INTEGRATED DUAL LEARNING PROGRAMS AT GERMAN UNIVERSITIES

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A dual education system stipulates for the combination of education and students’ manufacturing activities. Future employees study at universities where they acquire theoretical knowledge and work at enterprises where they acquire the necessary professional competencies. Germany is a recognized leader in dual education in Europe, where the vocational education system is characterized by a well-developed mentoring institution, practice-oriented training and active participation of business in specialists’ training. The experience of this country is a model for other countries of the European Union and world powers.

Using the methods of generalization, systematization, analysis of primary documents and expert assessments, the paper presents the analysis and typologization of the integrated dual education programs at German universities. A study of the scientific researches of both, domestic and foreign scholars enables to reveal an insufficiently developed complex theory that would focus specifically on duality in higher education on the one hand and on how to design the integration of academic and professional learning on the other.

The analysis of scientific papers helped identify the two types of curricula with a high and low degree of integration. The analysis allowed to determine the two types of curricula with a high and low degree of integration. It has been found that different types of curricula, taking into account the duality, can be brought to a full integration. It had also been determined that systems integration can be achieved through educational activities at different levels. This can be either by developing programs designed exclusively for students studying in dual mode or by creating hybrid program structures that support the learning experience with additional elements specifically designed for dual mode.

Keywords: Germany, universities, dual mode of study, integration, integrated curricula, academic and professional component, higher education institutions.

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ІНТЕГРОВАНІ ПРОГРАМИ ДУАЛЬНОГО НАВЧАННЯ В УНІВЕРСИТЕТАХ НІМЕЧЧИНИ

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Дуальна система освіти передбачає поєднання навчання з виробничою діяльністю студентів. Майбутні фахівці навчаються в університетах, де здобувають теоретичні знання та працюють на підприємствах, де опановують необхідні професійні компетенції. Загальновизнаним лідером в організації дуального навчання в Європі вважається Німеччина, де система професійної освіти характеризується розвитком інституту наставництва, практико орієнтованим навчанням і активною участю бізнесу в підготовці фахівців. Досвід цієї країни є відривом для інших країн Європейського союзу та світових держав.

Використовуючи методи узагальнення, систематизації, аналізу первинних документів та експертних оцінок, у статті здійснено аналіз та типологізацію інтегрованих програм дуального навчання в університетах Німеччини. В результаті вивчення наукових праць вітчизняних і зарубіжних науковців з'ясовано, що нині ще недостатньо опрацьована комплексна теоретична база, що зосереджувалася б саме на дуальності у вищій освіті, на питання про те, яким чином проектувати інтеграцію академічного та професійного навчання.

Здійснений аналіз допоміг визначити два типи навчальних програм з високим і низьким ступенем інтеграції. З'ясовано, що різні типи навчальних програм з урахуванням дуальності, можна довести до повної інтеграції. Установлено, що система інтеграція може бути досягнута за допомогою навчальних заходів на різних рівнях. Скажімо, шляхом створення програм, призначених виключно для студентів, які навчаються за дуальною формою або шляхом розроблення збірних структур програм, що підтримують навчальний досвід за допомогою додаткових елементів, спеціально розроблених за дуальною формою.

Ключові слова: Німеччина, університети, дуальна форма навчання, інтеграція, інтегровані навчальні програми, академічна та професійна складова, заклади вищої освіти.

Introduction of the issue. The main purpose of the dual form of education in higher education is to train highly qualified specialists in a certain number of professions using the advantages of integrating academic and professional learning. According to the German Research Council, bachelor's programs implemented in the dual form are aimed at systematic combination of two fields of study (theoretical and practical) [5]. More and more young people in Germany, Austria, Switzerland and other countries prefer this form of education, and the universities of applied sciences are the main providers of this form of education which demonstrate a stable growth rate of the number of students in this form of education. For example, in 2005, the share of students studying in dual programs at German universities was 1.4%; in 2017, it was 9.7%, and now more than 14% of students are studying in dual programs [15].

The growth in the number of dual degree programs in higher education is related to
the crisis in the vocational education system and the transition of a range of spheres of vocational training from secondary vocational education to higher education domain. Studies of their structure suggest that the degree of integration of academic and professional learning in different programs varies significantly. The transferability of dual-form programs refers to the student’s ability to comprehend and combine professional and academic learning experiences. As the higher education system in Ukraine strives to overcome the gap between theoretical knowledge and practical skills of graduates, the study of foreign experience in creating dual programs that can integrate academic and professional education is relevant for the further development of the national higher education system.

**Current state of the issue.** Currently, the issue of education, science and production integration is the subject of many researches made by both domestic and foreign scholars. N. Abashkina, S. Amelina, O. Davlіkantova in their works reveal the essence, formation and problems of dual education in Germany; O. Begma, Y. Panfilov, S. Karliuk, L. Krymchak, N. Kulalaeva, K. Yakovenko and other scholars suggest improve the interaction of education, science and production in the country by creating an educational and scientific complex of an associative type with the involvement of Ukrainian enterprises and institutions.

Since the number of researches on the dual programs that could integrate academic and professional components and their pedagogical aspects remains insufficient, the issue of integration is often discussed without specifying the degrees, types and outcomes for the students. Until now, the few studies of dual programs’ educational quality have mostly been focused on students’ attitude to learning and not supported by representative data [9; 11].

Foreign scholars (U. Faßhauer, S. Anselmann, R. Meyer, etc.) emphasize that during the discussions about the creation of dual academic programs, the pedagogical component is often omitted by пропедівної освіти та переходом значної кількості професійних напрямів підготовки із системи середньої професійної до вищої освіти. Дослідження їхньої структури свідчать про те, що ступінь інтеграції академічного та професійного навчання в різних програмах має суттєві відмінності. Трансферна спроможність програм за двою формою означає здатність студента осмислювати та пов’язувати професійний і академічний навчальний досвід. Оскільки система вищої освіти в Україні прагне подолати розрив між теоретичними знаннями та практичними вміннями та навичками випускників, вивчення зарубіжного досвіду в створенні навчальних двохних програм, котрі здатні інтегрувати академічну та професійну освіту, є актуальною і своєчасною для подальшого розвитку вітчизняної системи вищої освіти.

Аналіз останніх досліджень і публікацій. Нині проблеми інтеграції освіти, науки й виробництва присвячено чималя праця як вітчизняних, так і зарозвахших учених. Н. Абашкіна, С. Амеліна, О. Давлікантова в своїх роботах розкривають сутність, становлення та проблеми двохних освіти в Німеччині; О. Бегма, Ю. Панфілов, С. Карлік, Л. Кримчак, Н. Кулаєва, К. Яковенко та інші пропонують удосконалити взаємодію освіти, науки та виробництва країни шляхом створення освітньо-наукових комплексів асоціативного типу із залученням підприємств та установ України.

Оскільки кількість досліджень двохних програм, що інтегрували б академічну та професійну складову, їх педагогічних аспектів, залишається недостатньою, проблема інтеграції часто обговорюється без конкретизації ступенів, типів і результатів для здобувачів освіти. Дотепер нечисленні дослідження освітньої якості двохних програм здебільшого стосуються ставлення студентів до навчання і не підкріплені репрезентативними даними [9; 11].

Зарубіжні науковці (У. Факсауэр (U. Faßhauer), С. Ансельманн (S. Anselmann), Р. Міер (R. Meyer) та ін.) акцентують увагу на тому, що в дискусіях
scholars and practitioners [4; 12; 15]. In other words, the relationship between structural decisions and student's individual development is not taken into account.

Foreign and domestic science has not yet developed a comprehensive theoretical framework that would focus on the duality in higher education. The question of how to design the integration of academic and professional learning has also been poorly highlighted. We believe that the above aspects are quite important in defining of what duality and integration should mean and what characteristics of these concepts should be available in curricula. We have analyzed both, the dual bachelor's programs in the most common subject areas such as engineering and economics, as well as the data from the German Centre for Higher Education. For this purpose, the study uses the indicators based on the theory of the curricula formulated by A. Kelly [9].

**Aim of research** is to identify the features of the integration of academic and professional learning, and to characterize the types of integrated dual programs.

**Results and discussion.** Educational and professional programs (EPPs) in dual form at the level of secondary vocational education institutions have a long tradition, primarily in Germany. The recent emergence and spread of "hybrid programs" at the intersection of higher and vocational education may be considered as an innovation, since traditionally these two systems have been separated [7]. Embedded in the dual system of vocational education and training (VET), these vocational programs combine both, on-the-job training and training in vocational colleges [3: 97]. In previous years, VET has been the backbone of the German education system, with the number of students enrolled in this system far exceeding the number of students enrolled in universities. In recent decades this division has changed and the number of students enrolled in higher education institutions has exceeded the number of those enrolled in vocational education institutions [3]. Dual higher education programs are being considered in the
context of the mass character of higher education and the "crisis of apprenticeship" in vocational education. One of the reasons for this crisis is the declining interest in vocational education. In order to understand the differences in the degree of curriculum integration between dual programs, we consider the structure of these programs from a pedagogical point of view.

The dual system of vocational training in Germany is too complex. Each federal state is responsible for developing curricula for vocational schools, while the training rules for companies fall under the responsibility of the federal government. The term "dual system" means that the two systems cooperate to form a single unity. The duality goes beyond the management or organizational combination of two places of learning and extends to teaching and learning activities [16]. We should distinguish between the dualism and the duality. The first term in our view implies the concept of parallel activities of educational institutions and companies without any cooperation, while the second – intensive cooperation.

There are two types of dual academic programs: blended learning and in-depth practice. They differ primarily in the agreements that students sign with social partners and in the degrees of higher education they are awarded. What they have in common is that a student receives a Bachelor or a Master degree. In combined programs the students sign a contract with a company to learn a profession regulated by a law and obtain an additional degree of vocational education. We believe that this issue needs to be properly substantiated in order to explore the way students are assisted in combining and integrating their learning experiences in dual programs. The need for such an approach arises due to the fact that most of them involve a certain level of organizational connections, while the systematic integration of educational content appears problematic [6].

As a rule, it is the curriculum that provides the structural basis (modules, workload, assessment methods) together with the institutional framework (expectations for students and teachers)
within which the educational activities take place. The scientific literature identifies common elements of a curriculum, which include objectives (defining the expected outcomes from an educational program); content - the learning material selected to achieve the objectives; sequencing (referring to the vertical links in the curriculum and the systematic organization of content over time, for example, throughout the entire bachelor's program; integration (developing the curriculum so that its elements mutually contribute to a coherent learning experience); and assessment (referring to judgments about students learning) [14: 162].

In case of dual programs, their integration essentially concerns the academic and professional learning experiences. The final integration, however, occurs with the participation of the learner and it is influenced by how the curriculum components have been arranged.

Hence, we can distinguish between the personal integration and the curriculum integration. The theoretical analysis of the dual programs of the Darmstadt University of Applied Sciences in Chemistry and Informatics for Bachelor and Master degrees shows that academic and professional components are present in the structure of the curricula [19]. Similar examples can be found in other universities in Germany and Austria.

Integration is a key category for the study of dual programs, as it relates to all the above criteria and defines them in terms of the relationship between academic and professional components. The main question is how the elements of the curriculum structure help students to integrate academic and professional learning experiences. As is known, the theory of educational programs provides for the general categories for dual programs analysis. These need to be further clarified in relation to the pedagogical outcomes of the dual nature of the program.

The German Science Council (GSC) suggests some measures to systematize dual learning, ranging from management aspects, organizational measures to curricula elements. Table 1 shows those
features that are relevant for determining the integration and duality of PLOs in curricula (organizational connections). In the table 1, we distinguish between the organizational and the curricular (required) integration [8].

### Table 1. Characteristics of the integration of curricula in the EPP by dual mode of study

<table>
<thead>
<tr>
<th>Elements of integration</th>
<th>An element of curricula theory</th>
<th>Integrative characteristics in dual study programs</th>
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<tbody>
<tr>
<td>Organizational connections</td>
<td></td>
<td>Stable contractual relations with corporate partners</td>
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<tr>
<td>Goals and sequence</td>
<td>Stable contractual relations with corporate partners</td>
<td>Exchange in cooperation committees with representatives of universities and vocational schools</td>
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<td>Co-operation for integration</td>
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<td>Cooperation during the admission process</td>
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<tr>
<td>Content</td>
<td>Co-operation for integration</td>
<td>Coordination of curricula and learning objectives</td>
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<tr>
<td>Evaluation</td>
<td>Content</td>
<td>- integrated learning concepts that involve regular exchange between parties in the academic and professional spheres; - special classes for dual enrolled students if they are studying together with traditional students on the same program; - recognition of milestones with corporate partners as learning experiences formalised in the form of credit points.</td>
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The study of the dual programs potential in terms of the quality of the educational process has shown that the level of combination of academic and professional training differs from university to university. This is explained by the different level of coordination between the educational institution and the social partner, namely the recommendatory nature of the requirements for practical modules implemented in the partner company by a particular university. It is especially difficult to ensure integration in

Дослідження потенціалу дуальних програм з точки зору якості навчального процесу засвідчило, що рівень поєднання академічного та.profесійного навчання відрізняється в залежності від університету. Це пояснюється різним рівнем координації дій між закладом освіти та соціальним партнером, а саме рекомендаційний характер вимог до практичних модулів, що реалізуються у компанії-партнєрі з боку конкретного ВНЗ. Особливо важно забезпечити інтеграцію в тих програмах,
programs that combine regular and dual education [17].

F. Kupfer, B. Langfeldt, S. Krone and other scholars have found that dual programs often lack curriculum integration. Only a quarter of the students who took part in an online survey at the University of Baden-Württemberg, carried by a group of researchers led by B. Langfeldt, rated the combination of academic content in their curriculum as "good" or "very good". The research team led by Z. Krone noted that students were only partially satisfied with the integration of academic and professional learning in their dual programs. 79% of companies in the online survey claimed that universities are solely responsible for academic training, and 91% agreed that social partners do not have support from universities when it comes to vocational training [10].

Our study is based on the analysis of the EPPs database of the German Conference of Rectors. The programs in this database are state-approved and/or accredited. In total, the sampling included 52 professional programs in the dual mode of study. The distribution by the type of governing body and university reflected the general characteristics of dual programs in engineering and economics. Each program was assigned one of the five types of integration [6].

**Type A. Insufficient integration of EPPs arranged by the dual system, with EPPs arranged by the non-dual (traditional system).** This type is characterized by a relatively low share of contractual relations on institutional exchange between the university and the social partner. However, among all other types, it has the highest share of common enrolment between the university and the social partner. From the perspective of integration of the EPP, this type lacks transparency. For example, it does not provide for the content to be studied by social partners. However, in more than 50% of programs, representatives of social partners regularly teach at the university, and in 46.7% of cases, students receive credit points for learning activities in the partner company.

що поєднують звичайне та дуальне навчання [17].

Ф. Купфер (F. Kupfer), Б. Лангфельд (B. Langfeldt), З. Крона (S. Krone) та ін. з’ясували, що дуальним програмам часто бракує інтеграції навчальних планів. Лише четверть студентів, які взяли участь в онлайн-опитуванні в університеті Баден-Вюртенберга, що було проведено групою науковців на чолі з Б. Лангфельдом, оцінили поєднання навчального контенту у своїй навчальній програмі як "дobre" або "дуже добре". Дослідницька група під керівництвом З. Крона зауважила, що студенти лише частково задоволені інтеграцією академічного та професійного навчання в їхніх дуальних програмах. 79% компаній в онлайн-опитуванні стверджують, що ВНЗ відповідають виключно за академічне навчання, 91% погодилися, що соціальні партнери не мають підтримки від ВНЗ, коли йдеться про професійну освіту [10].

Наше дослідження засноване на аналізі баз даних ОПП Конференції ректорів Німеччини. Програми в цій базі даних є затвердженими державою та/або акредитованими. Загалом у вибірці було 52 професійні програми за дуальню форму навчання. Розподіл за типом органу управління та ВНЗ відображав загальні характеристики дуальних програм в інженерії та економіці. Кожна з програм була віднесена до одного з п’яти типів інтеграції [6].

Тип А. Недостатня інтеграція ОПП, складених за дуальню системою з ОПП, складеними за традиційною системою. Цей тип характеризується відносно низькою часткою договірних відносин щодо інституційного обміну між ВНЗ і соціальним партнером. Однак він має найвищу серед всіх інших частку спільного вступу до ВНЗ та соціального партнера. З точки зору інтеграції ОПП цьому типу бракує прозорості. Наприклад, вона не передбачає зміст, що вивчається в соціальних партнерів. Однак, в понад 50% програм прикрашани соціальних партнерів регулярно викладають у ВНЗ, а у 46,7% випадках студенти одержують кредитні бали за навчальну діяльність у компанії-партнері.
This type includes only those programs where dual and regular students study together. In 93.3% of programs of this type, the first group of students study partially in separate classes without traditional students to facilitate the integration of professional and academic content of the EPP. Programs of this type are mostly smaller in number – no more than 58 students. In terms of regulatory classification, most programs can be classified as integrating practice and learning. These are called blended programs.

**Type B. Integration of EPPs on the base of the assessment in programs mixed with non-dual programs.** It is characterized by a low degree of organizational connections. A small number of programs have agreements with social partners on institutional exchange in their cooperation. 10 per cent of programs rely upon the agreements related to the objectives and sequences that define the way to coordinate learning content, classes and assessment. As for the educational content, only 9.5% of programs rely on special classes for dual enrolled students. In all programs of this type, dual and regular students study together, and the number of dual students in each program is quite high. The number of students enrolled in this type of study program is about 120. Most of them assess the learning content provided by social partners and coordinate assessments with them. Thus, the integration in this type of program is essentially based on assessment. In terms of regulatory classification, these programs typically lead to a vocational qualification together with an academic degree. An example of a typical program would be a state program in mechanical engineering that integrates a regulated VET degree in industrial mechanics mainly through assessment practices.

**Type C. Clearly regulated, agreed integration of curricula in totally dual programs.** Dual programs of this type are characterized by stable contractual relationships. The degree of curricula integration is also quite high. As for the objectives and sequence, the agreements...
regulate how to coordinate learning content, classes and assessment in the majority of programs. In 67.2% of programs, curriculum content is clearly assigned to social partners, and 71.6% have accredited modules from partners. In no other type of program the company employees teach at the university. In terms of content, most programs are totally dual. This type consists mainly of large programs with at least 59 students. All programs define how to evaluate the content provided by social partners and coordinate assessments with them. In this type of program the students receive credit points for learning activities at the partner corporation. Given the regulatory classification, most programs are practice-integrated. A large, totally dual and agreed program on practice integration in business management at a dual university with a high degree of regulation at the organizational and curricular levels is typical of this type of integration.

**Type D.** An integral, transparent integration of the EPPs mixed with non-dual programs. Programs of this type have a relatively high level of organizational connections, e.g. the university and social partners cooperate mainly on the basis of a written agreement. As for the cooperation for integration purposes, in 85.7% of cases, the content is directly assigned to corporate partners in the curriculum, and 78.6% have accredited modules from partners. Students are enrolled in fully dual programs. As for the number of students, this type is in the middle range, i.e. from 13 to 139 students per program. An example of this type is an engineering program that is designed as a dual one, combining teaching and practice, and, like a regular program, has a transparent and holistic integration of curricula.

**Type E.** Mostly organizational connections in programs mixed with non-dual programs. Institutional cooperation is supported by written agreements. This type is characterized by a low degree of curriculum integration. 14.3% of programs of this type are totally dual, and 9.5% have separate groups, which is a low factor, considering the share of programs combined with regular programs. Public or
private engineering programs offered in both regular and dual modes of study, without the support for students who have integration problems are typical.

Conclusions and research perspectives. Thus, the analysis of dual programs of German universities has revealed that integration involves a set of consistent and interrelated actions of the educational institution and the social partner in the implementation of the educational process. Two types of study programs with a high degree of integration have been identified - types C and D. Types B and E have a low level of integration. The integration of academic and vocational learning in the curriculum is both, a key characteristic and a challenge for the development of dual programs. Programs with a high degree of curriculum integration also have stable contractual relations with partners as for the cooperation (types C and D).

The results of the study can be used in the national practice of training specialists and implementing dual forms of education in higher education institutions. This study is especially relevant within the frameworks of the adopted "Regulations on the dual form of vocational training and higher education" by the Ministry of Education and Science of Ukraine which took place on 13 April 2023. The purpose of the document is to implement a student-centered approach by improving the quality of students professional training.

Further researches should be carried out in the study of the content of Bachelor and Master programs in the dual form of education at universities in German-speaking countries in order to implement their elements in the national practice of dual training of specialists in institutions for higher education in Ukraine.

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