

RALF TENBERG (Technical University of Darmstadt)

## **Editorial**

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## Editorial

From November 23 to November 24, 2017, the second symposium on technical teaching and learning organized by the editors of the Journal of Technical Education (JOTED) and hosted by the University of Siegen took place in the Artur-Woll House. As JOTED editors and event organizers, this symposium was even more exciting to us than the first one in 2016: Rather than simply coming together for a one-time event as in 2016, this symposium was about establishing a format. The idea of continuing the symposium originated from conversations we had at the first symposium and from its wrap-up in the aftermath when we held an editorial board meeting for JOTED. It was in that meeting that a new vision was born: We intended to turn the symposium as a one-time event into an annual series so that it would add to the discipline-specific conference formats already in place. By facilitating contact points for cross-disciplinary researchers, we intended the symposium to propel scientific discussions and exchange on the diverse aspects of technical teaching and learning. We were therefore relieved about the many responses to our call for papers. In total, we had received twice as many abstracts as we could accept for the symposium. In order to meet the demand and do justice to a whole range of interesting research foci, we decided to implement a new poster-format in addition to the presentation program. As the number of registrations had doubled, too, we were sure that concurrent conference lines would help us to live up to these numbers.

To fill the spot of the keynote lecturer, we looked for a researcher who dealt with technique from a disciplinary angle that would establish some distance to the core field of technical teaching and learning. Dr. Bruno Gransche from the University of Siegen and member of the research group *Zukunft menschlich gestalten* turned out to be the right match. His research interests in the philosophy of new human-technique-relations, societal and ethical aspects of digitalization, and technical assistant systems clearly predestinated him for opening our symposium with a fresh view on our central research field. The central message of Gransche's dialectics on the substitution of human capacities with machines was that humans must develop together with their digital assistants; otherwise, the relationship between humans and their digital assistants could take unexpected turns. His conclusive recommendation was to develop and implement competence-sensitive, higher-level assistant systems that were able to deny comfort benefits in favor of competence-preservation: "Our assistance-society will be in need of insubordinate assistants if it is still seeking independence."

Presentations were given by researchers from universities, universities of applied sciences, and other institutions of higher education in Bremen, Darmstadt, Duisburg-Essen, Furtwangen, Hamburg, Ilmenau, Kaiserslautern, Kassel, Ludwigsburg, Paderborn, Siegen, and Stuttgart as well as from the Federal Institute for Vocational Education and Training (*Bundesinstitut für Berufsbildung*). In light of the fact that we experienced intense and constructive discussions after each expert input, the decision to have as much time for discussions as for presentations was confirmed. Open questions and further ideas on the particular research reports could be addressed and resolved. The coffee breaks offered yet another chance to discuss the posters and deepen the conversations that had been started in the presentation sessions.

The sessions on Thursday, November 23, 2017, introduced the following speakers:

- Elmar Dammann (University of Furtwangen) and Martin Lang (University of Duisburg-Essen) on the topic “Mechanic-mathematical modelling as a predictor of study success in the introductory phase of studies in civil engineering”.
- Felix Walker, Leo von Waveren, and Nico Link (University of Kaiserslautern) on the topic “Hypothesis on the exhaustion of potential in the industrial-technical sector”.
- Timo Wenner (University of Kassel) on the topic “Reciprocity of the cooperation of learning settings and the quality of vocational training from the perspective of vocational trainees: Empirical study in industrial-technical skilled occupations”.
- Markus Schäfer (Hönnle Berufskolleg des Märkischen Kreises) and Eckart Diezemann (University of Siegen) on the topic “Design-based research in design-based didactics: On the methodology and implementation of innovation-oriented research in the first phase of a car mechanic-training”.
- Alexander Nitzschke (University of Stuttgart) and Stefanie Velten (Federal Institute for Vocational Education and Training) on the topic “Professional skills of technicians for electrical engineering in the end of a continuing education program”.
- Bernd Geissel and Sandra Funk (University of Ludwigsburg) on the topic “Comparative analysis of error tracing processes of electricians for automation technology in simulated and real situations of demand”.
- Marcus Dengler (University of Darmstadt) on the topic “Explorative case studies on action-oriented digital learning in metal technology”.
- Christian Tölle, Grit Graefke, Kerstin Moeschke, and Kathrin Temmen (University of Paderborn and BK Paderborn) on the topic “Evaluating the interdisciplinarity of vocational high schools for engineering from the teachers’ perspectives”.
- Jennifer Stemmann and Martin Lang (University of Duisburg-Essen) on the topic “Is the log-file-generated exploration-completeness suitable as a process indicator for knowledge acquisition in problem-solving actions with technical everyday tools?”.
- Victoria Adenstedt (University of Duisburg-Essen) on the topic “Research results: Data collection of the technical self-concept of average nine years-olds”.

After the presentation program, four round table-groups elaborated on the following self-generated topic areas:

- Group no. 1: The lack of teachers in technical domains at vocational schools
- Group no. 2: Digital change and technical teaching and learning
- Group no. 3: Digital media
- Group no. 4: Technical teaching and learning and general education

On Friday, November 24, 2017, the following speakers invited to their presentations:

- Bernd Zinn (University of Stuttgart) on the topic “Competences and interests in the high school subject of natural sciences and technique after junior high”.
- Stefan Fletscher and Anja Kleinteich (University of Duisburg-Essen) on the topic “The development of technical systems thinking on the transition from primary to secondary education”.
- Leo van Waveren, Felix Walker, and Roland Ulber (University of Kaiserslautern) on the topic „Concepts of subject-specific didactics for reducing deficits in automation technology”.

- Tatiana Esau and Stefan Fletcher (University of Duisburg-Essen) on the topic “Process-oriented analysis of individual, constructive problem-solving processes with the help of eye tracking in technical education”.
- Britta Schlömer (University of Bremen) on the topic “A work-oriented model of and procedural approach to competence diagnostics in vocational teaching and learning: Results of a dissertation study”.
- Britta M. Gossel, Kathrin Schleicher, Anja Solf, Maximilian Krauß, Christian Weber, and Andreas Will (University of Ilmenau) on the topic “Entrepreneurship education in the context of technical didactics research: A descriptive survey of the so-called MINT-studies in six German federal states”.
- Daniela Straub (Tekom Europe), Birgitta Meex (KU Leuven), Sissi Closs (University of Karlsruhe–Technik und Wirtschaft), Julia Müller (tekomp Europe), Yvonne Cleary (University of Limerick), Zygmunt Drazek (Uniwersytet Szczeciński), Jan Engberg (Aarhus Universitet), Voichita Ghengea (Universitatea Politehnica din Bucuresti), Joyce Karreman (Universiteit Twente), and Patricia Minacori (Université Paris Diderot) on the topic “Competence definition and curricula development by way of applying EU tools”.

Reviewing and evaluating the presentations with regard to their reference frame of technical didactics indicated that the symposium covered a variety of segments of technical education. Two presentations referred to primary education; three presentations addressed secondary general education; seven presentations referred to vocational education; one presentation drew on subject-specific colleges; one presentation was about vocational high school education; and four presentations were about technical education in higher education. All presentations provided insight in finalized empirical studies or empirical studies in the final stages. By number, there were eight qualitative-explorative studies; eight quantitative studies (descriptive by nature or testing hypotheses); and two design-oriented studies. Also, we were quite impressed by the spread width of the studies presented to us. However, the focus was clearly set on school education. The studies ranged from analytical approaches to teaching and learning to varied effects studies and from testing diagnostic tools to media reception. On top of that, there were analyses of curricula; predictive studies; studies on learning settings-cooperations; studies on learning dispositions and learning success dispositions; and, finally, studies on other specific interests. This list gives evidence to the wide range of cutting-edge research on technical teaching and learning, which, from the symposium’s perspective, seems highly fragmented; we can hardly speak of a clear focus or mainstream.

Both the symposium’s evaluation and the participants’ impressions made clear that everyone appreciated the atmosphere, the discussion culture, and the scientific output. This positive feedback was not least due to the venue, the lovely catering, and especially the hosts: The team of technical teaching and learning from Siegen University. We are therefore very much looking forward to the next JOTED-symposium on November 15-16, 2018, at the University of Duisburg-Essen where we will be hosted by our dear colleague Lang.

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