



TRENDS IN DEVELOPING DIGITAL SKILLS OF UKRAINIAN STUDENTS IN DUAL STUDY MODE

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Abstract: *This work discusses the issue of intensifying the use of information technologies and acquiring digital competencies by students of professional higher education within the framework of dual study mode. The authors analyze the survey performed among the applicants of one typical institution of higher education regarding the dual form of education. Students showed considerable enthusiasm about promoting cooperation between institutional learning environment and employer companies as to the introduction of dual form of higher education. The authors continue by discussing ways of using information technology to develop digital skills of students of higher business education based on a dual form of education. However, a number of unresolved challenges should be addressed, namely financial issues, regulatory and organizational ones.*

Keywords: higher education, dual mode of study, students, information technologies

INTRODUCTION

As noted previously (Introduction to Tuning-2, 2007, p. 60), students' awareness that "having obtained a university degree does not automatically ensure employment" prompts the need to increase their value with employers, thereby satisfying the relevant needs of the latter (Rashkevych, 2014, p. 16). This means that employers are becoming actively involved in the creation of relevant training programs and the implementation of the chain "specific applicant – specific conditions – specific employer" with the aim of taking into account the features of all three components as much as possible. Previous research has explored the possibilities of using elements of various forms of higher education on the basis of institutional education to meet the need of applicants to expand (individualize) their own learning results (Karimov

et al., 2022). In particular, it was proposed to use a dual form of higher education in combination with an in-depth study of the specifics of metallurgical/chemical production (which are specific to the region) in a distance format to form conditionally stable profiles for the “Management” study program.

At the same time, according to the experts of the Ministry of Education and Science of Ukraine, «dual form of education acquires particular relevance in terms of solving the tasks of rapid post-war recovery of the Ukrainian economy, meeting the demand for highly qualified personnel with in-demand skills, as well as the prospects of Ukraine’s integration into the EU» (Vprovadzhennia polozhennia..., 2023). This opinion was reflected in the Regulation on the Dual Form of Vocational Pre-Higher and Higher Education (Polozhennia pro dualnu..., 2023), developed in accordance with the Strategy for the Development of Higher Education in Ukraine for 2022–2032 (V Stratehiia rozvytku vyshchoi..., 2022), approved by Order No. 286 of February 23, 2022. It is focused on «meeting the expectations of education seekers regarding successful work in their profession, ..., facilitating and speeding up the transition of graduates from the field of education to the labor field, as well as generally increasing their competitiveness on the labor market» (Vprovadzhennia polozhennia..., 2023), i.e., taking into account the components «specific applicant – specific conditions – specific employer».

The goal of the study is to determine the directions of development of digital skills in business education students under the conditions of dual study mode.

The paper is attempting to answer the following **research questions**:

1. How interested are the students and potential employers in the implementation of dual study mode at DSTU?
2. What is the regulatory framework to support the dual study mode in Ukraine?
3. What are the ways of developing digital skills in students of higher business education under the dual form of study?

1. THE CONCEPT OF DUAL FORM OF HIGHER EDUCATION

1.1. Dual system of higher education: a brief introduction

Three German companies are believed to be at the forefront of dual higher education, namely in 1972, when Bosch, Daimler Benz and Standard Elektrik Lorenz agreed to launch a collaborative experiment aiming to enrich higher education with real work practices. They founded the first dual higher educational institution called Berufssakademie, with the goal of training graduates with highly demanded professional qualifications as well as high education diplomas (Göhringer, 2002).

Broadly speaking, the majority of definitions for work-based learning mode share the specific three-way relationship between the student or learner, employer or industry and the university, where students are able to integrate theory with meaningful and relevant work-based practices (Dean & Rook, 2023).

Evidently, this approach to university training offers benefits for educational management, since it nurtures highly motivated and responsible students, helps develop cooperation network nodes in the relevant industry, provides a clearer visions of

technological change within different companies as well as invites more applicants to study in a specific dual-mode study programs.

Germany has been a brilliant example for countries, aiming to build and strengthen ties between educational institutions and employers, leading to the preparation of highly-qualified graduates for the given economy (Graf et al., 2014), (Giannelli & Sergi, 2017), (Powell & Fortwengel, 2014).

Overall, the competitive nature of the global economy encourages European educators and researchers to look for efficient and proven educational modes to tackle unemployment and promote entrepreneurship skills. In this context, a research network CWIHE (European Network of Cooperative...) promotes sharing the best practices, knowledge, as well as challenges among stakeholders (universities, enterprises, governments, professionals, etc) in order to help them develop innovative programs that bring the business and academic world closer.

Despite all the promising aspects of real work practice inclusion into university programs, there are numerous challenges and difficulties proving how important it is to foster intense cooperation between all stakeholders and deep awareness and commitment of all participants. One must be driven by sober recognition of specific challenges and resistance factors in a given country and institution (Rienties et al., 2023). It appears to be particularly challenging for small to medium-sized enterprises to provide for diverse needs of students with disabilities and international students. Overall, work placements have been described as resource intensive for all participants. Besides, some work-integrated study programs might require significant funding, often of the governmental origin (Dean & Rook, 2023).

The vibrant topic of higher education enriched by real work experiences for the student reveals quite a broad use of terminology – work-based learning, work-integrated learning, workplace learning, work-based experience) (Rienties et al., 2023) and a group of terms based on the term “dual” – dual study mode, dual studies, dual (work-study) programs.

Moreover, new terms are coined in order to reflect recent challenges faced by the educational community. Namely, non-placement work-based learning (NPWBL) is a solution gaining global popularity as it represents a more sustainable study model enabling students to engage in meaningful work-learning opportunities without the need for extended, physical proximity in a workplace (Dean & Rook, 2023). The Covid-19 pandemic has been another challenge to all kinds of educators, pushing them into online educational environments and thus giving birth to yet another term – online WBL, with academic interest likely to keep growing (Rienties et al., 2023).

1.2. Organizational and normative framework for the implementation of dual study mode in Ukraine

The normative framework for the dual study mode is rather young in Ukraine. Dual form is defined as a method of obtaining higher education that involves a combination of training in educational institutions and other subjects of educational activity with training at workplaces, enterprises, institutions and organizations. Part of the scope of educational activities is performed at the workplace instead of classroom and independent work at the university (Vprovadzhennia polozhennia pro..., 2023).

According to the Ministry of Education and Science of Ukraine, the organization of training specialists in the dual learning mode is a complex and time-consuming process that «requires a more careful balancing of the interests of the parties. Therefore, the cooperation of scientists, educators, employers, their unions and professional associations, public and international organizations is key to developing domestic experience and developing models of training organization based on the dual form of education» (Buchynska et al., 2022, p. 5). The experience gained within the framework of the pilot project (Nakaz Ministerstva osvity..., 2019) of the Ministry of Education and Science of Ukraine in institutions of professional pre-higher and higher education with dual learning mode was reflected in the Regulation on the dual form of obtaining professional pre-higher and higher education (Polozhennia pro dualnu..., 2023) approved on April 13, 2023, which stands out as one of the key documents on the list regulating dual form of education. However, when introducing dual learning mode, one should pay attention to some differences in the normative subordination of all participants of such a process (institution of higher education – enterprise – student). The generalized scheme of documentary and regulatory support for the organization of training in a dual form is shown in Figure 1.

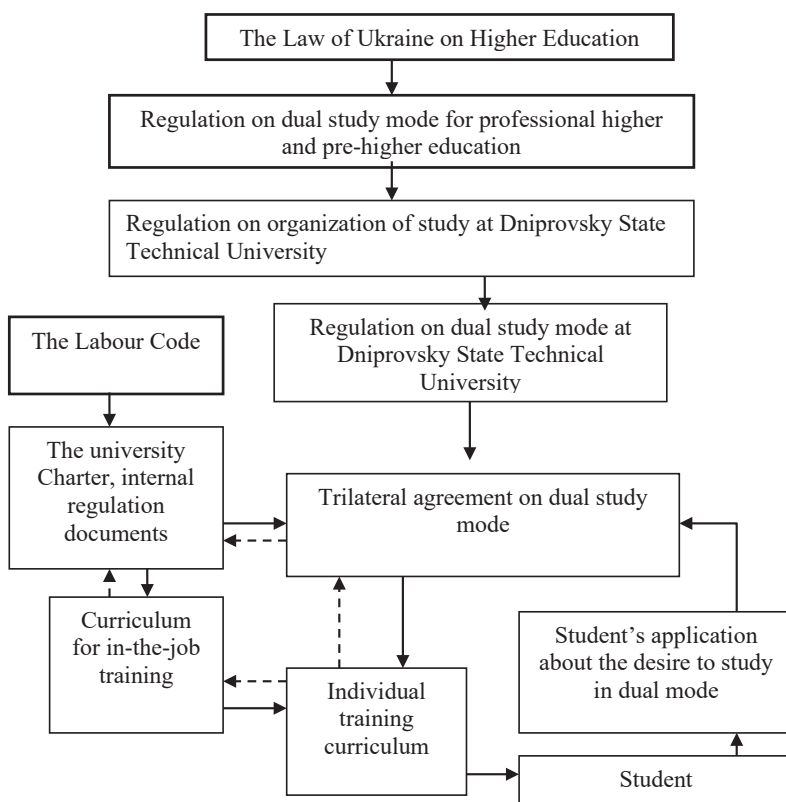


Figure 1. Generalized scheme of documentary and regulatory support for the organization of training in dual mode

Source: Own work.

The given scheme is designed to best focus on the interests and characteristics of all participants in the chain «specific student – specific conditions – specific employer», which is reflected in the Regulation on the dual form of obtaining higher education at Dniprovsky State Technical University (Hlushchenko & Dobryk, 2022).

Taking into account the «variety of specific needs, opportunities and limitations of partner companies and higher education institutions, as well as the expectations of education seekers» (Buhaichuk et al., 2022, p. 13), as well as the non-technical focus of business education, we rely on the model «Higher education with integrated practical training» according to the classification of models of dual higher education of the Main Committee of the Federal Institute of Vocational Training in Germany (Buhaichuk et al., 2022). Overall, there is already some positive experience of training business specialists using a dual mode of education, but it is necessary to take into account the forecasts of experts – «the IT field may take second place according to this form of education» (Kashchenko, 2023), while the first is taken by agricultural companies and enterprises. That is, business education will have to locate itself in a variety of existing models of dual higher education. However, «in the European Union, dual education is one of the drivers of digital and «green» transformation» (Vprovadzhennia dualnoi formy, 2023), and in each of these directions management and economic experts are indispensable.

2. DUAL STUDY AS PERCEIVED BY THE PARTICIPANTS

2.1. Students' perception of dual studies

As a basic institution of higher education the present research involves a typical higher educational institution with both technical and humanities specialties – Dniprovsky State Technical University (DSTU), Ukraine. In order to study the opinion of higher education applicants regarding the introduction of a dual form of higher education, the sociological laboratory of DSTU conducted an anonymous electronic survey based on a specially developed toolkit. The survey included participants from both humanities and technical fields of study.

The study «Dual education mode as viewed by DSTU students» aimed to explore the opinions of the interviewees regarding the implementation of the dual study mode at the university. This mode involves a combination of presence training at the university and practical training at large and medium-sized enterprises within the city and the region. The survey questions were multiple-choice, and a total of 483 responses were collected and analyzed. The employers' perspectives on this issue was also studied, with 10 enterprises classified as large, medium and micro businesses and 3 communal enterprises of the Kamianske City Council. The distribution of respondents by field of science is shown in Figure 2.

Overall: 63.2% of higher education students understand the content and features of dual education; 32.4% learned about this form of education only after reading the introduction to the questionnaire; and a small percentage (4.4%) indicated that they are not familiar with the topic at all.

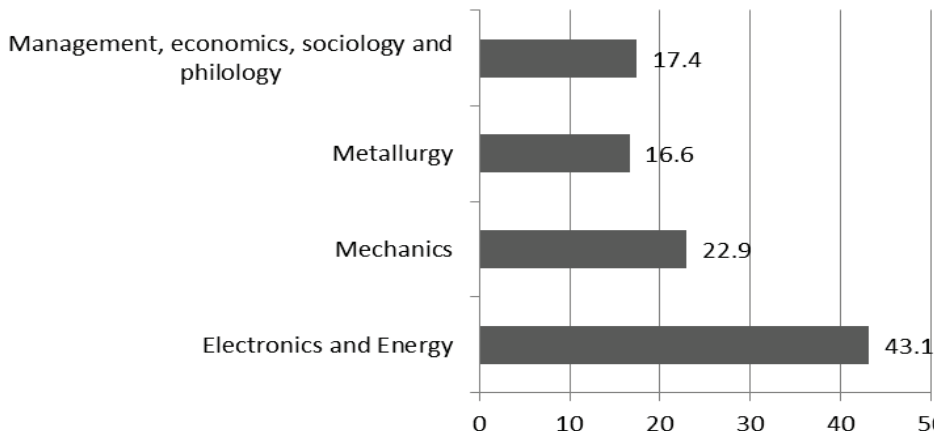


Figure 2. Data distribution concerning the percentage of students from different faculties

Source: Own work based on (Zvit pro rezultaty, 2023).

Moreover, the majority of applicants feel quite positive about the possibility of introducing the dual form of higher education at the university, with only a small percentage (6.3%) opposing such a mode of study. The distribution of respondents' viewpoints is illustrated in Figure 3.

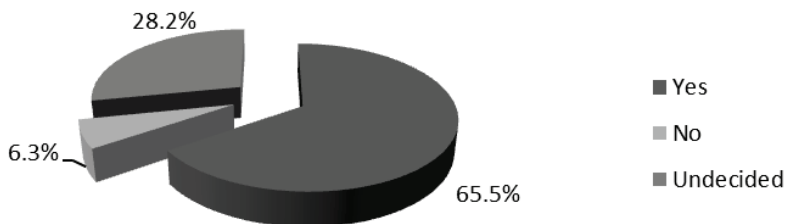


Figure 3. Data distribution concerning students' attitude to the introduction of the dual study mode

Source: Own work based on (Zvit pro rezultaty, 2023).

Applicants' motivations for considering a switch to dual-mode education are shown in Figure 4, highlighting their desire for official employment specialty, along with associated social guarantees.

In general, 23.6% of respondents are ready to switch to dual education, and their distribution according to the degree of readiness to change the educational format is shown in Figure 5.

It is worth noting that nearly half of the survey participants need additional information or clarification of organizational issues to settle this issue. Therefore, despite the 7.9% of students who strongly oppose changing the mode of education, young people are generally interested in this form of education and need fuller information on its possibilities, advantages, and prospects.

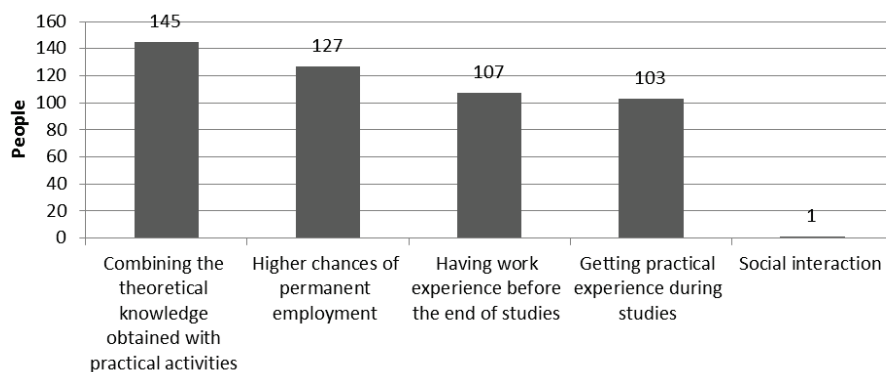


Figure 4. Data distribution concerning students' motivation to study in the dual mode

Source: Own work based on (Zvit pro rezultaty, 2023).

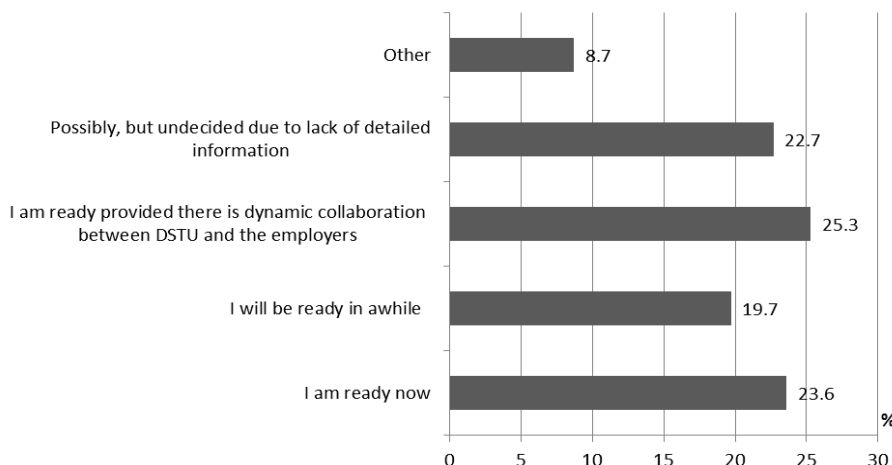


Figure 5. Data distribution concerning students' readiness to obtain higher education in dual mode

Source: Own work based on (Zvit pro rezultaty, 2023).

2.2. Employers' perception of dual study mode

The dual form of education is based on a close relationship between employer enterprises and the educational institution «on the basis of social partnership as an indicator of the economic, social and political maturity of society: the educational institution and the enterprise are equal partners who jointly develop and coordinate the educational process, control its results» (Azhazha, 2019, p. 21). This cooperation is heavily reliant on the opinion of employers regarding the introduction of dual form education at basic enterprises. The distribution of opinions among education seekers and potential employers regarding the expected advantages and obstacles in the implementation of the dual form is presented in Table 1. The table shows that both categories of interviewees, in addition to generally recognized benefits, recognized

other advantages (a focus on market needs, enhancing the company's image, and the potential for additional human resources and others).

Table 1. Advantages and obstacles to the introduction of dual study mode

Advantages	Respondents, %				Obstacles
	students	employers	students	employers	
Inviting a prepared specialist right after graduation	31.2	37.5	22.3	16.7	Extra financial costs for the enterprises
Preparing workers, adapted to realia of manufacturing process	30.4	43.8	19.1	33.3	Risky investment (low guarantee of employment for a university student)
Other advantages (focusing on the market's demand, building company's image, a chance to invite additional human resources and other)	38.4	18.7	17.5	16.7	Extra time effort without long-term guarantee
	–	–	10.2	16.7	Absent state support for the business / no students' motivation to work in Ukraine
	–	–	30.9	16.6	other
Total	100	100	100	100	Total

Source: Own work based on (Zvit pro rezultaty, 2023).

In contrast, applicants primarily view financial consideration to be the main obstacle to the introduction of dual study mode at enterprises, while employers complain about the lack of guarantees for retaining students within the company.

Both applicants and employers have also pointed out additional obstacles, including the lack of legislative norms, staffing, the shortage of mentors, and other factors. Besides, currently none of the respondents claimed that they do not see any obstacles in the implementation of the dual form of higher education.

Another financial aspect is the coverage of tuition fees for students studying in dual mode (60.1% of the interviewed students believe that the employer company should cover the cost of tuition, while company representatives unanimously express unwillingness to cover students' expenses). Table 2 presents the attitudes of respondents to the issue of students' salaries (as a percentage of the wages of a full-time employee in a specific position).

Table 2. Percentage distribution of wages paid to students in dual study mode

Per cent from the wages of a full-time employee	Students	employers
up to 40%	16.6 %	66.7 %
from 40 to 80%	64 %	32.9 %
up to 100%	19.4 %	0.4 %
Total	100 %	100 %

Source: Own work based on (Zvit pro rezultaty, 2023).

Thus, the financial aspects of each specific case requires in-depth discussions. As a potential compromise option, it is worth discussing increasing the wage proportion during training.

3. BOOSTING IT COMPETENCIES IN THE IMPLEMENTATION OF DUAL LEARNING MODE

“The fertile ground for the introduction of dual learning mode are the fields where there is a systemic shortage of qualified workers and employees” (Kashchenko, 2023) – recently, the IT field, in particular its non-technical component, belongs to the fields with a constant demand for specialists.

Simultaneously, students of almost all majors express a desire to enhance their IT skills in order to improve their learning outcomes. Previously, there were outlined the following prerequisites of expansion (individualization) of learning outcomes due to active involvement of IT elements and dual learning mode (Karimov et al., 2022):

- Data from a local DSTU sociological questionnaire shows that 62.7% of students combine study and work, with 48.3% partially aligned with the specialty, and 26.3% already work in the field (Profesiini priorityty ta ochikuvannia..., 2020);
- 78% of employers preferred the students’ skills which imply «so-called general competencies that do not depend on the main profile of the chosen profession» (Rashkevych, 2014) – in this context the use of an asynchronous learning mode based on ICTs is expected to bring maximum learning outcomes;
- elements of informal and nonformal learning have proven efficient in higher education when it comes to recognizing and accumulating learning outcomes (Cedefop, 2016).

All of the factors contributing to boosting IT competencies can be effectively implemented when adopting a dual form of education. This approach can partly meet the demands of employers who prioritize «the ability to quickly learn and adapt to new conditions, and also want practical experience even from beginners» (Shumilova, 2023). This can be accomplished by using educational online platforms for Ukrainian higher education students, especially in the context of blended learning (regardless of the study mode, in particular within the limits of the dual form). All the more so, since a similar experience already took place during the quarantine restrictions – «institutions that train students using the dual form were recommended to transfer such

students to distance learning. Among the resources that the enterprise could provide for training are online platforms, educational films, enterprise instructions, etc.» (Naidonova, 2022, p. 3). Thus, online platforms supported by the Ministry of Education and Science and the Ministry of Digital Transformation of Ukraine, are focused on the integration of relevant all-Ukrainian educational courses into the process of obtaining higher education in blended learning mode.

A vivid practical example of the use of online platforms in dual study mode with the aim of enhancing IT competencies of students from various majors is the interactive gamified courses from Ukrainian IT company Genesis and Product IT Foundation for Education, for instance, «Creation and development of IT products», «Marketing of IT products», «Analytics in product IT» (Cooperation, 2023).

The cycle of courses is focused on the acquisition of non-technical competencies in the IT sphere and is based on an interactive online platform (online tasks, videos, cases, testing) that provides access to various learning resources, such as:

- LMS-platforms with an internship simulator in a product IT company.
- Pre-recorded video lectures with expert practitioners.
- Abstracts, infographics and a glossary of terms.
- Video lectures in the format of a dialogue with industry leaders.
- Interactive tasks and tests on the platform.

Since the course is recommended for any specialty and is aimed at the business component of IT activities, we will consider the feasibility of its integration into the master's curriculum of a typical higher education institution in the specialty 073 «Management». The department quality assurance group for the “Management” specialty performed an analytical study of the IT-competencies of the proposed cycle of interactive courses and the competencies of the educational and professional program of the master's course “Management” and found significant overlaps in the field of general and professional competencies potentially developed by the students. The overlapping of competencies of the curriculum for specialty «Management» with the IT competencies of the specified cycle of courses on Ukrainian interactive online platform EdEra is presented in Tables 3 and 4.

In the case under consideration, the competencies of the management curriculum overlap with the focus skills (IT competencies) of the interactive course only partially, which is due to its specialized direction – product IT. Despite this, according to Shumilova, if the online course covers 100 percent of general competencies and a rather significant proportion of professional competencies of the university business course curriculum it can be argued that it is appropriate to integrate online courses into the educational process in order to activate the IT competencies of future business specialists. It will enable them to choose «career directions and employers, because they will be much more qualified than most graduates and, probably, even specialists with experience» (Shumilova, 2023).

Table 3. Overlapping of general competencies of master students with those provided by interactive online courses

Full or partial overlapping	Common competencies according to (Karimov et al., 2023)	Focus skills according to (Cooperation, 2023)
+	Ability to conduct research at an appropriate level;	Work in a team;
+	Ability to communicate with representatives of other professional groups of different levels (with experts from other fields of knowledge/types of economic activity);	Creativity and flexibility of thinking;
+	ICT skills;	Search for open information, analysis and judgments;
+	Ability to motivate people and move towards a common goal;	Presentation skills;
+	Ability to act on the basis of ethical considerations (motives);	Market structure, competitor analysis, target audience;
+	Ability to generate new ideas (creativity);	Peculiarities of interaction with technical and non-technical product teams;
+	Ability to abstract thinking, analysis and synthesis.	Methods of influencing user behavior;
100 %	overlapping	Platform policies and features of creating advertising creatives.

Source: Own work.

Table 4. Overlapping of special competencies of master manager students with those provided by interactive online courses

Full or partial overlapping	Special competencies according to (Karimov et al., 2023)	Focus skills according to (Cooperation, 2023)
+	Ability to select and use management concepts, methods and tools, including in accordance with defined goals and international standards;	Measurement and analysis of marketing and product metrics for user engagement and retention;
+	Ability to establish values, vision, mission, goals and criteria which the organization relies on to set directions of development, work out and implement appropriate strategies and plans;	Building a strategy, goals, components, application, selection of promotion channels, performance measurement
+	Ability of self-development, lifelong learning and effective self-management;	Ability to create a personal development plan;
-	Ability to effectively use and develop resources in the organization;	Aspects of interaction with technical and non-technical product teams;
+	Ability to create and organize effective communications in the management process;	Work in a team;
+	The ability to form leadership qualities and demonstrate them while managing people;	Methods of influencing consumer behavior;
+	Ability to develop projects and manage them, show initiative and entrepreneurship;	Presentation skills;
-	Ability to use psychological techniques to communicate with personnel;	Creation and development of IT products;
+	Ability to analyze, structure organizational problems, develop managerial solutions and provide conditions for their implementation;	Decision-making;
-	Ability to manage an organization and its development;	Searching for open information, analysis and making judgments;
+	Ability to apply statistical and mathematical methods and models to study socio-economic processes and systems.	Market structure, competitor analysis, target audience;
73 %	Overlapping	Analytics in product IT.

Source: Own work.

4. DISCUSSION

Enriching dual study mode programs with elements of informal learning can create more extensive employment opportunities for graduates. It is particularly true in extremely uncertain times that all educators are facing in post-COVID-19 era (Silva & Alvarez, 2021: p. 23), (Gajewski, 2021).

Logically, these uncertain times produce success and failure that can serve as valuable learning experiences. Recent research into the opinions of crisis management leaders completing a work-based master's program in the UK revealed both aspects. The study uncovers significant improvements in leaders' adaptive skills, confidence and self-reliance. However, it also highlights universities' limited interaction with leaders (Rowe et al., 2023). These findings align with our previous reflection on enriching the individual learning trajectories of bachelor and master students in the specialty "Management" with maximum recognition and accumulation of learning out-comes from non-formal and informal learning. There must be a vibrant interaction between educators and informal learning platforms for the learning outcomes to enter the study agenda naturally (Karimov et al., 2022).

CONCLUSION

The study has demonstrated that students showed considerable enthusiasm for promoting cooperation between DSTU and employer companies in the implementation of the dual form of higher education, which allows us to ascertain its significant prospects in the country, especially when implementing blended learning mode. Also, this form of study boosts the acquisition of IT competencies and skills of future specialists, regardless of their chosen specialty. However, a number of unresolved issues should be noted, including:

- financial issues (additional costs for both employer companies and higher education institutions, incentives for applicants and companies, state costs, and others);
- regulatory (responsibility of all participants as well as terms of cooperation and others);
- organizational (implementation of asynchronous mode of training and overlapping of courses for institutional and dual forms of higher education, methodical support of online platforms and interactive courses, and others).

As a way of addressing the organizational challenges, it is advisable to consider integrating open online courses into university curricula. This integration should be achieved by deepening cooperation between the State (Ministry of Education), institutions (higher educational institutions and enterprises), and online educational platforms. This cooperation should ensure that online courses align with relevant educational and professional programs and standards, while encouraging partner enterprises to develop their own educational online platforms/courses. Furthermore, relevant departments may explore the possibility of enhancing curriculum specialization within one specialty. For example, they can develop study programs like «Product Management» or «IT Management» within the specialty «Management».

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