SIGRUN NICKEL
NICOLAS REUM

Dual Higher Education in Germany

DOI 10.25162/EJDHE-2025-0007

For decades, dual study programmes have been an important component of the education system in Germany, characterised by a high degree of dynamic development. This article provides a brief overview of key developments and structures in dual study programmes in Germany and analyses current developments between 2019 and 2025. It provides in-depth insights into the interlinking of theory and practice as a core element of dual study programmes from the perspective of programme coordinators.

Keywords: German Higher Education System, Dual Study Programmes, Dual Students, Theory-Practice Interlinking

1. Introduction

Since their inception in the 1970s, dual study programmes have been an integral part of the German educational landscape. Since then, this sector has been characterized by strong development dynamics. The number of dual study programmes, enrolled students, and cooperating companies continues to rise (Hofmann, König & Groten, 2025; Nickel & Thiele, 2024). In the beginning, this study model was limited to the federal state of Baden-Wuerttemberg and a specific type of educational institution: vocational academies. However, over the past 20 years, its importance has grown steadily throughout Germany. In addition, the German study model also arouses considerable international attention, as the combination of higher education and vocational qualifications is highly attractive worldwide, both for prospective students and employers. Yet, experience also shows that it is always a challenge for all those involved to ensure the quality of the core feature, the close integration of theory and practice. For around ten years, Higher Education Institutions (HEI) and industry partners as well as higher education policymakers and the German Accreditation Council have been working intensively on various improvements in this area. It should be noted that the legal framework for dual study programmes is characterised in some cases by considerable heterogeneity between the 16 German federal states. However, due to the brevity of this article, it is not possible to go into this in depth here.

Overall, the main goal of this article is to provide an overview of dual study programmes in Germany and their development between 2019 and 2025. The following topics are the focus of attention:

- Structures of dual study programmes in Germany
- Development of student numbers and study programmes
- Assessments of the interlinking of theory and practice from the perspective of programme coordinators

A central source of data is the study “Duales Studium: Umsetzungsmodelle und Entwicklungsbedarfe” [Dual Study Programmes: Implementation Models and Development Needs] (Nickel et al., 2022) published in 2022 by the Centre for Higher Education (CHE) and the f-bb Forschungsinstitut Betriebliche Bildung [Research Institute for Vocational Education and Training]. Commissioned by the Federal Ministry of Education and Research (BMBF), the study provides a comprehensive assessment of the current status of dual study programmes in Germany, including an analysis of the legal framework and recommendations for the further development of this study model. In order to provide an up-to-date picture, the results used are supplemented by more recent data, which were additionally evaluated by the team of authors. For example, a special evaluation of the higher education statistics of the Federal Statistical Office with data from 2024 (Destatis, 2025) is used for student numbers. It includes figures from both HEI and Vocational Academies, a special type of tertiary education institution in Germany (see Chapter 2). The figures for the range

of courses on offer were taken from the "Hochschulkompass", a database of the German Rectors' Conference (HRK, 2025). Data from the CHE university ranking, which were collected as part of a nationwide survey of those responsible for dual study programmes, are used as a source for empirically verified statements on the integration of theory and practice (Ulrich & Hüsch, 2025).

2. Structures of Dual Study Programmes in Germany

Today's dual study programmes in Germany can be traced back to an initiative by German industrial companies and chambers of industry and commerce in the federal state of Baden-Wuerttemberg. In order to secure the specific skilled labour requirements of companies, a link between vocational training and higher education was sought. Supported by the state's Ministry of Education and Cultural Affairs, a new type of tertiary education institution was established and trialled in 1974: the Vocational Academies. They provided theoretical training, which was combined with vocational training in companies. Vocational Academies still award state degrees in dual study programmes today but are not legally classified as HEI (Mordhorst & Reum, 2022). However, the development of dual study programmes in Germany only really took off when state Universities of Applied Sciences (UAS) discovered dual study programmes as an innovative higher education format. UAS in Germany – formerly known as "Fachhochschulen" – are similar to polytechnics or professional schools and emphasize practice-oriented teaching and applied research. In contrast, traditional Universities (including Technical Universities) focus primarily on basic research and theory-oriented education. UAS currently offer by far the largest number of dual study programmes, especially at Bachelor level. At traditional Universities, there are hardly any dual study programmes. A new development came up in 2009 when the Vocational Academies in Baden-Wuerttemberg were merged and transferred to a special HEI for dual studies called "Duale Hochschule Baden-Wuerttemberg" (DHBW, 2025), a state university of its own kind. In other federal states, too, Vocational Academies are still being converted into dual HEI. In 2025, only Hamburg, Hesse, Lower Saxony and Saarland still have Vocational Academies, with varying importance for dual study programmes.

This development has also significantly changed the concept of dual study programmes as such. Instead of the training-integrated variant, the practice-integrated variant is now dominating. In practice-integrated dual study programmes, students are enrolled at a HEI and complete longer practical phases in a cooperating company (see Chapter 3).

For quite some time, dual study programmes in Germany had developed relatively freely. What was missing were quality standards that could be used to

determine when a study programme was actually dual and when it was not. For this reason, the German Science and Humanities Council was commissioned to develop defining criteria, and they were published in 2013 (WR, 2013). This was followed by a reform of the accreditation system, which again led to a new model legal ordinance being agreed upon and implemented by the 16 federal states in 2017, which for the first time contained clear requirements for dual study programmes (KMK [Standing Conference of the Ministers of Education and Cultural Affairs], 2017). Since then, only forms of study that can be clearly assigned to one of the following three organisational types may be designated as dual study programmes (Nickel & Thiele, 2024):

- **Training-integrated dual study programme:** Vocational training is systematically integrated into the degree programme. There is a structural and institutional interlinking of the degree programme and vocational training (through contact between HEI/Vocational Academy and practice partners). Parts of the vocational training are credited as academic achievements.

- **Practice-integrated dual study programme:** Practical components are systematically integrated into the programme to a greater extent than in regular degree programmes with compulsory internships and are at least structurally and institutionally interlinked with the programme (through contact between HEI/Vocational Academy and practice partners). Practical components are credited as academic achievements.

- **Career-integrated dual study programme:** Full-time or part-time studying with a related professional activity and a structured frame of reference or interlinked content between work and study. The employer is informed about the start of the programme and regularly exchanges information about the programme content with the student.

3. Development of Student Numbers

The number of students in dual study programmes has been growing steadily for years. According to the latest available data from 2019, 2022 and 2024, there has been a further increase from a total of 121,731 to 143,578 (Table 1). Nevertheless, dual study programmes remain a marginal phenomenon in the German higher education system. This is not even changed by the fact that the proportion of dual students among all students rose moderately from 4.2 per cent in 2019 to 4.8 per cent in 2024. There have also been fluctuations in the number of first-year students in dual study programmes. Although this figure rose from 40,575 to 42,058 during the observation period, a more detailed look reveals a slight decline in between. While 5.6 per cent of all first-year students

were enrolled in a dual study programme in 2022, the proportion fell to 4.9 per cent in 2024. A similar trend can also be observed for graduates of dual study programmes: an increase from 24,390 in 2019 to 26,023 in 2022 was followed by a slight decline to 25,919 in 2024.

Dual students at higher education institutions and vocational academies	2019		2022		2024	
	%	Absolute	%	Absolute	%	Absolute
First-year students in dual study programmes	4.6 %	40,575	5.6 %	44,992	4.9 %	42,058
Students in dual study programmes	4.2 %	121,731	4.7 %	138,194	4.8 %	143,578
Graduates in dual study programmes	4.8 %	24,390	5.1 %	26,023	4.8 %	25,919

Tab. 1 *First-year students, students and graduates in dual studies from 2019 to 2024 (Destatis, 2025)*

As explained in Chapter 2, three different organisational forms of dual study programmes in Germany are specified in the accreditation guidelines. Quantitative analysis shows a continuation of the trend towards a dominance of practice-integrated dual study programmes, which has been ongoing for years. While 68.2 per cent of all dual students were still studying in practice-integrated programmes in 2019, this figure had risen to 80 per cent by 2024. At the same time, the proportion of training-integrated dual study programmes fell from 27.1 per cent to 17 per cent. The original model with a double academic and vocational degree (Chapter 2) therefore now only plays a minor role. Career-integrated dual study programmes, which are by far the least frequently chosen, are also continuing to lose relevance: while 4.7 per cent of all students chose this type of programme in 2019, only 3 per cent did so in 2024. Dual study programmes in Germany are therefore predominantly practice-integrated programmes in which mandatory practical phases are integrated into a basic bachelor's degree programme by means of theory-practice interlinking.

As mentioned above, UAS are by far the most active in this field. Here, too, slight increases can be seen. While 81.8 per cent of all dual students were enrolled at this type of HEI in 2019, the figure is slightly higher in 2024 at 89.3 per cent. In contrast, the importance of traditional Universities continues to decline from 8.7 per cent to 2.1 per cent over the same period. This sharp decline also has statistical reasons, as a large, formerly university-based private provider of dual study programmes was reassigned to UAS in the period from 2019 to 2022. Nevertheless, it can be said overall that traditional Universities hardly offer any dual study programmes. The importance of Vocational Academies, even though they are not formally affiliated with HEI (see Chapter 2), continues to decline in quantitative terms. While 9.5 per cent of dual students were still studying at Vocational Academies in 2019, the figure is slightly lower in 2024 at 8.7 per cent.

There are also quantitative differences between the types of institutions. In 2024, 60.3 per cent of dual students were enrolled at state-run institutions, and 39 per cent at privately run institutions. Church-run institutions hardly play any role when it comes to dual study programmes, accounting for 0.7 per cent only. In 2019, the share of private institutions was still 35.4 per cent.

4. Analysis of Dual Study Programmes

Collecting data on dual study programmes in Germany is methodologically challenging because, unlike student numbers, they are not included in official statistics. Therefore, online databases where HEI voluntarily provide information about their study programmes in order to inform prospective students have to be taken as a basis. Due to the voluntary character of such databases, it is not possible to collect complete data for all study programmes. In addition, the operators of the databases do not carry out any quality checks on the entries.

For the purposes of this article, the CHE has drawn on the "Hochschulkompass" published by the German Rectors' Conference (HRK, 2025). One advantage of this data source is that it does not only cover initial degree programmes, i.e. bachelor's programmes (e.g. Hofmann, König & Groten, 2025), but also dual master's programmes. Since the database does not allow access to historical data, the figures below refer to October 2025. Study programmes offered by Vocational Academies are not included.

At the time of the study, a total of 1,890 dual study programmes at German HEI were listed in the "Hochschulkompass" database run by the HRK. This corresponds to 8.5 per cent of all 22,306 degree programmes recorded in Germany. Calculations based on the "Hochschulkompass" from an earlier CHE study show an even lower proportion of dual study programmes for 2018, at 5.4 per cent (Mordhorst & Nickel, 2019). Currently, 81.9 per cent of dual study programmes lead to a bachelor's degree. Master's programmes account for only a small proportion of 17.5 per cent, while other degrees (diploma degrees that have largely been transferred to the Bologna system and state examinations) are hardly available anymore, accounting for 0.6 per cent.

As Figure 1 shows, dual study programmes are distributed very unevenly across individual subject groups. Most dual study programmes are found in the Engineering Sciences subject group, which accounts for 33.4 per cent. This is followed at some distance by Economics and Law with 22.9 per cent, although a closer look reveals a particularly large number of programmes in Economics. Mathematics and Natural Sciences come in third place with a share of 17.6 per cent of all dual study programmes, followed by Medicine and Health Sciences in fourth place with 8.6 per cent. Social Sciences rank fifth with 7.9 per cent of dual study programmes. The remaining subject groups account for only small shares. Of particular note here are dual study programmes in the subject group of Public Administration with 4.7 per cent and dual Teacher Training programmes with 1.6 per cent. The latter are a recent development in Germany and some German federal states, and they are intended to be a countermeasure against the current shortage of teachers which is an acute problem in the German education system (Brinkmann et al., 2025).

In addition to acquiring skills from a practice partner, a key difference between students in dual and those in traditional degree programmes in Germany is that students in dual degree programmes are usually in a contractual relationship with a cooperating company, e.g. in the form of a study contract, employment contract or training contract. In this context, they also receive an income or training allowance in most cases. However, the amount of the salary is not fixed and may vary considerably between disciplines. Table 2 shows the results of a

survey of dual students conducted as part of a study by the CHE on behalf of the Federal Ministry of Education and Research (Nickel et al., 2022).

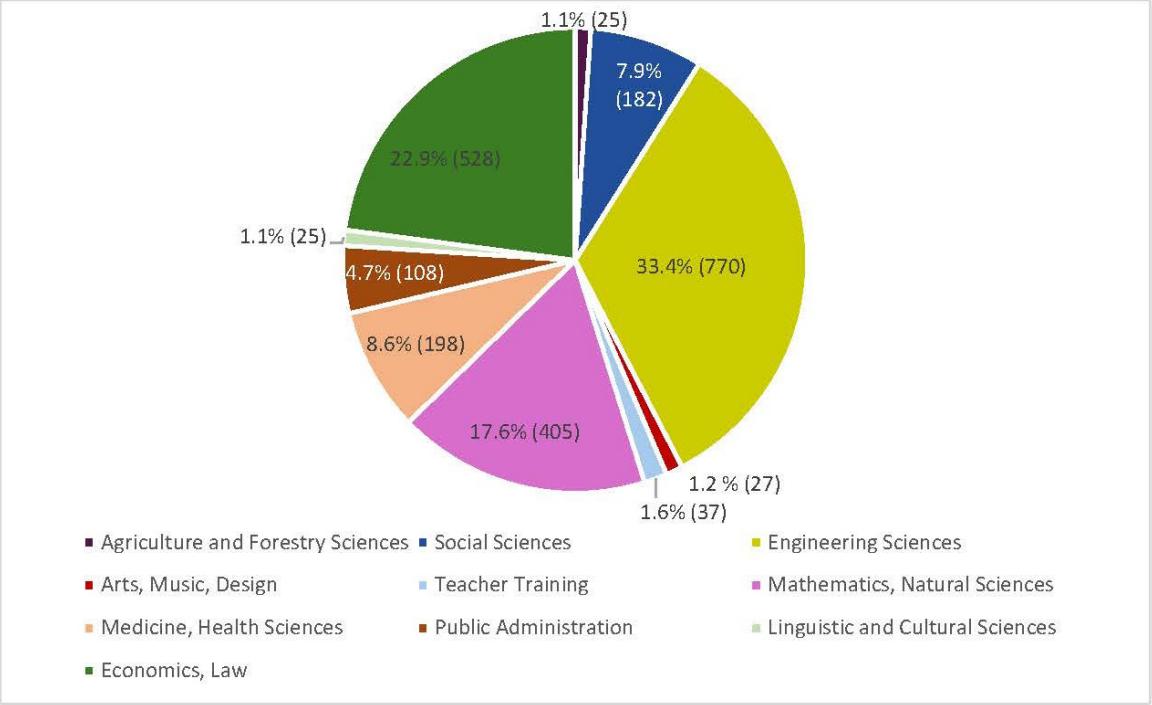

Fig. 1 *Dual study programmes in 2025 by subject group (HRK Hochschulrektorenkonferenz, 2025)*

While in the fields of Civil Engineering, Mechanical Engineering, Mechatronics, Systems Engineering, Industrial Engineering, and Economics, most of the students surveyed earn between 600 and 900 euros per month, in the fields of Electrical Engineering, Health and Nursing Sciences, Computer Science, and other Engineering Sciences, the average monthly income is between 900 and 1,200 euros. However, Social Sciences are at the top of the list. Here, 74.4 per cent of the dual students surveyed earn more than 1,200 euros net per month. This striking figure can be explained by the fact that the sample consisted predominantly of students from a particular state administrative college that offers particularly high remuneration. On the negative side, however, the field of Health and Nursing Sciences stands out, with a strikingly high proportion of the dual students surveyed (10.4%) receiving no income at all.

All in all, it is clear that adequate remuneration in dual study programmes is by no means guaranteed for all students. Although remuneration is a major advantage of dual study programmes and an attractive factor for prospective students, greater harmonisation between fields of study is therefore one of the key areas for improvement in dual study programmes (Nickel et al., 2022).

Study field	Monthly net income from dual studies					
	no income	< € 300	€ 300 to 600	€ 600 to 900	€ 900 to 1,200	> € 1,200
Civil Engineering (n = 74)	0 % (0)	0 % (0)	5.4 % (4)	47.3 % (35)	44.6 % (33)	2.7 % (2)
Electrical Engineering (n = 121)	0 % (0)	0 % (0)	1.7 % (2)	45.5 % (55)	48.8 % (59)	4.1 % (5)
Social Sciences (n = 457)	0.2 % (1)	0 % (0)	0 % (0)	2.0 % (9)	23.4 % (107)	74.4 % (340)
Nursing Sciences (n = 230)	10.4 % (24)	0.9 % (2)	3.0 % (7)	30.9 % (71)	44.3 % (102)	10.4 % (24)
Computer Science (n = 791)	0.9 % (7)	0.1 % (1)	2.8 % (22)	41.7 % (330)	45.5 % (360)	9.0 % (71)
Mechanical Engineering (n = 183)	0 % (0)	0 % (0)	3.8 % (7)	46.4 % (85)	43.7 % (80)	6.0 % (11)
Mechatronics, Systems Engineering (n = 104)	0 % (0)	0 % (0)	1.0 % (1)	46.2 % (48)	43.3 % (45)	9.6 % (10)
Other Engineering Sciences (n = 61)	0 % (0)	0 % (0)	1.6 % (1)	47.5 % (29)	49.2 % (30)	1.6 % (1)
Industrial Engineering (n = 275)	0,4 % (1)	0 % (0)	2.2 % (6)	53.5 % (147)	39.3 % (108)	4.7 % (13)
Economics (n = 1,165)	0.3 % (3)	0.1 % (1)	3.5 % (41)	44.7 % (521)	41.5 % (484)	9.9 % (115)

Tab. 2 *Proportion of students in the respective fields of study with corresponding monthly net income from dual studies (Nickel et al., 2022)*

5. Theory and Practice Interlinking as a Challenge

For dual study programmes, the successful interaction between the participating learning locations (HEI/Vocational Academies and practice partners) is of central importance. This applies to all dual training formats (Dauer et al., 2021) and is fundamental to the close interlinking of theory and practice as the core feature of this type of study programme. The study by Nickel et al. (2022) has identified a number of areas for improvement in this regard. For example, continuous and direct exchange of content between the participating institutions is necessary for the design of practical phases in order to build trust and understand each other's perspectives and needs. To this end, joint committees should be created and utilised, involving as wide a range of practice partners as possible. Measures to ensure the quality of the practical phases are also important, such as agreements on the recognition of practical activities in the cooperating companies as academic achievements or the review of recognition criteria by HEI.

In order to empirically examine the interlinking of theory and practice in dual study programmes, the CHE has developed an indicator model that can be used to determine and compare their extent on the basis of three criteria (Ulrich & Hüsch, 2025): 1. the interlinking of study content, 2. practice-oriented teaching and support by practice partners, and 3. institutional interlinking and quality assurance. Clear, verifiable indicators can be used to award points for each criterion, which are then combined to produce an overall assessment. Table 3 provides a detailed overview.

Based on a nationwide survey of those responsible for dual study programmes as part of the CHE university ranking (Chapter 4), the indicator model shows very different results depending on the field of study considered in terms of the extent of theory-practice interlinking (Figure 2). It becomes clear that dual study programmes do not belong to the bottom group in any of the fields of study. However, the proportion of degree programmes in the top group or middle group varies greatly. With 77 per cent, dual Computer Science degree programmes account for the largest share in the top group. This is followed by Mechatronics (73 per cent), Industrial Engineering (67 per cent) and Business Administration (61 per cent). Bringing up the rear are Electrical Engineering and Information Technology with 47 per cent of the degree programmes, Mechanical Engineering/Materials Engineering with 45 per cent and, some way behind, Civil and Environmental Engineering with only 25 per cent. It is clear that, although there is a minimum level of interlinking between theory and practice, there is still room for improvement in this key area, depending on the field of study.

Criteria	Points
(1) Interlinking of study content (max. 4 points)	
Number of credits gained with external institutions / with the practice partner ≥ 60 ECTS ≥ 30 ECTS ≥ 10 ECTS The timing of theory and practice phases must be agreed. Study outcomes are controlled in coordination with the practice partner. It must be specified which contents should be carried out with the practice partner.	3 (2) (1) 1 (1) (1)
(2) Practice-oriented teaching / support by the practice partner (max. 3 points)	
The practice partner provides contact persons: a contact person for specialist matters a contact person for organisational matters	2 1
(3) Institutional interlinking / quality assurance (max. 3 points)	
Share of practice partners in higher education bodies ≥ 25% ≥ 10% or: practice partners have a right to vote, or: practice partners have a counselling function, or: practice partners are involved in at least one higher education body (at the level of the higher education institution, of the department, or of the course of studies). Practice partners are involved in explicit quality assurance bodies.	2 (1) (1) (1) (1) 1
Overall assessment A maximum of 10 points can be achieved. Assignment to groups ≥ 8 points top group ≥ 4 points middle group less than 4 points bottom group	

Tab. 3 *Evaluation of the interlinking of theory and practice using an indicator model (Ulrich & Hüsch, 2025)*

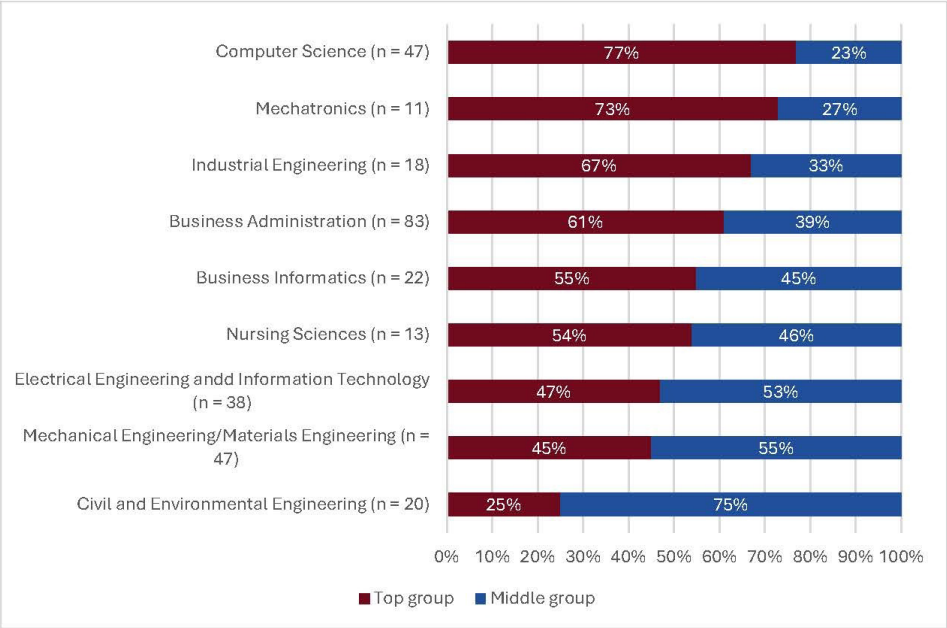

Fig. 2 *Extent of the interlinking of theory and practice in dual study programmes in the respective fields of study (Ulrich & Hüsch, 2025)*

6. Conclusion

Over the past 20 years, dual study programmes have become a small but highly sought-after component of the range of study programmes offered in Germany. State-run UAS dominate this sector, although private HEI are also becoming increasingly active. All in all, there has been a steady increase in the number of dual students, the range of study programmes offered, and the number of cooperating companies. Nevertheless, traditional degree programmes are not being superseded. Instead, this is a rather specialised form of study for a limited range of disciplines, with Engineering and Economics at the forefront. The original idea of enabling students to obtain a dual degree and vocational qualification through dual study programmes is steadily losing importance. Most dual students now study in a practice-integrated manner, i.e. in addition to their studies, they complete longer practical phases in the cooperating company without obtaining an additional vocational qualification alongside their degree. Nevertheless, the close interlinking of theory and practice continues to form the core feature of dual study programmes. Specific national criteria have been established for their quality assurance, which also form the basis for the accreditation of dual study programmes by the German Accreditation Council. Yet, there is still room for improvement in this important area. Corresponding proposals, including those from the CHE, are on the table but have not yet been implemented across the board.

References

[1] **Brinkmann, B., Jorzik, B., Müller, U., Münchner, A., Schibelius, U. (2025):** Neue Wege in der Lehrkräftebildung: Bedarf und Qualität nachhaltig sichern. Policy Brief June 2025. https://www.che.de/download/neue-wege-in-der-lehrkraeftebildung-bedarf-und-qualitaet-nachhaltig-sichern-policy-brief-juni-2025/

[2] **Dauser, D., Fischer, A., Lorenz, S., Schley, T. (2021):** Digital und regional vernetzt – Ansätze zur Optimierung der Lernortkooperationen in der beruflichen Bildung. Ein Leitfaden zum Online-Selbstcheck. f-bb-online 02/2021. https://www.f-bb.de/unsere-arbeit/publikationen/digital-und-regional-vernetzt-ansaetze-zur-optimierung-der-lernortkooperationen-in-der-beruflichen/

[3] **Destatis Statistisches Bundesamt (2025):** Hochschulstatistik. https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bildung-Forschung-Kultur/Hochschulen/Methoden/Erlaeuterungen/hochschulen.html

[4] **DHBW Duale Hochschule Baden-Württemberg (2025):** Die Duale Hochschule Baden-Württemberg. https://www.dhbw.de/die-dhbw/wir-ueber-uns

[5] **HRK Hochschulrektorenkonferenz (2025):** Hochschulkompass. https://www.hochschulkompass.de/home.html

[6] **Hofmann, S., König, M., Groten, N. (2025):** AusbildungPlus. Duales Studium in Zahlen 2024. Analysen und Trends. Bonn. urn:nbn:de:0035-1203-2

[7] **KMK Kultusministerkonferenz (2017):** Musterrechtsverordnung. https://www.akkreditierungsrat.de/sites/default/files/downloads/2019/Musterrechtsverordnung.pdf

[8] **Mordhorst, L., Nickel, S. (2019):** Grenzenloses Wachstum? Entwicklung des dualen Studiums in den Bundesländern. https://www.che.de/download/grenzenloses-wachstum-entwicklung-des-dualen-studiums-in-den-bundeslaendern/

[9] **Mordhorst, L., Reum, N. (2022):** Berufsakademien in Deutschland. https://www.che.de/download/berufsakademien/

[10] **Nickel, S., Pfeiffer, I., Fischer, A., Hüsch, M., Kiepenheuer-Drechsler, B., Lauterbach, N., Reum, N., Thiele, A., Ulrich, S. (2022):** Duales Studium: Umsetzungsmodelle und Entwicklungsbedarfe, wbv Verlag. https://www.che.de/download/studie-duales-studium-umsetzungsmodelle-und-entwicklungsbedarfe/

[11] **Nickel, S., Thiele, A. (2024):** Duales Studium in Deutschland (Daten-Analyse 2024). https://www.che.de/download/check-duales-studium/

[12] **Ulrich, S., Hüsch, M. (2025):** Betreuung von Studierenden im dualen Studium. Betrachtung anhand von Daten aus dem CHE-Ranking 2023–2025. Lecture held at the annual conference of the Gesellschaft für Hochschulforschung [Higher Education Research Society] 2025 in Heilbronn. Unpublished document.

[13] **WR Wissenschaftsrat (2013):** Empfehlungen zur Entwicklung des dualen Studiums. Position paper. https://www.wissenschaftsrat.de/download/archiv/3479-13.pdf

Authors

Dr. **Sigrun Nickel** works as a head for higher education research at the CHE Centre for Higher Education (CHE), Gütersloh, Germany. One of her main fields of expertise is the connection between higher education and vocational training. She conducted a lot of projects in a leading position, e.g. a scientific study about the current situation of dual study programmes in Germany on behalf of the Federal Ministry of Education and Research. She holds a Master of German Studies, Sociology and Pedagogy from the University of Münster/Germany and a doctorate in Social Sciences from the University of Klagenfurt/Austria.
| Photo: Sirko Junge

Dr. **Nicolas Reum** works as a senior project manager in higher education research at the CHE Centre for Higher Education, Gütersloh, Germany. After studying Economic Geography in Hanover, he was a research fellow at the Department of Economic and Social Geography at the Cologne University. Since 2019, he has participated in various research projects in Continuing Higher Education, Knowledge Transfer and Dual Study Programs funded by the German Federal Ministry of Education and Research. | Photo: Sirko Junge