our partner institutions DIU and SLUB, we would like to express our special thanks to the members of the Advisory Board Prof. Dr. Bernhard Marschall, Dr. Julia Meyer, Prof. Dr. Andreas Schadschneider, Prof. Dr. Friedemann Vogel, and Prof. Dr. Bianca Watzka for their advice and supportive ideas, as well as the sub-project leaders in Dresden, Prof. Dr. Simon Meier-Vieracker, Prof. Dr. Stefan Odenbach, Prof. Dr. Ingo Röder, and Prof. Dr. Eric Schoop for their willingness to engage in cross-disciplinary, constructive, and unconventional collaboration.

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