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Editorial: The lack of teaching staff and new teacher training entrants in the industrial-technical subjects at vocational colleges

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Editorial: The lack of teaching staff and new teacher training entrants in the industrial-technical subjects at vocational colleges

This special edition of the Journal of Technical Education entitled "The lack of teaching staff and new teacher training entrants in the industrial-technical subjects at vocational colleges" examines a topic that now runs like a golden thread through the debate on vocational education and research into teacher training in the field of occupational education. The issue of the lack of teaching staff at vocational colleges is consistently the focus of public discussion and papers published within the academic community. This debate on the lack of teaching staff at industrial vocational colleges is currently highly topical again in terms of educational policy, too! In actual fact there has been a more or less chronic lack of teachers at vocational colleges going back for several decades (cf. Bader 1992, for example). Apparently also as a result of the ongoing economic boom years, attractive degree programmes in the field of engineering and an increasing war for talent, the shortage of teaching staff at vocational colleges is now taking on a whole new dimension, particularly in the technical subjects. Currently the vocational training system is confronted with a striking scarcity of teaching staff, though there are variations among regions, specific domains and school types. This not only affects technical career areas such as electrical engineering, metal technology and IT, it now also applies to industrial career areas such as construction engineering as well as personal career-related subjects such as health. Without having systematically surveyed the situation to be able provide quantitative evidence, the longstanding shortage of graduates who have completed teacher training courses in industrial and technical subjects ultimately also seems to be reflected in the staffing of research assistant positions in vocational teacher training that is complained of in many places, especially in technology teacher training, as well as the staffing of professorships in the field of technology teacher training.

Generally speaking, prospects for graduates of industrial and technical teaching training programmes can be said to be excellent – in the past, present and medium term (cf. MKJS 2017, for example). So given these good prospects, why aren't there enough teaching staff to cover the vacancies at vocational colleges? Why are so few young people opting to train as teachers at vocational training colleges? Why is there a lack of up-and-coming scientists? There are many different reasons for the low number of students taking industrial/technical teacher training programmes and the low numbers of graduates of such programmes. Root cause analysis suggests factors such as a lack of familiarity with the idea of a teaching career at a vocational college among young people, competition with engineering degree programmes combined with limited numbers of technology-minded youngsters qualified for university admission, and also the rigorous demands of the degree programmes as well as critical requirements in terms of basic engineering subjects in particular (e. g. higher mathematics). This editorial will simply aim to provide an outline of these aspects; other reasons can be added and are to be found in recent publications (cf. Tenberg 2015; Riedl, Schindler & Moser 2016, for example) as well as in the various articles contained in this special edition.

The debate on the shortage of teaching staff at vocational colleges has become increasingly controversial in recent years, not least in view of fundamental structural changes in teacher training concepts such as the introduction of an entirely new degree programme model. The controversy surrounding the introduction of a so-called single-subject bachelor's teacher training programme, with implications such as: (1.) the risk of lowering teacher training standards, (2.) the

unresolved issue of adherence to the Quedlinburg Resolutions (KMK 2005) and the framework agreement on training and examinations for a teaching position at Secondary Level II (vocational subjects) or for vocational colleges (teaching position type 5) (KMK 2007), and (3.) conflicts within the current professionalisation debate in teacher training, clearly reflects the fact that discussion of the teaching staff shortage at vocational colleges within the academic community is not only being conducted in the narrow horizon of traditional teacher training in Germany. (cf. Schelten 2011; Lipsmeier 2014; Faßhauer 2014; Bals 2014; Tenberg, 2017, for example). However, there have been no concrete experiments or model projects to date which clearly move beyond these conventions. Nonetheless, it is possible to observe approaches that point in this direction.

In order to meet immediate and short-term needs for industrial/technical teaching staff at vocational colleges, educational authorities in the German federal states continue to initiate specific special programmes aimed at transfer and changeover entrants who already hold a bachelor's or master's degree in a science subject. These special programmes are generally run without substantial participation in the first teacher training phase, mostly involving a relatively high share of teaching on the part of entrants and are standardised to a limited extent in terms of their structure and content (cf. Monitor Lehrerbildung 2017, p. 8 f.). Here again the question arises as to whether the relevant state-specific special programmes are able to sufficiently ensure that the would-be teachers develop desirable teacher skill profiles (cf. KMK 2014) to be able to do justice to the (increasingly) demanding challenges posed by the teaching profession at vocational colleges.

On a positive note, there are signs that the dialogue on vocational teacher training is currently focusing on the shortage situation in a variety of ways – at federal and state level as well as at various institutions – and there are innovative approaches and potential solutions under discussion, including a cross-phase perspective (e. g. Monitor Lehrerbildung 2017, Stifterverband 2017, for example). In particular, the Federal Ministry of Education and Research (BMBF) initiative "Quality Offensive Teacher Training" and the resulting funding of research and development projects at a number of tertiary education sites is expected to bring about an improvement in the situation at those tertiary education sites involved in terms of degree programmes aimed at those seeking to train as teachers at vocational schools and hopefully beyond.

In terms of the set of problems outlined here, the authors of this special edition report on projects under the BMBF initiative "Quality Offensive Teacher Training" which are related to the issue under examination. The five articles deal with the shortage of teaching staff and new teacher training entrants in the industrial-technical subjects at vocational colleges in the context of the specific situations and background in the various states and universities. The articles cover a diverse range of aspects and outline areas in which activities are being pursued or deemed necessary in order to improve the quality of teacher training in the context of attracting and keeping suitable teaching staff in the industrial-technical field and beyond.

The articles have varied focus areas, including the following: Cooperation models between higher education institutions and universities, cross-phase approaches between state teacher training and university, ideas for attracting and keeping trainee teachers, the interest profiles of students, reasons for programme withdrawal, the general problem of recruiting students to study engineering subjects.

In the article entitled *"Vorbildung, Studienmotivation und Gründe eines Studienabbruchs von Studierenden im Lehramt an berufsbildenden Schulen"*, Matthias Wyrwal and Bernd Zinn report on an empirical study conducted among students and programme drop-outs on a course in technology teacher training. The results provide a systematic description of sociodemographic

features, previous education, study motivation and reasons for programme withdrawal on the part of teacher trainees in the subject areas of construction engineering, electrical engineering, mechanical engineering and IT. In their article *"Zwischen Ingenieurstudium und Lehramtsoption – Wann und warum entscheiden sich Studierende für den PLan C?",* Julia Gillen, Anna Wasserschleger, Katharina Wehking and Kristina Beinke report on the general problems of recruiting students to train as teachers at vocational colleges and examine the central issue of why students of engineering subjects change to teacher training for vocational college. The article entitled *"Interessensstrukturen von Studierendenden unterschiedlicher Fachrichtungen und damit verbundene Potentiale für die Gewinnung von Lehramtsstudierenden in technischen Domänen"* by Andreeas Leon, Stefan Behrendt and Reinhold Nickolaus follows up this line of enquiry: here an empirical study is undertaken to analyse the interest profiles of those studying vocational teacher training and technology teacher training. The results indicate that the interest profiles of students taking engineering programmes in particular are similar to those students taking technology teacher training courses.

The two articles by Alfred Riedl's Munich-based research group present two cooperation models which not only address the recruitment problem but also indicate potential ways in which teacher training might be optimised on a cross-phase and cross-institutional basis. In the article "*Studiengang Bachelor Ingenieurpädagogik – Kooperation der Hochschule Landshut mit der Technischen Universität München zur Nachwuchskräftesicherung"*, Silvia Dollinger and Alfred Riedl report on a cooperation model in the vocational subject areas of electrical engineering/IT and metals technology, and they discuss the central issues and challenges facing vocational teacher training in the context of this model, which enables those who hold a bachelor's degree in engineering teacher training to be able to move on directly to take a master's degree in vocational education. The article "*Masterstudiengang mit integriertem Vorbereitungsdienst in der Metall- und Elektrotechnik – Berufliche Lehrerbildung phasenübergreifend gestalten"* by Alfred Riedl, Katharina Kronsfoth, Reinhard Gentner, Janina Häusler and Maria Gruber presents a concept in which the first and second teacher training phase after completion of the bachelor's degree programme are structurally linked as part of the ongoing professionalisation process. Here the authors anticipate that this concept would also appeal to a new target group in the shortage subjects of metals technology, electrical engineering and IT.

Finally, I should like to thank all the authors who contributed to this special edition who by so doing are advancing the discussion of the future of vocational teacher training in the industrial-technical subject areas.

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