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Assessment of the quality of curricula and educational technologies in vocational education in Ukraine in accordance with modern labor market requirements

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ABSTRACT

The objective of this study is to assess the quality of curricula and educational technologies in vocational education in Ukraine, with a particular emphasis on aligning them with the demands of the current labor market. The aim of the study is to identify the strengths and weaknesses of these curricula and provide recommendations for their improvement to increase the competitiveness of students in the labor market. The principal research methods utilized in this study were an analysis of the regulatory framework and content analysis of scientific publications. The results of the study show that the modern labor market significantly affects both the content of educational programs and the criteria for assessing the quality of educational technologies. The relevance of curricula to labor market needs is increasingly becoming a key criterion for the effectiveness of education. Additionally, international quality assessment approaches are being widely adopted. Consequently, the effectiveness of quality assessment in curricula and educational technologies is grounded in a combination of labor market analysis and international best practices in education quality evaluation.

Keywords: Educational standards. Professional training. Market adaptation. Evaluation of curricula. Learning technologies.

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1. Introduction

1.1. Problem statement

Currently, the globalization of education, understood as the creation of a common global educational space, when differences between educational systems are erased, poses the challenge for Ukraine, on the one hand, to modernize its own national system of education quality assessment, and on the other hand, to implement the best of international experience and adapt it to its needs and values [1]. This opportunity involves the use of new technologies, active implementation of interactive educational platforms and online courses, as well as the development of international student and teacher exchange programs [2].

In recent decades, the world has witnessed major changes in the field of quality assessment of curricula and educational technologies. National certification framework requirements as well as higher education institutions' goals to raise the caliber of instruction they provide to aspiring professionals are the driving forces behind reforms in this field. The reason for changing approaches to assessment lies in the huge impact it has on

the quality of learning [3]. Educators recognize that assessment is a central aspect of learning that determines how students learn new knowledge, skills and abilities and what they achieve.

Assessing the effectiveness of learning is not just an academic exercise, but a key element in the development and management of talents of future professionals in all fields of human activity [4]. This procedure is of fundamental importance and has a significant impact on the quality of educational process management and its results. This article will discuss why the evaluation of the effectiveness of curricula and educational technologies is so important and what problems an adequate approach to its implementation can solve [5].

The evaluation of the effectiveness of curricula and educational technologies is based on several key principles from a theoretical point of view. Firstly, it assumes that learning should be purposeful and aimed at achieving specific results, whether it is improving professional skills, expanding knowledge, or changing behavior [6]. Secondly, without proper evaluation, it is difficult to establish whether and to what extent the goals have been achieved [7]. Finally, evaluation provides feedback to both students and teachers, which contributes to the continuous improvement of educational processes [8].

The lack of systematic evaluation of the effectiveness of training leads to several significant problems:

1. *Inefficient use of resources.* Without proper assessment, organizations risk spending significant financial resources on programs that do not produce the desired results, leading to unjustified budget expenditures [9].
2. *Insufficient staff development. If* training does not meet the needs of employees or is ineffective, it can lead to insufficient staff development, which, in turn, negatively affects productivity and quality of work [10].
3. *Lack of feedback.* Without assessment, the learning process is deprived of constructive feedback, which makes it difficult to improve both the learning process and its results [11].
4. *Decreased motivation.* Employees may feel that their efforts and time spent on learning are not properly valued, which can negatively affect their motivation and engagement in the learning process [12].

1.2. Review of recent sources

This problem has been the subject of comprehensive and rigorous studies in the EU, the UK, the USA, Australia, and Japan. The scientific literature offers various definitions of the term "assessment." Anggraini and Handayani [13] define assessment in their study as a process of gathering and discussing information from multiple and diverse sources to analyze in depth what learners know, understand and can do with their knowledge because of educational activities. According to the authors, the assessment process is completed when the results are used to improve subsequent learning. Student assessment is the responsibility of the teaching staff, and it involves gathering comprehensive information for the purposes of analyzing, discussing, and evaluating the skills that have been tested. N. Barakat, A. Al-Shalash, M. Biswas, S.-F. Chou, and T. Khajah [14] assert that the term "assessment" encompasses a range of processes that gauge student learning outcomes. According to R. Makhachashvili and I. Semenist [15], assessment involves the systematic gathering of data concerning the learning process. This process requires a significant investment of time, knowledge, experience, and resources to inform decisions on how to enhance the quality of learning.

Thus, the relevance of this topic is justified by the many controversies surrounding the existing system of education quality assessment. An analysis of the existing system of national assessment of the quality of general education will help to identify strengths and weaknesses, determine successful approaches and methods, and outline aspects that need further development and modification [16]. The study focuses on the study of established methods of evaluating the effectiveness of training programs and educational technologies in Ukraine, taking into account the modern requirements of the labor market**.**

1.3. Objective of the study

The purpose of this study is to identify and assess the quality of curricula and educational technologies in vocational education in Ukraine, considering the current labor market requirements. The study is aimed at identifying the strengths and weaknesses of educational programs and providing recommendations for their

improvement to make students more competitive in the labor market. This is done considering current standards and employers' expectations.

2. Research method

This study can be classified as explanatory, as it clarifies and explains the relationship between market demands and the assessment of the quality of curricula and educational technologies in Ukraine. Since the sample of scientific articles and regulations was studied at the same time in terms of time horizon, this study is considered cross-sectional.

The study was conducted in several stages. At the first stage, the purpose of the study was defined and scientific materials for the study were selected. The regulatory and legal framework was determined, which consists of: Law of Ukraine "On standardization" [17], the Law of Ukraine "On Higher Education" [18], Recommendations on the application of criteria for assessing the quality of the educational program [19] and the Concept of implementation of the state policy in the field of vocational education "Modern vocational education for the period up to 2027" [20].

At the second stage, using general scientific methods, the method of documentary research and content analysis of scientific literature, the state of quality assessment of curricula and educational technologies in vocational education in Ukraine was studied. The outcomes obtained are compared with the results of previous studies.

3. Results and discussion

Currently, scientific research considers the competitiveness of future specialists in different aspects (economic, organizational, social, psychological and pedagogical), which indicates the integrative nature of this phenomenon, which is complex and manifests itself at different levels: personal, educational institution and social. All factors of competitiveness in the labor market can be divided into two groups: external and internal. External factors include factors that determine the labor market: education, specialty, work experience, demand for the services of young professionals in a particular field, availability of vacancies, demand and supply of labor services from other categories of the population. Internal factors of competitiveness include specific features of their human capital and personal qualities that allow them to compete in the labor market. And the key in this variety of factors is the assessment of the quality of educational programs and training courses for future specialists [21].

The learning space in whole and higher education provided by higher education institutions, in particular, play a priority role in the formation of a young specialist. According to the new standards (the so-called "three plus" standards), the educational process is not focused on the content of education (in the form of knowledge, skills and abilities), but on learning outcomes in the form of a set of competencies that change quite dynamically, both quantitatively and qualitatively [22].

The competitiveness of graduates largely determines the competitiveness of the HEIs themselves, including increased requirements to the organization of various areas of the institution's activities, the quality of the teaching staff, and the entire history of its existence. The competitiveness of an HEI is also determined by its competitive advantages in relation to other HEIs of the same profile. In fact, a significant number of higher education institutions are state budgetary educational institutions that are subject to fairly strict regulation, with a certain degree of autonomy [23]. At the same time, one of the basic principles of traditional state educational policy is not questioned: training of specialists with higher education should be concentrated mainly at the state level. Table 1 shows the requirements of the modern labor market for vocational education.

Table 1. Modern labor market requirements for vocational education

Requirement	Explanation	Examples of implementation in the educational process
Flexibility and adaptability	Ability to quickly adapt to changes in the labor market, master new technologies and skills.	Modular structure of study programs, the possibility of choosing specializations, online courses, internships.

Practical orientation	Practical skills, ability to apply theoretical knowledge in practice.	Project activities, laboratory work, internships at enterprises, simulation models.
Interdisciplinarity	Ability to combine knowledge from different fields and think systematically.	Integrated courses, inter-faculty projects, problem-based learning.
Digital literacy	Proficiency in modern digital tools and technologies.	Using digital platforms for learning, software development, and data analysis.
Soft skills	Communication skills, leadership qualities, creativity, ability to work in a team.	Soft skills training, participation in student organizations, debates, presentations.
Continuous training	Readiness for continuous self-development and knowledge updating.	Online courses, webinars, scientific conferences, mentoring.
Creativity and innovation	Ability to generate new ideas and solve non-standard problems.	Projects aimed at developing new products or services, hackathons, start-up competitions.
Critical thinking	Ability to analyze information, evaluate different points of view, and make informed decisions.	Problem tasks, discussions, research projects.
Social responsibility	Understanding of social problems and willingness to participate in their solution.	Social projects, volunteering, ethical aspects of professional activity.
Global consciousness	Understanding of global issues and ability to work in an international environment.	International projects, learning foreign languages, cultural exchange.

To meet the needs of the modern labor market, Table 1 identifies such essential components of modern vocational education as flexibility, practical orientation and interdisciplinarity. Modular programs and online courses provide flexibility and adaptation, enabling students to customize their education to changing market demands. Through practical experiences such as internships and project work, students are able to apply their theoretical knowledge in real-world situations, which is known as practical orientation.

Today, higher education should be considered not only as an institution of the market economy, but first of all as an institution of the state that ensures the efficiency of the country's development by providing highly qualified specialists to the labor market [24]. However, despite the rather high requirements of society (state and commercial organizations, enterprises) to the quality and composition of intellectual and professional labour resources, which implies both an objective need for personnel and a sufficient level of remuneration, only specialists in a narrow range of areas with long work experience are in demand. All of this makes it impossible for most young professionals to find opportunities for professional and creative self-realization.

As mentioned above, labor market conditions determine the effectiveness of curricula, especially in vocational education. The labor market determines what knowledge and skills are needed in curricula to make future

professionals competitive and in demand by employers. HEIs should constantly monitor labor market trends and changes in order to adjust the content of their courses in a timely manner. Changes in the labor market have a significant impact on the methods of evaluating educational programs [25]. The effectiveness of educational programs is measured not only by the academic performance of students, but also by their ability to use knowledge and skills in the real world. It includes an assessment of how employable graduates are, how mobile they are in their careers, and how well their skills match the needs of employers [26]. Table 2 shows the main methods for assessing the quality of curricula and educational technologies in vocational education in Ukraine.

Table 2. Methods for assessing the quality of curricula and educational technologies in vocational education in Ukraine

Assessment method	**Description of the method**	**Advantages**	**Disadvantages**	**Application in the context of modern labor market requirements**
Feedback from alumni	Surveys, questionnaires, interviews with graduates on satisfaction with the program, relevance of knowledge and skills for employment.	Direct assessment of learning outcomes, identifying strengths and weaknesses of the program.	Assessments may be subjective, depending on the time that has passed since graduation.	It allows us to determine how well the program meets the needs of employers and to prepare graduates for rapid changes in the labor market.
Assessment of employers	Questionnaires, focus groups with representatives of enterprises on the compliance of graduates' competences with the requirements of jobs.	Evaluation of the program in terms of practical significance.	The sample of employers may be limited, depending on their willingness to participate in the assessment.	It helps to identify the gap between theoretical training and the practical needs of the labor market.
Comparative analysis of programs	Comparison of study programs with similar programs of other institutions, national and international standards.	Identify best practices, determine the strengths and weaknesses of your own program.	There may be a lack of comparable data and difficulty in unifying the evaluation criteria.	Contributes to improving the quality of programs by adopting best practices.
Monitoring of graduates' employment	Statistical analysis of graduate employment data and salary dynamics.	Objective evaluation of the programmer’s effectiveness in terms of employment.	It may not take into account other aspects of graduates' success (e.g., career progression).	It allows us to assess the extent to which the program contributes to the competitiveness of graduates in the labor market.

Expert assessment	Evaluation of the program by experts in the field of education and the relevant profession.	Comprehensive evaluation, taking into account various aspects of the program.	Assessments may be subjective and depend on the competence of experts.	It helps to identify program shortcomings and offer recommendations for improvement.
Assessment through student projects	Assessment of the quality of projects completed by students and their compliance with labor market requirements.	Practical assessment of students' knowledge and skills.	The assessment may be subjective, depending on the complexity of the project.	It allows us to assess the extent to which students are able to apply the knowledge they have acquired in practice.
Assessment using online platforms	Use of online platforms to collect data on student satisfaction, learning effectiveness, and test results.	Efficiency of data collection, scalability.	Dependence on the quality of the developed assessment tools and student engagement.	

The table 2 presents various techniques for evaluating the quality of educational technologies and curricula within Ukraine's vocational education system. Each approach offers distinct insights, but also comes with specific limitations. Alumni feedback provides a clear assessment of how effectively an institution prepares students for the workforce; however, these evaluations may vary depending on the time elapsed since graduation. Employer assessments are valuable for gauging the relevance of graduates' skills in real-world contexts, although the sample size may be limited by the level of employer participation. International practices include the following approaches to assessing the quality of student learning:

1. Learning-oriented method.
2. Student-cantered method.
3. Consistent assessment.
4. Understanding that a wide range of assessment methods is necessary.

In the 1960s and 1970s, the United States introduced a results-oriented approach to education. R. Mager, one of the most famous advocates of this type of learning, suggested that specific statements should be made about the results that are observed. He called these statements challenges. He tried to clarify what kind of training students would have after their studies and how this training would be assessed using learning tasks and performance outcomes. The European Credit Transfer and Accumulation System (ECTS) first used the term “learning outcomes” in 2005. In the context of education, this term denotes a statement of the knowledge, understanding, and abilities that a learner is expected to attain at the conclusion of a defined period of study [27].

The learning outcomes approach is becoming increasingly common internationally. Study modules and programs of HEIs in countries participating in the Bologna Process are designed with the planned learning outcomes in mind. Assessment procedures and methods are developed and planned as part of the whole program in such a way that they are consistent with the planned learning outcomes and teaching methods. This approach requires that learning outcomes be clearly and unambiguously stated. They specify the courses given, the organization and substance of the learning, the teaching strategies, the evaluation procedure, the learning environment, and the schedule. They also offer the foundation for evaluating curriculum [28].

It is a prerequisite that students receive feedback on how they are doing in their work. Instructors focus not so much on grades as on feedback, which can help them show students how to improve their work. The advantage of this approach is that feedback, which promotes proper self-esteem and self-improvement in students, is a

form of natural motivation. As a result of such activities, students become more and more developed and conscious of subjects of knowledge. They think about what they learn and how they learn it. All this helps teachers and students to analyze the existing learning environment and find ways to improve it. In a student-centered approach, teachers conduct assessments, regularly gathering students' opinions on how well they are being taught and whether a course is helping them in their learning or not. It is important for teachers to know what students understand and what they do not understand in order to change their teaching in a timely manner [29].

Evaluation can help focus on what students know and can do after the program [29, 30]. Evaluation helps to determine whether a program is helping to achieve its intended outcomes. To make the right decision, it is important to know what is not taught in a school or course. The Assessment Handbook, created by the University of Walster (Northern Ireland), describes the main elements of effective assessment [31, 32].

Curriculum evaluation is important to ensure the quality of education and compliance with modern requirements [33, 34]. It provides an opportunity to improve course content and teaching methods, adapt programs to new technologies and the labor market, and take into account the needs of students. Regular assessment helps organizations meet national and international standards, facilitates accreditation and optimizes the use of resources [35]. This is a key tool for the constant improvement of the educational process and the quality of learning.

The study's [36] findings demonstrate that efficient techniques for evaluating educational quality have a direct impact on graduates' and institutions' competitiveness. The author claims that a well-structured assessment aids in determining the advantages and disadvantages of educational initiatives, hence promoting ongoing enhancement. For instance, it is feasible to modify curriculum to match the actual needs of the labor market through the routine examination of feedback from employers and graduates. This raises the applicability of the knowledge and skills learned to current requirements.

Improving tools for assessing educational quality is strongly related to improving a student-cantered approach [37]. The idea that the educational process should be in line with each student's needs, interests, and unique qualities is at the heart of student-cantered learning. Employing more precise, adaptable, and varied evaluation techniques that take into consideration not only academic accomplishments but also the growth of practical skills, critical thinking, and social responsibility is crucial to achieving this goal. New evaluation techniques make it easier to determine each student's unique needs and enable curriculum modifications that guarantee a more efficient learning environment.

Global improvements in educational quality over the past several years are a reflection of both the rapid advancement of technology and the changing socioeconomic landscape. The integration of digital technology is a significant trend that is increasing accessibility and personalization of education, as work [38] points out. Online learning environments, courses, and interactive materials encourage students to learn in a more engaging way and assist them in acquiring the essential digital skills [39].

The article indicates that educational programs are becoming more and more tailored to the demands of the labor market [40]. In order to better prepare students for issues they will face in the real world, this adaptation entails combining practical skills like critical thinking, problem-solving, and project-based learning.

According to the words [41], individualized and hybrid learning are prominent trends, and adaptive learning systems design customized learning routes based on each student's particular requirements. This method embraces a range of learning styles and improves learning efficiency. A growing trend in education is mixed learning, which blends online and conventional individual instruction. This strategy offers flexibility and access to a wide range of resources by utilizing the best aspects of both systems [42].

As a result, every evaluation technique has inherent biases and limits. The primary goal of outcome-based assessment is to meet predetermined learning objectives, which may restrict the evaluation process and obscure many significant facets of students' growth and learning. Inadequate consideration of students' varied needs and talents in learning outcomes increases the possibility of bias and unfair treatment. Despite emphasizing students' needs and interests, the student-centered evaluation approach might present practical issues. Because of the difficulty of objective assessment in a customized manner, it may not be universally applicable to a diverse student population, and biases may arise.

There can be restrictions on effective assessment, which entails applying the best strategies to meet learning objectives. For instance, specific information or abilities that are not part of common processes may be

undervalued by the assessment techniques that were selected. Furthermore, biases against pupils who are better prepared for one kind of work but less so for another may exist, contingent on the methodologies employed.

Although using a variety of assessment techniques allows for a more thorough approach, it can also make the evaluation process more difficult, particularly if some techniques are not modified for every student [43]. The use of different approaches can lead to circumstances in which particular student groups are better or worse off depending on their unique qualities, which can also result in biased evaluation.

4. Conclusions

A comprehensive and systematic approach is needed to train competitive specialists with higher education that meet the real needs of the economy and labor market. This requires the active involvement of the state, strengthening social interaction between individuals, society and higher education institutions. The concept of competitiveness should become the basis for designing educational activities. The state should provide an effective system to promote youth employment, focused on their needs and the needs of the market. Young people need to develop their capabilities: learn to objectively assess the prospects of their future profession, be mobile in the labor market, and gain work experience.

In higher education, assessment is crucial to the learning process for students. It enhances and boosts the efficacy of learning while also managing the learning processes. The student-centred learning outcomes approach, student-centred approach, effective assessment and the use of various assessment tools are the main methodologies used in higher education institutions abroad to assess the quality of education provided.

Declaration of competing interest

The authors declare their impartiality and independence. The authors have not received funding from any stakeholders. The conclusions are based solely on the findings of the study.

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