

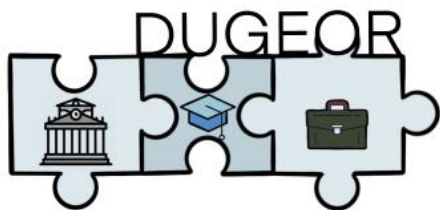
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REPORT

**Report on depth analysis of good practices and experiences in
respect to DHE in EU Member States and third countries
associated to the Programme**

**Prepared by Vano Tsertsvadze
GIPA**

2023 July



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Strengthening capacities for the implementation of dual education in Georgian higher education

DUGEOR

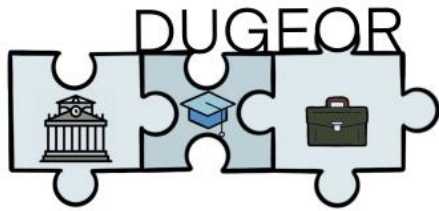
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Abstract

This report on the state-of-the-art in dual higher education includes results from information provided on 20 dual study programmes in higher education from programme countries in different industrial sectors. 5 study programmes have been analyzed in each of the four programme countries (Austria, Germany, Spain, Serbia).

The report also elaborates the concept of “Dual Higher Education (DHE)” and the overall framework for dual education at the respective universities and beyond. The report concludes with a short summary and conclusions regarding options for DHE programmes in the partner country Georgia

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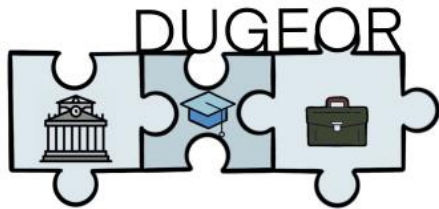
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DISCLAIMER

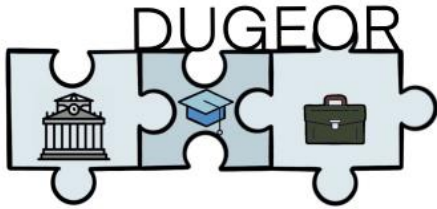
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Introduction

This report describes dual higher education (DHE) programs at universities in different European countries. The report was prepared within the framework of the DUGEOR project.

The main goal of the project is to improve the competence of graduates of higher education and their employment in Georgia, taking into account the best practices of EU countries.

This report includes the results of an analysis of 20 dual higher education programs implemented by different universities in 4 countries (Austria, Germany, Spain, Serbia) in different industrial sectors.

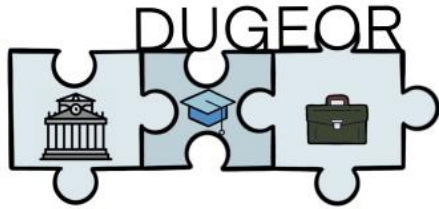
The report analyzes the following training programs:

Austria

- PTO – Production Technology and Organization FH JOANNEUM, Graz
- ENP – Engineering and Production Management FH JOANNEUM, Graz
- Mobile Software Development - FH JOANNEUM, Graz
- HSD – Hardware-Software Design - FH OBERÖSTERREICH
- Electrical Engineering Dual - FH VORARLBERG

Germany

- Business Administration - Baden Wuerttemberg Cooperative State University Heilbronn (DHBW Heilbronn)
- Management & Business Psychology - FOM Hochschule für Oekonomie und Management
- Cooperative Study Model – Degree Programme Engineering Heilbronn University of Applied Science
- Advanced Midwifery Science - Baden Wuerttemberg Cooperative State University, Stuttgart
- Mechatronics - Technische Hochschule Ingolstadt



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Spain

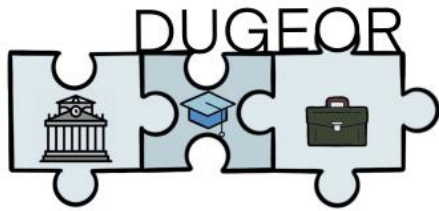
- Degree in Automotive Engineering - University of the Basque Country
- Master in Digital Manufacturing - Dual Engineering University School
- Degree Primary Education - University of Lleida
- Master Degree in Informatics Engineering - University of Lleida
- Degree in Process and Product Innovation – Engineering - Dual Engineering University School

Serbia

- Energy efficiency and clean energy - (AATSB)
- Fashion design of leather products - (AATSB)
- Graphic engineering - (AATSB)
- Interior design - (AATSB)
- Mechanical engineering - (AATSB)

The report also implies the concept of DHE and general approaches to dual education in education policy.

The report ends with a brief summary and conclusions that may be useful in the next stage of developing a dual higher education model in Georgia.



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Dual education in the educational system of European higher education institutions and historic foundations of Dual education in Georgia

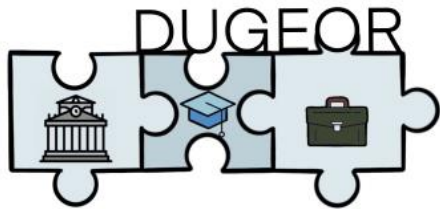
The higher education system around the world has been changing dramatically in recent decades as a result of the impact of information technology. Rapid dissemination of information ensures social, technological or cultural access to knowledge.

In the previous century, the greatest importance was attached to the theoretical knowledge obtained in libraries and university spaces. Today, an in-depth knowledge of fundamental works has been replaced by the information shared on the Internet, which, unlike the bachelors and masters from the previous century, nowadays is available to almost all interested people, regardless of their basic knowledge and age characteristics.

As a result of this circumstance, today in Georgia, as well as around the world, the demand for fundamental knowledge is somewhat reduced and emphasis is placed on the skills and universality of applying knowledge in practice. Of course, the acquisition of theoretical knowledge and the application of knowledge in practice has its own place in the university education system. However, the difference between the previous and current study models are based on the fact that the theoretical knowledge can be obtained relatively easily, while professional habits and constantly changing requirements related to work as well as developing adequate skills are much more valuable.

Thus, the modern and growing trend of obtaining knowledge in the coming decades will be the model of education where the student will be provided with basic theoretical knowledge and the professional skills that the modern labor market presents to the employee.

Historically, academic degrees have been directly linked to the initiation of a student (apprentice) into a higher-level craftsman. A bachelor, from the French *bachelier* (eleventh century), meant a young man, an assistant to a master or craftsman (Wedgwood 1859), while a master or craftsman, also from the old French word *maitre*, was used to denote a



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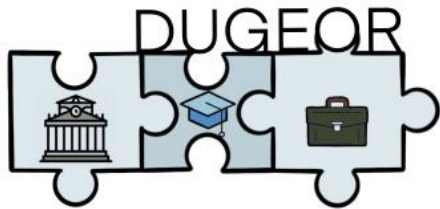
person eminently and thoroughly skilled in some field (Harper 2023). The hierarchy of professional ranks in Georgia consisted of three-levels: master, prentice and apprentice. The master, as a teacher, would teach his craft experience to the apprentice, who after some time would start working as prentice, i.e. partially independent work, whereas after apprenticeship, he would be approved by the master and receive a set of workshop tools from him, and after that he would be considered as a fully-fledged master. The oldest data on the master-apprentice relationship dates back to the 6th century. According to Iv. Javakhishvili, ancient Georgian manuscript - "Martviloba of Eustathius Mtskheteli" (VI century) denotes a crafts union in Georgia as "workman's elder", "craftsmen's boss" and "superior", which were responsible for various actions towards "doers", i.e. "workers" (არჩვაძე, ბოკუჩავა და გულაძე 2011). Since the 19th century, a union of artisans named "Amkari" took hold, although it preserved the centuries-old tradition of passing knowledge from the master to the apprentice.

According to the researchers, the abundance of Georgian sources and data related to the Amkari unions, constitutes an important document which proves that the Amkari originated in Georgia and reached their powerful development in the 10th-11th centuries (გუგუშვილი 1975), (მესხია 1983).

Unfortunately, in the twentieth century, the ugly forms of economic and labor relations in Soviet Georgia weakened these traditions and they were forgotten, which did not happen in the civilized world, where the academic and professional education were developed side by side.

Ways of learning with relation to the world of work

Based on the literature analysis, in which the integration of work-based learning methods in the higher education model of different countries is investigated, the following approaches can be outlined:



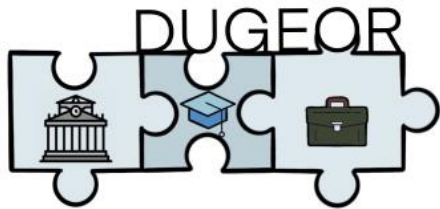
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Work-Related Learning (WRL): It is a method in which learning takes place in close connection with the work environment through formal trainings (after work) or informal methods (on-the-job environment). According to study (Ferreira, Künn-Nelen and De Grip 2016), which analyzed the extent to which work-related learning is related to the development of employees' skills in 28 European countries, it was found that WRL uses two approaches: formal training and informal learning.

Various empirical studies have confirmed that individuals who participate in formal training or are involved in informal learning show higher skill improvement. It is also interesting that the relationship between informal learning and the development of work skills is stronger compared to participation in formal training. Nevertheless, these two forms of work-related learning are complementary. This complementarity further contributes to skill development, as observation shows that staff who participate in both training and informal learning show significant incremental improvements in their skills (Cunha and Heckman 2007).

Work-Based Learning (WBL): An educational strategy that provides students with a real-world work environment where they can apply academic and technical skills and improve their employability (cte.ed.gov 2020). Work-based learning refers to all forms of learning that takes place in a real work environment. It provides individuals with the skills needed to successfully obtain and keep jobs and progress in their professional development. Apprenticeships, internships/traineeships and on-the-job training are the most common types of work-based learning. These types usually – but not always – combine elements of learning in the workplace with classroom-based learning (Inter-agency Group on Technical and Vocational Education and Training 2017).

Work-based learning refers to learning that occurs when people do real work. This work can be paid or unpaid, but it is the real work that leads to the production of real goods and services. Some enterprises, particularly large ones, have their own training classrooms or workshops, and employees take time away from work to attend training sessions in them (ETF 2014).

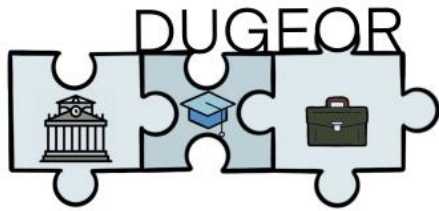


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Work-Integrated Learning (WIL): Training programs in this model connect university students with a workplace that is relevant to their field of study. This kind of professional HE (PHE) aims to combine a relevant field of academic study with work practice through a specific programme.

Work-integrated learning gives students the opportunity to apply knowledge gained from academic studies to relevant work and transform work experience into knowledge (Cooper, Orrell and Bowden 2010). Although work-integrated learning shares the same approaches as work-based learning (WBL), it differs in that WIL is part of the curriculum and guided by learning objectives, whereas WBL focuses on the workplace and is not linked to academic research and teaching (Cooper, Orrell and Bowden 2010). The WIL approach includes apprenticeships, field experiences, mandatory professional practice, cooperative education, internships, participation in applied research projects, and service oriented learning (Turcotte, Nichols and Philipps 2016). Work-integrated learning can have many names depending on the context. For example, WIL programs in healthcare are known as clinical placements, while in other fields they may be referred to as practicums, industry projects or simulations (if carried out at a university or in virtual reality) (Atkinson 2021). The WIL system is effective in that it not only improves the student's career, academic and other personal skills, but also has additional benefits for employers and academic institutions (Zegwaard 2014). The system is an effective tool for graduate employment. Students who participate in WIL are more employable and better able to navigate the job search and transition of university knowledge into full-time employment (Jackson 2015).

In many countries, educational policy makers realize that for the effective functioning of the labor market, its intellectualization and the increase of innovative capabilities, it is necessary to strengthen the alliance of knowledge between academic organizations, industrial enterprises and other professional associations that define professional standards. The rapidly changing business and technological environment forces education providers to regularly update engineering curricula (Mahler, 2019). Work-based, work-related or work-integrated learning at the higher education level is emerging as a

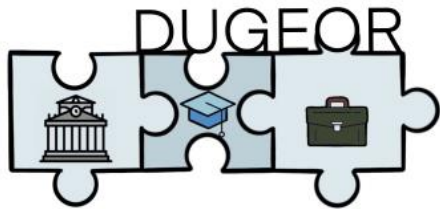


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profitable model of cooperation between higher education institutions and industry. Higher education institutions have the opportunity to take advantage of the current challenges and create flexible curricula based on a theoretical and practical model of teaching, which are focused on meeting the demands of the labor market by developing relevant skills for students (Davey and Orazbayeva 2017). Such an approach is very effective in higher education programs in engineering and applied sciences, although it can be equally useful in other areas such as business and management, law and education. On the other hand, companies and entrepreneurs involved in the higher education process benefit from the involvement of students in their work tasks. Work-based learning helps companies overcome the shortage of skilled workers, improve the quality of the workforce, simplify the recruitment process and save costs. By partnering with higher education institutions, companies can influence the curriculum by adding the knowledge and skills they want.

Work integrated approach in Georgia

Following the work-based learning approaches we have outlined above, there are several forms of incorporating work experience into higher education curricula, including internships, apprenticeships, practicum courses, etc. However, ensuring the highest level of incorporation of real-world work experience into education is achieved through dual-model training programs. There are two models of dual education - model of professional education and model of professional higher education. The first one is already implemented in Georgia, and the latter is a hybrid form of higher education, which offers the participant the opportunity to complete a bachelor's/master's program at a higher educational institution and simultaneously receive a certificate of practical professional training or work experience in a company.



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Dual education is fundamentally different from the "part-time" study or work model, where the type of work and the study program may differ from each other. A crucial feature of dual education is that professional internships are an integral part of training programs (Zrnic & Miskovic 2017) (Davey & Orazbayeva 2017) (Nickel, Higher & Area 2021). Studying on a dual program means that students enroll and sign a contract, which allows them to study in two different places - the university and the company. Dual education considers the company as a student's learning environment together with the university. In this way, three parties are integrated into the system of dual higher education: student-higher institution-company.

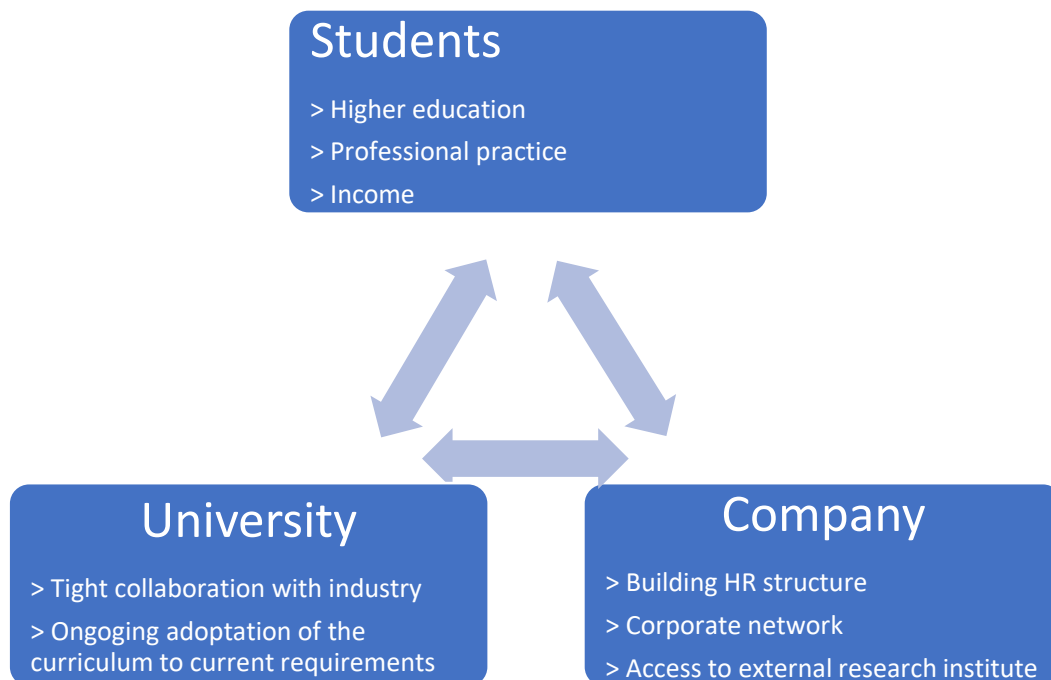
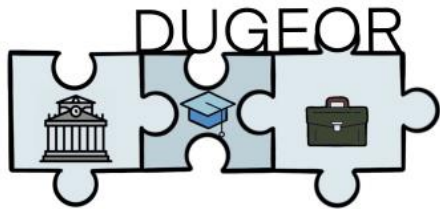


Figure 1. Characterization of Study programmes in Austria EQF 6-7. Graz: FH Joanneum. Source: (Hochrinner 2020)

This relationship, in its turn, is consistent with the requirements of both higher education and labor legislation. In addition to the flexible response to market demands, the Dual education model also has a social impact, within which students with low socio-economic opportunities receive significant benefits as a result of conducting study and paid work



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together, which allows them to at least partially solve the problem of financing of the tuition fees. However, in some countries, companies do not recognize students' work contribution for payment.

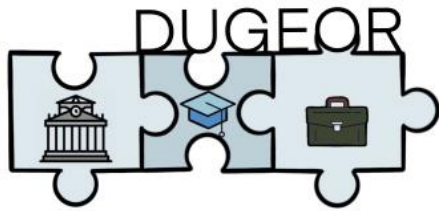
Currently, Dual higher education (DHE) training programs are an important educational direction in German-speaking countries (Graf 2013). For most other European countries, Dual education is mainly implemented at the secondary, but not at the higher education level (Zrnic & Miskovic 2017). However, the need for dual education at the higher level led to the development of relevant legal regulations and the development of Dual study programs at the university level in a number of European countries. Accordingly, this situation puts the issue of quality assurance of Dual training programs on the agenda, depending on their specificity.

The concept of Dual education is not new. It started at the beginning of the 20th century at the University of Cincinnati, USA, which introduced a dual program for mechanical engineering students in a machine tool factory, and later spread to English-speaking countries. The first and most famous Dual education system in Europe was developed in Germany when they established the Cooperative State University of Baden-Württemberg (German: Duale Hochschule Baden-Württemberg, DHBW) in 1974, which is the successor of the Vocational Academy (Berufsakademie) of the Federal State of Baden-Württemberg (Zrnic & Miskovic 2017).

Comparative characterization of dual vocational and Dual higher education models

Dual vocational and dual higher education models differ mainly in their focus, level of specialization and outcomes. The table shows the characteristics of these two models.

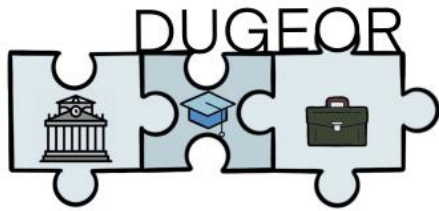
	Dual vocational education:	Dual higher education:
Focus	Focuses on providing students with specific skills and practical knowledge necessary for a particular profession. This model emphasizes hands-on training and prepares students for	Aims to provide a broader and more comprehensive education including various disciplines, related to the core subject. Emphasis is placed on the practical application of theoretical



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	immediate transition into the workforce.	knowledge, critical thinking, management and research skills. Students are qualified for immediate start in respective job positions.
Level of specialization:	Dual vocational programs are highly specialized and train students in specific occupations such as auto mechanics, culinary arts, electrical work, nursing, information technology, etc.	In Dual higher education programs, the disciplines and fields of study offer a holistic approach to a relevant professional field. Learning takes place in parallel mode: theoretical learning is complemented by practice learning. Students receive systematic knowledge of the chosen study course but also learn and apply transversal skills, e.g. project management or quality assurance.
duration and outcomes:	Vocational education programs can vary in length, but are generally shorter than traditional higher education programs. They usually range from a few months to a few years, depending on the specialty. Vocational education programs are designed to provide students with the skills and knowledge needed to directly enter specific occupations. Their aim is to meet the immediate needs of the job market and as a result, graduates are quickly employed.	Dual Bachelor's programs are three to four years long, where almost equal time is allocated to studying theoretical subjects and developing practical skills. Graduates often go on straight to professional careers. Some study at a higher academic level in their field. A graduate of the Dual higher education program quickly adapts to the labor market and is highly employable. Students have the in-depth knowledge of a study subject as well as relevant skills to combine it with experiences from practice. Together with the transversal skills trained and adopted in academic and work environments graduates are enabled to manage real life challenges in their jobs.

It is important to note that these differences are not absolute and there may be some overlap between vocational and higher education. In some cases, the vocational education model may offer students to complete their knowledge and profession through higher education, and on the contrary, some higher education institutions may include professional or practical components. The specific structure and characteristics of Dual higher education models may vary between countries and educational institutions.



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Dual Higher Education in Europe

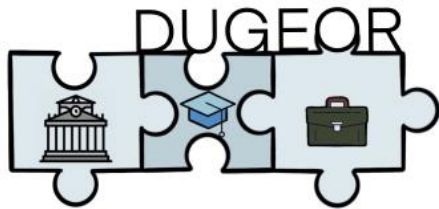
Dual higher education combines students' academic learning with work experience in enterprises/industry and can be used to achieve different goals such as (ETF 2014):

- Development of professional skills that contribute to obtaining a recognized professional qualification;
- Development of work habits and job-readiness;
- Student's understanding of job requirements and making the right choice when planning their own career;
- Giving the students of low social status access to opportunities to work that they might not have otherwise.

In the process of creating the concept of Dual higher education, the main key issue for policy makers is to develop a program and goals that ensure that the best interests of the parties involved in the implementation of the program are met. The Dual higher education model combines the efforts of three main stakeholders - a three-way partnership between the student, the higher education institution and the company.

The terms of cooperation are usually established by specific agreements between the company and higher education institutions, which define:

- Number of students accepted by the company. In different countries, taking into account the economic situation, the labor market and other circumstances, this number is different. For example, in Austria, one company receives 1-5 students, while the accumulated number of students employed by a German company for different Dual Study Courses varies between 1 and about 60.
- Remuneration conditions (will students work for free or receive a salary),
- Number of hours spent in the company per semester (as a rule, 50% of time spent with academic learning and 50% with workplace learning), The practical learning is, like the theoretical, in a certain way recognised with ECTS.



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- Other rights and duties of the student, the company and the higher education institution. E.g. insurance for students, intellectual ownership, research options, curriculum development, lecturing by company representatives, holidays, ...,
- The work of the students in the company requires a supervisor, a mentor, who will guide the students in the company, give the necessary instructions for completing the tasks, and finally evaluate the activity performed by the student after the practical learning phase. Usually, the mentor is selected from the company's internal resources.
- After completing the studies, the company is not obliged to employ the student, however often prefers this option, as it is more difficult to get new external staff on board.

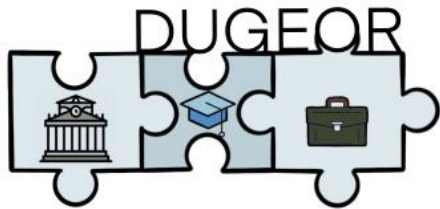
Analysis of Dual Higher Education programs in European countries - summary

As can be seen from the examples of DHE programs implemented in European countries, the goals of Dual higher education models are similar, although there are slight differences in structure and approaches, which in principle depend on the institutional and regulatory framework of the given country. For example, DHE programs in Austria are strictly regulated at the national level and therefore follow a uniform approach to program design and implementation, whereas in Germany the trend is much more flexible.

In all the countries we have studied, Dual higher education programs are accredited by National accreditation agencies and are usually in line with the Bologna criteria, take into account the European Qualifications Framework (EQF) scheme, the requirements of bachelor's and master's levels and include the right to access the next educational level.

In all cases discussed, students receive remuneration for working in enterprises and in almost all cases, work is based on specific employment contracts.

In terms of partnerships with companies, there are significant differences in the size of the companies and the process of selecting students:



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In Austria, as a rule, the student chooses the company for further practical work (although the company's initiative to select students is not excluded), while in Germany, the company itself is the initiator of the selection and recruitment of students of the Dual higher education program and the work practice.

As for teaching, it is a mixture of theory and practice. Studies usually begin with a theoretical semester followed by practical semesters in an alternating pattern. Depending on the subject, at the beginning of the study, the share of theoretical hours can be bigger compared to practical hours. In such cases, the volume of practice increases in the subsequent semesters, and finally the ratio between theoretical and practical hours in undergraduate programs is on average 60:40, in master's programs 50:50.

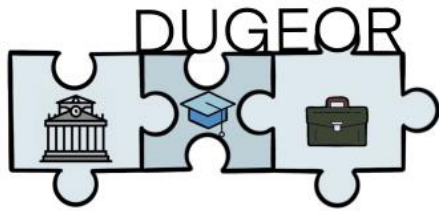
Students are evaluated by the staff of the higher education institution, complemented by the report of the company representative (mentor). A student's internship report is usually supervised by a company representative, and in many cases as also by a university professor.

Among the 15 programs analyzed, the majority are technical DHE programs, although there are also DHE programs in management, business administration, education, and the health sector.

Austria

In Austria, universities of applied sciences play a leading role in the implementation of dual higher education programs, although other classical universities are also authorized to develop and implement dual education programs.

DHE programs in Austria are standardized within the educational framework. Most of the dual higher education programs are implemented in technical education programs and are in full compliance with the Bologna regulations - the duration of the bachelor's studies is 6 semesters and includes 180 ECTS, while the master's programs last 4 semesters and include



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120 credits. Graduates of dual higher education, like graduates of classical universities, have the right to continue their studies at master's or doctoral level (EuroEducation.net 2014).

Accreditation of the dual higher education program is regulated by law and carried out by the Austrian National Agency for Education Accreditation.

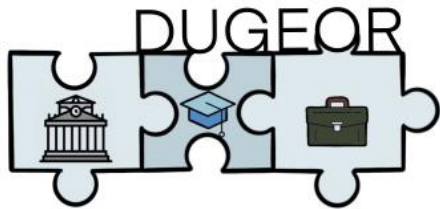
All programs are jointly developed by representatives of HEIs and partner companies. Higher education institutions have a leading role in the development and implementation of training programs, which is also reflected in the ratio of teachers of higher education institutions (60%) and persons involved in the program from companies (40%).

The companies participate not only in the development, revision and implementation of the curriculum, but are also involved in the mentoring of the student's final thesis (co-supervised with the higher education mentor).

HEIs have overall responsibility for conducting student assessments. However, the inclusion of partner companies in the assessment of students is related to the practical part of the educational program (working in companies), which is not strictly regulated. The mentor from the partner company usually shares a recommendation with the head appointed by the higher education institution regarding the evaluation of the students based on a standardized reporting form.

The relationship between partner companies and dual higher education students is governed by a direct employment contract in accordance with Austrian labor law. As a rule, these contracts are concluded on a part-time basis.

As for the educational process, during the first and second semesters, teaching takes place in the HEIs settings and the staff of the HEIs is involved in it. From the 3rd semester, partner companies are involved in the educational process, and the distribution of hours between higher education institutions and partner companies is 50/50 at the undergraduate level and 40/60 at the master's level, which means that the partner companies have even more responsibility for the education of students.



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Staff involved in teaching must have at least 3 years of experience in the relevant industry and an academic degree equivalent to at least 300 ECTS credits.

The employment rate after graduation is very high, ranging from 90 to 100%, and the dropout rate is 15 to 30%.

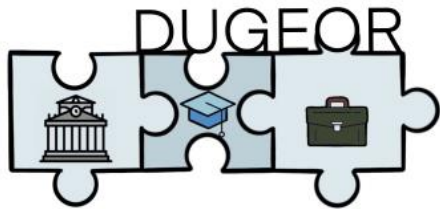
Details of dual higher education programs in Austria are provided in the appendix. For more information on dual education in Austria, see also www.dualstudieren.at.

Germany

A Dual education curriculum in Germany combines academic studies with work training and experience in many industries, services and even in State administration. Due to their practical nature, the high employability and the opportunity to be financially independent, Dual higher education programs are quite popular in Germany. If a student is enrolled in a Dual education study program, he usually already has signed an employment contract with the company or institution. Accordingly, teaching/training is carried out in two places: at the higher educational institution and at the place of the employer. In Germany, the Dual higher education programs offered by different HE institutions are not unified. The design and structure of the program depends on the subject specialization and the appropriate approach developed by the implementing HE institution.

Dual higher education programs in Germany are based on the WRL, WBL, WIL approaches discussed above. All German HE institutions can offer programs at the bachelor's and master's level. Dual higher education programs are available not only in technical disciplines such as engineering, but also in areas such as management, business administration, services, social sciences and the health sector.

All Dual higher education programs comply with the Bologna criteria, but are not unified (6 or 7 semesters for bachelor programs (180 to 210 ECTS)) and 4 semesters for master programs (60 to 120 ECTS). Graduates of Dual higher education programs have the right to



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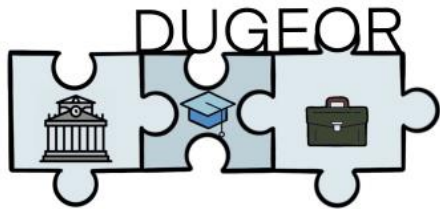
continue their studies at the master's and doctoral level. Some technical training programs are aligned and combined with professional education programs (EQF 4 or 5). In this case, graduates receive the corresponding degree and specialty of higher education as well as of professional education.

Accreditation is regulated by law and is carried out by the National Accreditation Agency. All programs are jointly developed by representatives of HEIs and partner companies/institutions. HE institutions have a leadership role in the development and implementation of programs, which is also reflected in the share of teachers involved in the educational process between HEIs (60%) and partner companies (40%), including some variations. In addition to teaching and curriculum development/revision, industry/institutional partners are also involved in mentoring the student's final thesis (along with the university mentor). Joint research can also be conducted.

The HE institution is responsible for the assessment of students. The Dual partners are also involved in the part of the evaluation that covers the practical side of education, although this part is not unified in terms of a single structure or format.

Regarding the employment contracts, some companies sign a direct contract with the student of Dual higher education. However, it is also common practice that the terms of the employment contract with the students are determined by the Higher Education Institution and not by the partner company.

In some subjects, the first two semesters after the beginning of the educational process are held in a HE institution. From the 3rd semester, the educational process is distributed between institutions and partner companies in an approximate 50/50 ratio at the bachelor's level. In other subjects, academic and practical learning alternates in regular periods of 3 months. As for master's programs, the partner companies might have even more responsibility in the education of students, and this ratio is 40/60 in favor of the companies.



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The personnel involved in the DHE programs must have experience in the relevant professional subject and possess an adequate academic degree.

Employment rates after university graduation are very high, ranging from 85 to 90%, and dropout rates from max 6 %.

Details of Dual higher education programs in Germany are given in the appendix. An extensive list of study programs on dual education is provided on the designated web-portal '[Ausbildung Plus](#)', which includes a database of up to 1,800 dual higher education study programs.

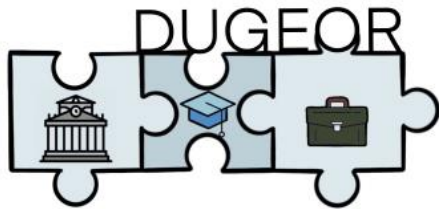
Spain

Similar to Austria and Germany, dual higher education programs in Spain are implemented by different types of private and public higher education institutions. The design of the program depends on the discipline, the future profession and the approach chosen by the respective higher education institutions. Dual higher education programs are offered in fields such as engineering, education or business studies.

The curricula of the programs are built in the format of WRL, WBL, WIL models. Bachelor's and Master's dual higher education programs comply with the Bologna model (8 semesters for undergraduate (240 ECTS)) and 2-4 semesters for master's programs (60 to 120 ECTS). Dual higher education programs are not unified. All graduates of the dual higher education program have the right to continue their studies at the next level of education - master's and doctorate degree.

Development of dual higher education programs is implemented jointly by representatives of universities and partner companies. Partner companies are also responsible for developing a set of competencies for the practical part of the training process.

The leading role in the implementation process is assigned to the relevant higher educational institution. In the distribution of shares of teachers involved in the educational



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process, you can find different ratios from 50/50 to 75/25 between HEIs and the partner company, respectively.

Labor relations are regulated either directly by a contract signed between the student and the company, or by an agreement signed between the university and the company. There is no special standardized work contract for students in dual higher programs (although there is one for students of vocational programs defined by the state). Nevertheless, the general framework of the agreement is as follows: a cooperation agreement is signed between the university, the company and the student, which defines the rights and obligations of the partners.

Accreditation of dual higher education programs is regulated by law and carried out by an accreditation agency.

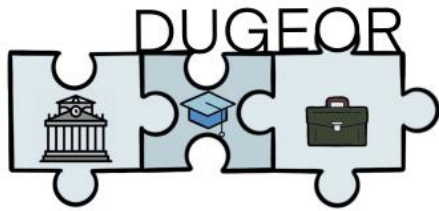
As for the staff involved in the dual higher education process, in contrast to Germany and Austria, no special requirements were identified.

Data on employment rates are not available for all programs (some are newly introduced), but available data show that post-graduation employment rates are very high for dual degree programs (80-100%), while dropout rates range from 20-36%.

Details of dual higher education programs in Spain are provided in the appendix.

Serbia

Dual higher education in Serbia is at the initial stage of development. Although there is a long tradition of work-based learning in Serbia at the level of secondary vocational education, a legislative act regulating this area was adopted only in 2017 (Serbian dual education law 2017). As for higher education, the Law on Higher Education of the Republic of Serbia since 2017 envisages ways of institutionalizing cooperation between companies and higher education institutions, which promotes work-based learning. Accreditation standards in Serbia include mandatory internships in all professional training programs. The

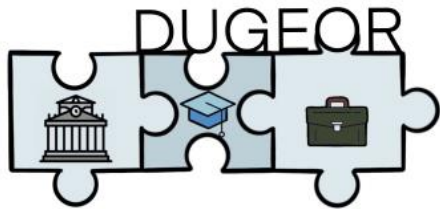


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final institutionalization of the dual study model in higher education in Serbia took place in 2019 (Zakon o dualnom modelu studija u visokom obrazovanju 2019). Accordingly, the accreditation standards of study programs were updated and the first dual-model study programs were accredited in 2021, mainly in the direction of applied sciences. In the process of developing a dual education program, higher education institutions often faced difficulties as it was challenging to find companies that had the ability and willingness to accept students for work-based learning. At the initial stage, the need to unify the regulatory documentations necessary for students' involvement in work processes were also identified (contracts, study agreements, monitoring procedures, payment negotiations, work safety procedures, etc.). The enactment of the law on dual study model in higher education, put on the agenda the development of basic trainings for mentors involved in the training process of the companies. Another important problem is related to the fact that often companies do not see the benefits that can be obtained by involving students in the work process. Even in the highly socially responsible companies the legally established payment rate for the students were recognized as a significant financial burden for small enterpriser (Marinkovic, Savic and Stamenovic 2022). All these difficulties revealed the need to establish a dual higher education quality assurance system. Although the main requirements for the accreditation of dual higher education programs have been established by the National Council of Higher Education of Serbia, the main indicators for the evaluation and self-evaluation of dual higher education programs have not yet been developed.

According to the law of Serbia "dual study model in higher education", dual programs can be implemented in all educational programs that comply with accreditation standards, the Law on Higher Education and the National Qualification Framework. Accordingly, dual higher education programs can be implemented at all higher levels of education, with the right for graduates to continue to the next level of education.

Curricula of the programs according to the Law of Dual Higher Education of Serbia is compatible with WIL format, which implies the transfer of acquired practical skills in a



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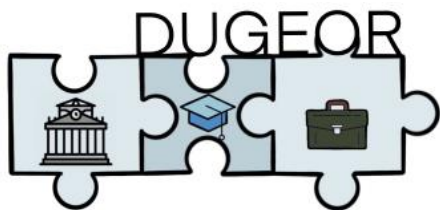
certain number of ECTS credits and is an organized process. This process is taking place under the guidance of a company mentor, where the student implements theoretical knowledge in a real work environment, has direct contact with business procedures operating in the business world and technology, interacts with other hired professionals, and is prepared for real work.

A higher education institution willing to implement a dual higher education program will have to search in advance and create a network of employers who are ready to hire staff according to the qualifications provided by this university.

The higher education institution is responsible for the assessment of students. The partner company is involved in the part of the evaluation that covers the practical side of education. The evaluation format is governed by the university's curriculum framework. The mentor appointed by the company must possess the relevant competence.

The dual model can be accredited as an independent educational program or as one of the modules within an educational program. In addition to the standard accreditation requirements, the program/module must be accompanied by a description of the nature and scope of the work practice with the corresponding ECTS credits/hours. For the organization of DHE modules, within the accredited educational program, the universities can submit an appropriate application for the realization of dual education without increasing the number of accredited students.

The distribution of hours between studying at the University of Applied Sciences and the hours spent at work in the company is determined within the framework of the DHE program, provided that the active learning carried out by the University of Applied Sciences (lectures, seminars and other forms of active education) must be offered for at least 450 hours per year, distributed on average over the entire training period. The same applies to the hours of the work based training, which, like theoretical learning, must be represented by at least 450 hours per year, spread over the entire training period.



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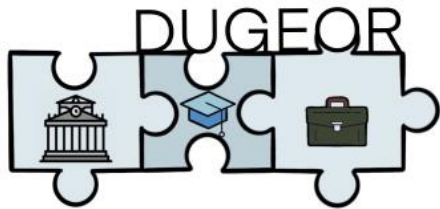
HEIs-student-company relations are regulated on the one hand by the agreement between HEIs and the company, and on the other hand by the agreement between the student and the company. In the contract between HEIs and the company, there are mandatory conditions that must be met by the participating parties, including the commitment of the company to carry out training with its own funds. Respectively, the plan and program of the work-based training, location and schedule must be clearly defined in advance, intellectual property rights must be protected accordingly, etc.

As for the contract between the student and the company, there are also a number of mandatory rules that must be taken into account during the study period at the workplace. First of all, it concerns the issue of material and financial support of the student. The company is obliged to compensate the student for the cost of using public transport, as well as the cost of food and insurance if these funds are provided for company's other employees. In addition, the student has the right to request work compensation, which is at least 50% of the salary of the staff employed in the corresponding position.

Details of dual higher education programs in Serbia are given in the appendix.

Parameters of quality assurance in Dual higher education

The accreditation system ensures the quality of higher education institutions and study programs in compliance with minimum standards. However, adherence to minimum standards in the academic community cannot be considered the ultimate indicator of quality. On the contrary, quality as "excellence" in achieving its performance is an academic approach, according to which only the highest levels of quality are understood as realized true academic quality. Accordingly, higher education institutions and study programs strive to achieve excellence as a primary goal (Van Damme 2002) (Marope, Wells, and Hazelkorn 2013). Key Performance Indicators (KPI) are a tool for monitoring and evaluating the work done by higher education institutions (Suryadi 2007). Their main goal is to make objective conclusions about the quality and to prepare a work plan for the future. Measurement and

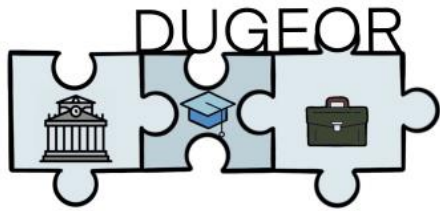


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analysis of indicators requires systematic planning and execution; Having a plan for measuring, defining and comparing baseline values and other criteria, which allows evaluation of the tasks performed by the institution. Establishing indicators of success is the first step in achieving excellence in learning, teaching and skills development. Thus, it becomes necessary to develop a Dual higher education model assessment system that integrates academic learning with the real world of work. The developed system can then be used to profile and rank institutions and study programs. With a wide range of potential measurement indicators, it is important to have a quality system that serves the diverse needs of students, the labor market, and society. It is necessary to optimize clear indicators for both quantitative and non-quantitative monitoring.

This process should be carried out by repeatedly measuring, reviewing and optimizing various parameters and indicators in order to obtain a reliable set of indicators of the success of Dual higher education study programs. Establishing performance evaluation system will support the process of quality control of Dual higher education programs, and will allow higher education institutions to easily identify weaknesses and threats, improve performance and strive for excellence. In addition to the quality standards of higher education, which should be followed by the higher education institutions, the quality standards should also be taken into account by the Dual partner companies or institutions from the job offer to the end of the training process. Thus, quality assurance of Dual higher education should integrate elements of quality assurance at HE institutions, at the Dual partner level, and at all intermediate levels that include the requirements of various professional associations.

At the same time, the quality assurance of Dual education should focus on elements that affect the provision of teaching services (available equipment, lecturers' qualifications, curricula, etc.), the teaching process (learning methods, lecturers' motivation, etc.), teaching on the outcome (final grades, application of knowledge in practice, etc.) (Bundesinstitut für Berufsbildung (Hrsg.) 2017).



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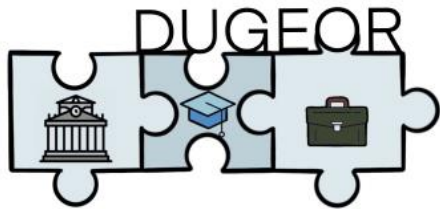
In terms of quality assurance in company-based training, the following aspects are very important: occupation principle, practical orientation and examination procedures (Bundesinstitut für Berufsbildung (Hrsg.) 2017). The occupation principle ensures that students who have received training in the practical component of Dual education (profession) have the ability to perform various specific work tasks that correspond to the qualification description. The practical orientation ensures that qualifications correspond to the requirements of the labor market and are adapted to meet current and future challenges in a timely manner. Since the real work environment is constantly changing, the learning objectives are formulated within a general terminology. Given that different students may be trained in different companies to obtain one final qualification, the examination procedure is a very important part of the dual education process. To obtain a certificate of qualification, students must demonstrate the possession of the necessary professional skills, professional knowledge and competences and understanding of the study material. Thus, the examination evaluation procedure should be clearly established.

In general, four dimensions of quality are recognized in Dual higher education (Nickel, Higher Education Area 2021).

First, it is the learning concept and learning objectives. The main added value of Dual higher education programs, which should be clearly expressed in the curriculum of the program, is the Dual qualification of the student through scientific study and practical training related to theoretical and scientific study content.

Second, quality dimension of Dual programs is admission and support of Dual students, including support measures like the option of an individual coaching or mentorship but also concrete and permanent supervisors on both sides – the HEI and the Dual partner– that support the students through their study.

The third dimension includes the quality of program design and testing. Higher education institutions and companies/institutions should develop adequate educational concepts for theory-practice transfer. Although HE institutions have full responsibility for the evaluation



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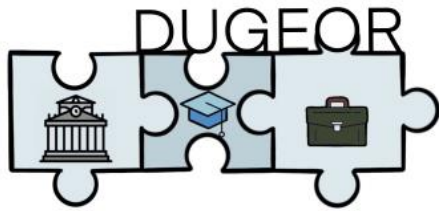
and examination process, it is necessary to involve company personnel in the examination process, especially in the development of the final thesis.

The fourth dimension of Dual education quality is program management and quality control, which includes a clear description of tasks and systematic communication between HEIs and their Dual partner companies/institutions.

Recommendations for the future model of dual higher education

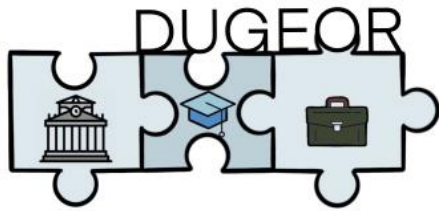
Within the DUGEOR project, based on the analysis of Dual higher education programs of different European countries, it is possible to summarize the main results and present recommendations for the development of future DHE models/programs in Georgia:

- The Dual higher education program is carried out at the bachelor's or master's level, corresponding to the relevant EQF level (6 – BA, 7 – MA).
- Graduates have the right to continue their studies at the next educational level.
- Where possible, along with an academic degree, a vocational education degree should also be awarded.
- In terms of contractual relations, it is recommended that contracts be signed directly between students and partner companies/institutions. However, it is also important to sign agreements between universities and companies/institutions. To the extent possible, the agreement between the student and the company should provide for compensation for the work performed by the student at the company/institution to support the student's financial independence.
- The ratio of theoretical and practical work: It is recommended that at the undergraduate level, the first 2 semesters focus on theoretical learning, the first work experience starts from the 3rd semester and continues until the end of the studies (for example, with a ratio of 50/50 - theoretical/practical work). At the Master's level, more emphasis should be placed on practical experience and the proportion of practical work may be larger than theoretical teaching.



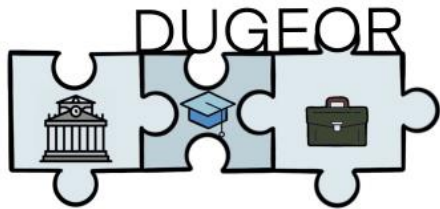
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- Company mentors must undergo special training to prepare for their highly responsible role. Regular meetings between company mentors and university teachers are recommended (at least once a year). In general, the obligations of companies and mentors should be broadly discussed and clearly defined—for example, the mentors' compensation (if any) and the amount of time spent on training.
- Representatives of both HE institutions and the Dual partner should be involved in the process of developing and updating the curriculum (for example, in a 50/50 ratio). It is obligatory that company/institution representatives have experience in the relevant field.
- Both academic staff and partner companies/institutions should be involved in the teaching process. It is recommended that HEI teachers have relevant industry experience and that company or institutional tutors have approximately 5 years of industry experience as well as a relevant academic degree (minimum MA). The leading role in the evaluation is assigned to the HE institution, however, in the part of practical work, it must rely on the partner company's information about the students' work, according to the established reporting and evaluation system.
- In the process of working on the final thesis, the student should be guided by the joint mentorship of the representatives of the HE institution and the company/institution involved in the educational process. The mentor appointed by the company should evaluate the practical part, and the supervisor appointed by the university should evaluate the academic and theoretical side of the thesis. It is recommended that the university mentor visits the company/institution, meets with the company mentor and that they develop a joint leadership approach, etc.
- At the level of the Ministry of Education and the Quality Assurance Service, there should be a clear list of criteria that reflects the requirements that a study program must fulfill in order to be called a "Dual Higher Education Program". It can be the distribution of theoretical and practical credit hours; determination of learning



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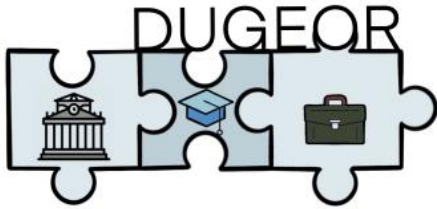
outcomes; existence of two places for teaching; Involvement of companies in the training process; clear connection of practical and theoretical components; existence of a quality management and monitoring system for two different learning environments, etc.



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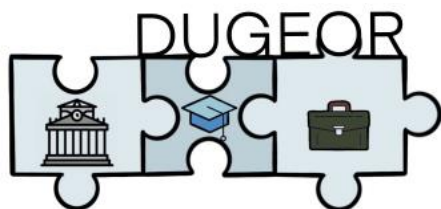
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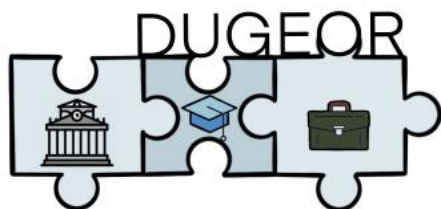
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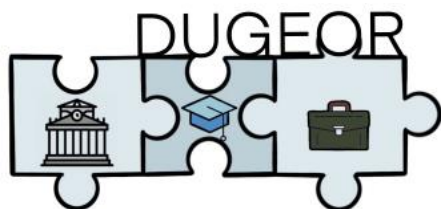
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Appendix 1. Austria	Program 1	Program 2	Program 3	Program 4	Program 5
University name	FH JOANNEUM Gesellschaft mbH.	FH JOANNEUM Gesellschaft mbH.	FH JOANNEUM Gesellschaft mbH.	University of Applied Sciences Upper Austria	FHV Vorarlberg University of Applied Sciences
program	PTO – Production Technology and Organization	ENP – Engineering and Production Management	Mobile Software Development	HSD – Hardware- Software-Design	Electronics and Information Technology Dual
website	https://www.fh-joanneum.at/produktionstechnik/bachelor/	https://www.fh-joanneum.at/engineering-and-production-management/master/en/	https://www.fh-joanneum.at/mobile-software-development/bachelor/en/	http://www.fh-ooe.at/hsd	https://www.fhv.at/en/studies/engineering-technology/electronics-and-information-technology-dual-bsc
Implementing Faculty/Department	IAP – Institute of Applied Production Sciences/Department – Engineering	IAP – Institute of Applied Production Sciences/Department - Engineering	Applied Computer Sciences	School for Informatics, Communications and Media/ ESE – Embedded Systems Engineering	Fachbereich Technik / Faculty for Engineering and Technology
Employment sector by specialization	Bachelor of Science in Engineering, BScE	Master of Science in Engineering, MScE	Mobile Software Developer -	Bachelor of Science in Engineering	Bachelor of Science in Engineering (BSc)
Academic degree to be awarded	Engineering	Engineering	IT	Engineering	electronics development, automation technology



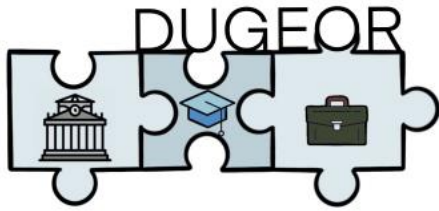
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					y, software engineering, power engineering.
European Qualifications Framework	Level 6	Level 7	Level 6	Level 6	Level 6
Number of semesters and credits	6 semesters/180 ECTS	4 semesters/120 ECTS	6 semesters	6 semesters/180 ECTS	6 Semesters; programme starts with a fulltime year answitches then to 3-month cycle.
Tuition fee	No	No	no	Yes	No
Ratio of university/company personnel involved in training	60/40	60/40	100/0	60/40	50/50
Requirements for personnel involved in training	3 years of practical experience in industry,Finished study program at HE with minimum 300 ECTS	3 years of practical experience in industry,Finished study program minimum at HE with min. 300 ECTS	Practical experiences	3 years of practical experience in industry,finished study program at HE with minimum 300 ECTS	Engineering diploma, Ph.D.
Work load/ from which semester dual education starts	1st year – 100% university. 2nd and 3rd year - 50%/50%(6	40% university/ 60% company (7months company/5 monthsuniversity)	33,3 and 66,6 %2 day at institution and 3 days a week in company	1st year – 100% university2nd and 3rd year - 50%/50% (6	80% @ institution, 20% = 1 year @ company



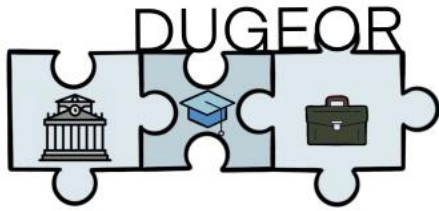
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	months university/6 months industry)			months university / 6 months industry)	
Contract form academy-company, company-student, academy-student	Contract only between student and company.	Contract only between student and company.	Letter of Intent and an apprenticeship contract	Contract only between student and company.	cooperation agreement.
Student remuneration from the company	Yes (in average a half employment, students are paid 14 times according to Austrian Law)	Yes In average is a half employment, students are paid 14 times according to Austrian Law.	Yes	Yes In average a half employment, students are paid 14 times according to Austrian Law.	Yes, starting with 2nd year (= start of dual phase)
Participation in the evaluation of the student - ratio HEI/company	Only university. Exception is bachelor thesis	Only university. Exception is the master thesis.	8%The partners evaluate the goals for each semester. Those goals are 50 percent of the praxis course.	Only university. Exception is bachelor thesis	100% by the HEI, industry partners may make recommendations.
Final thesis supervision ratio - HEI/company	1 academic mentor + 1 in-company mentor per student	1 academic mentor + 1 in-company mentor per student		1 academic mentor + 1 in-company mentor per student	Students are mentored by industry and by HEI, assessment by HEI, while industry mentors may make recommendations.



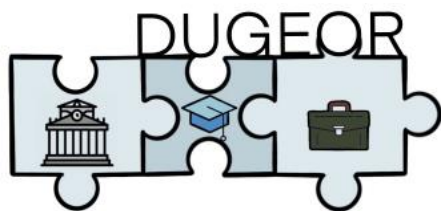
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Appendix 2. Germany	Program 1	Program 2	Program 3	Program 4	Program 5
University name	Baden Wuerttemberg Cooperative State University DHBW Mannheim	FOM Hochschule für Oekonomie & Management	Heilbronn University of Applied Sciences (Hochschule Heilbronn HHN)	Baden Wuerttemberg Cooperative State University DHBW Stuttgart	Technische Hochschule Ingolstadt THI, Ingolstadt, Germany
program	Business Administration, different specializations possible	Business Administration & Business Psychology (Betriebswirtschaft & Wirtschaftspsychologie)	Cooperative Study Model – Degree Program (Kooperatives Studienmodell – Bachelorprogramm) - Different combinations available	Advanced Midwifery Science (Angewandte Hebammenwissenschaft)	Automotive Engineering
website	https://www.mannheim.dhbw.de/en/dual-study/bachelors-degree-courses/business/business-administration	https://www.fom.de/de/hochschulbereiche/wirtschaft-und-psychologie/betriebswirtschaft-und-wirtschaftspsychologie-ba.html	https://www.hs-heilbronn.de/kooperativ	https://www.dhbw-stuttgart.de/studium/bachelor-studienangebot/gesundheits/angewandte-hebammenwissenschaft/ https://www.dhbw-stuttgart.de/en/studying-at-dhbw-	https://www.thi.de/en/studies/degree-programmes/details/automotive-engineering-beng/



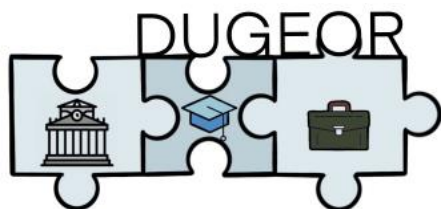
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				stuttgart/school-of-business-and-health/	
Implementing Faculty/Department	School of Business Administration, DHBW has 34.000 students and offers 100 study programs in 29 disciplines in 10 locations in Baden-Wuerttemberg	School of Economy and Psychology It is the biggest private university in Germany with 55,000 students at 32 study centres in Germany and 1 in Vienna, Austria.	Faculty Mechanics and Electronics (T1) Faculty Economics and Engineering (TW)	Faculty of Health	Electrical Engineering and Information Technology
Employment sector by specialization	Management positions/ All business sectors: industry, trade, banking, insurance, IT, service companies, consulting, etc.	All economic sectors - Management positions, expert positions in customer management, human resources, market research, product design, organization, change management, etc.	Engineer in different branches or departments (Research Development, IT, Manufacturing, Logistics, Purchasing...). Industry (Manufacturing Companies, Logistics Companies)	Midwifery and Health - Direct care of women and families in clinical and non-clinical settings, implementation of scientific projects.	Automotive industry, vehicle development, automotive electronics, vehicle design
Academic degree to be awarded	Bachelor of Arts (B.A.)	Bachelor of Science (B. Sc.)	Bachelor of Science (Bachelor of Engineering) plus professional degree (EQF4)	Bachelor of Science plus professional State Exam (EQF4)	Bachelor of Engineering



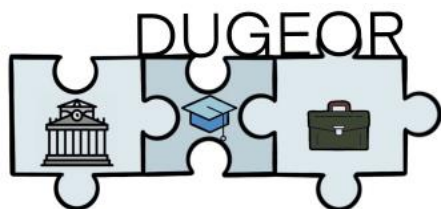
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European Qualifications Framework	Level 6	Level 6	Level 6 and level 4	Level 6 and level 4	Level 6
Number of semesters and credits	6 semesters/210 ECTS 3 months study, three months academia alternating	7 semesters/180 ECTS Extra occupational (only Dual if Business Psychology is related with the respective occupation)	4.5 - 5 years, 210 ECTS: 1,5 years vocational training (Dual company and professional school-special class), then start of study program (summer semester) combined with finalisation of vocational training in the second year. Second till seventh semester follows the regular study program at University. All other periods (holidays for regular students) the dual student receives practical content at the Dual partner company.	3.5 years, 240 ECTS: within the framework of a midwifery training with State Examination. The integration model combines training with the Dual partner and studies at the DHBW Stuttgart. The curriculum is designed in a way that training and studies can overlap. Training and studies are alternating, whereby the studies only begin after the first year of training. In accordance with the standard period of study, the course of study lasts three	The programme has a standard duration of seven semesters, divided into two sections. The first part consists of two theoretical semesters, while the second section is made up of four more technical semesters and a practical semester in industry. From the sixth semester onwards, students can choose from three specialisations: "Electromobility", "Body Design and Vehicle Safety" or "Theory and Mathematical Methods". With the



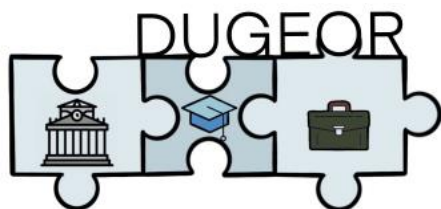
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				years. In the third year of study, i.e. after the training, the students remain employed by the training hospital, the Dual Partner.	specialisations, each student can set the individual focus that suits their interests and future plans.
Tuition fee	no	12,390 euro	No	No	No
Ratio of university/comp any personnel involved in training	40/60	50/50	80/20 after the nearly full time practical VET period (3 Semesters) in sum about 50/50	40/60	N/A
Requirements for personnel involved in training	For Professors: the usual requirements by law plus relevant practical experience. For external teachers: academic degree and relevant practical experience	For Professors: the usual requirements by law/For external teachers: academic degree	For Professors: the usual requirements by law plus relevant practical experience. For external teachers: academic degree and relevant practical experience	For Professors: the usual requirements by law plus relevant practical experience. For external teachers: academic degree and relevant practical experience	N/A
Work load/ from which semester dual education starts	1-6 Semester: Interlinking training with theoretical phase and practical phase – each semester has 12	Three different time models: 1) “evenings + Saturdays”: a) 2 or 3 evenings per week (Mo till Fr) 18:00 –	1,5 years vocational training: 70% Company, 30% professional school) 1– 4th Semester: 60% at University, 40 % at	1.-7. Semester: Interlinking training / theoretical phase at University and practical phase at	Dual education starts from 3 rd semester.



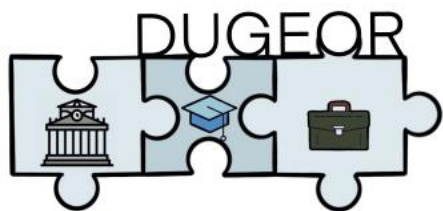
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	weeks theory at university and 12 weeks practical training at Dual partner company.	21:15 and 2 or 3 Saturdays/Month 08:30 – 15:45 hrs. b) every Friday 18:00 – 21:15 and Saturday 08:30 – 15:45 hrs. 2) “evening model”: 3 evenings per week (Mo till Fr) 18:00 – 21:15 hrs 3) “day studies”: a) 2 days per week (Mo through Fr) normally 08:30 – 15:45 or b) 1 day per week plus Saturdays 08:30 – 15:45 o’clock. There are no requirements for the practical training, most students work in a normal job (full-time or part-time).	Company, 5th Semester Company like in most UAS study programs, 6 – 7th Semester (50% at University, 50% in Company (or more, depending on Bachelor Thesis)	Dual partner hospital; Rhythm is adapted to needs in medical study courses wich have to follow State Exam regulations. Example: https://www.dhbw-stuttgart.de/fileadmin/dateien/Semesterplene/Wirtschaft/2023_Angewandte_Hebammenwissenschaft.pdf	
Contract form: university-company,	Training / study contract between the company and the	No	Yes – training contract between company and student	Training / study contract between the hospital and the	N/A



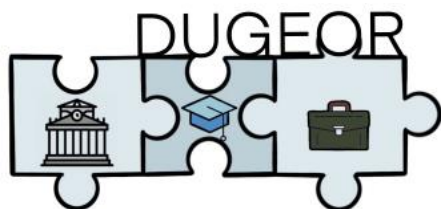
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company-student, university-student	student. The company has a contract with the university which grants it the right to fill a certain number of places with Dual students.			student. The hospital has a contract with the university which grants it the right to fill a certain number of places with Dual students.	
Student remuneration from the company	Yes	Yes (they are normal employees)	Yes	Yes	Yes
Participation in the evaluation of the student - ratio HEI/company	Exams at HEI 100%	HEI 100 %	Exams at HEI about 75%; Exams at Professional School about 25%	Exams at HEI about 70%; State Exams at midwifery section of hospital about 30%	HEI 100 % of academic assessment for B. Sc.
Final thesis supervision ratio - HEI/company	One mentor on each side, but evaluation is exclusively on the HEI side	100 % HEI	One mentor on each side.	One mentor on each side, but evaluation is exclusively on the HEI side	1:1 (recommended)



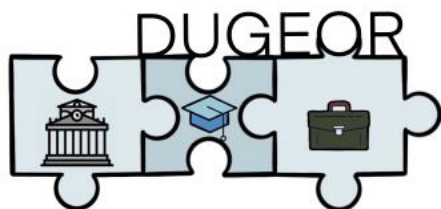
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Appendix 3. Spain	program 1	program 2	program 3	program 4	program 5
University name	University of the Basque Country (UPV/EHU)	Dual Engineering University School	University of Lleida	University of Lleida	Dual Engineering University School
program	Degree in Automotive Engineering	Master in Digital Manufacturing	Degree Primary Education	Master Degree in Informatics Engineering	Degree in Process and Product Innovation Engineering
website	https://www.ehu.es/es/grado-ingenieria-automocion	https://www.imh.eus/es/ingenieria-dual/master-industria-4-0	http://www.educacionprimaria.udl.cat/en/pla-formatiu/alternanca.html	http://www.masterinformatica.udl.cat/en/pla-formatiu/FormacioDual/Formacio-Dual.html	https://www.imh.eus/es/ingenieria-dual/grado-dual
Implementing faculty/department:	Faculty of Engineering Vitoria-Gasteiz	Idem	Faculty of Education, Psychology and Social Work	Polytechnic School.	Idem
Employment sector by specialization	Automotive engineer, Automotive industry	Engineer, Advanced manufacturing, machine-tool, automotive, aeronautic	Teacher of primary education, Education	IT engineer, Technology. Software development.	Engineer, Advanced manufacturing, machine-tool, automotive, aeronautic
Academic degree to be awarded	Degree in Automotive Engineering	Master Degree	Bachelor	Master	Bachelor Degree
European Qualifications Framework	Level 6 of the European Qualifications Framework (EQF)	Level 7 of the European Qualifications Framework (EQF)	6	7	Level 6 of the European Qualifications Framework (EQF)



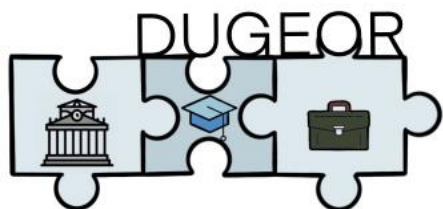
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Number of semesters and credits	4 courses; Number of credits: 240 ECTS credits, 60 ECTS/year; 42 ECTS Internship stay in companies	2 courses; Number of credits: 90 ECTS credits, 60 ECTS/first year, 30 ECTS/second year; 29 ECTS Internship stay in companies	4 years. 240 ECTS	3 semester. 90 ECTS There are compulsory courses that must be taken and the university. These are 54 out of the 90 ECTS. Work in company, are 24 ECTS There is a final thesis that is 12 ECTS. Usually part of the work in company.	4 courses; Number of credits: 240 ECTS credits, 60 ECTS/year; 66 ECTS Internship stay in companies
Tuition fee	Yes (Price per credit in 1st registration € 19.19)	Yes	Yes	Yes	Yes
Ratio of university/company personnel involved in training	77,5% (HEIs)	No percentages set / can be %100		70%	No percentages set / can be %100
	22, 5% (Industry partners)	No percentages set / can be %0	20%	30%	No percentages set / can be %0
Requirements for personnel involved in training	University teacher	No	No	Practical experience and academic degree equal or higher than the pursued by the student.	No
Work load/ from which semester dual education starts	During the last two courses, students spend 3 days (Monday, Tuesday and Wednesday) at the company, and 2 days	Approximately 6 days per month at the university (eighthours per day). The rest in the company	2 days at School ("company"), 3 days at university, each week, during first 3 year of study program. 4th year, they are	First and second semester, mornings company, afternoon university. Third semester, company.	First semester at the university. From the second semester 3 days per week in the company, and two days in the



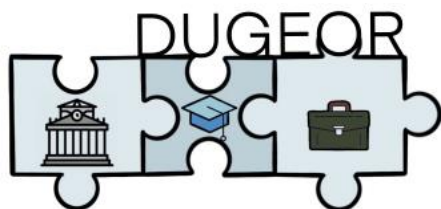
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	(Thursday and Friday) at the educational institution.		longer periods at schools (“company”).		university; except one week per month which is 2 days in the company and 3 days in the university.
Contract form academy-company, company-student, academy-student	Yes. The participating companies establish two types of agreements. The first agreement is generic, has a duration of 4 years and is established to collaborate with the Faculty of Engineering. The second agreement is particular for each student doing the internship and has a duration of one year. It establishes the training plan to be developed by the student in the company advised by a company instructor and a tutor from the Faculty of Engineering Vitoria-Gasteiz.	Yes. Employment contract or university-company collaboration agreement. In Spain, at university level, there is no specific employment contract for Dual education. At VET level, yes. In addition to the previous one, a collaboration agreement is also signed between the university, the company and the student, which defines the rights and obligations of all of them.	No. There is a global agreement with the regional government, and a specific agreement for each student.	Yes. Work contract.	Yes. Employment contract or university-company collaboration agreement. In Spain, at university level, there is no specific employment contract for Dual education. At VET level, yes. In addition to the above, a collaboration agreement is also signed between the university, the company and the student, which defines the rights and obligation of all of them.



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Student remuneration from the company	Yes. The second agreement also includes a section dedicated to the financial aid that the student will receive.	Yes	No	Yes	Yes
Participation in the evaluation of the student - ratio HEI/company	85% (HEIs)15% (Industry partners)	70% (HEI)30% (Industry partners)	85%15%	The compulsory 54 ECTS are assessed by HEIs. The work in company is assessed by the academic tutor together with the company tutor	50%. Each final thesis work is assigned a tutor from the university and an instructor from the company.
Final thesis supervision ratio - HEI/company	50%. Each final thesis work is assigned a tutor from the university and an instructor from the company	50%. Each final thesis work is assigned a tutor from the university and an instructor from the company	No	50%-50%	HEIs %66 – Industry %33



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Appendix 4. Serbia	Program 1	Program 2	Program 3	Program 4	Program 5
University name	The Academy of Applied Technical Studies Belgrade (AATSB)				
program	ENERGY EFFICIENCY AND CLEAN ENERGY	FASHION DESIGN OF LEATHER PRODUCTS	GRAPHIC ENGINEERING	INTERIOR DESIGN	MECHANICAL ENGINEERING
website	https://atssb.edu.rs/en/energy-efficiency-and-clean-energy/	https://atssb.edu.rs/en/fashion-design-of-leather-products/	https://atssb.edu.rs/en/graphic-engineering/	https://atssb.edu.rs/en/interior-design/	https://atssb.edu.rs/en/mechanical-engineering/
Employment sector by specialization	mechanical engineering	fashion design	Graphic Engineering	Interior Design	Mechanical Engineering
Academic degree to be awarded	Bachelor's (appl.) Degree in Mechanical Engineering	Bachelor's (appl.) Degree in Design – fashion design of leather products	Bachelor's (appl.) Degree in Engineering Technology	Bachelor's (appl.) Degree in Design	Bachelor's (appl.) Degree in Mechanical Engineering
European Qualifications Framework	6th level	6th level	6th level	6th level	6th level
Number of semesters and credits	6/180	6/180	6/180	6/180	6/180