

## ASSESSMENT OF VOCATIONAL SKILLS AND LEARNING OUTCOMES IN VET: A REVIEW OF INTERNATIONAL INITIATIVES

### EVALUACIÓN DE LAS COMPETENCIAS PROFESIONALES Y LOS RESULTADOS DEL APRENDIZAJE EN LA EFP: UNA REVISIÓN DE LAS INICIATIVAS INTERNACIONALES

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#### ABSTRACT

There is a growing need for valid tools for assessing skills and certifying qualifications in the context of increasing labour migration and mobility. Due to the growing internationalization of business activities, companies are interested in standardized skills assessments that ensure valid and comparable ratings of job applicants and employees. At the same time, assessment of professional or vocational skills, which are highly domain-specific and numerous, remains challenging, especially in terms of comparability. Therefore, objective skills assessment tops the list of challenges faced by national VET systems.

This paper presents an overview of practices and tools for assessing vocational skills and VET learning outcomes, and covers the following issues: a) current practices and challenges in measuring vocational skills and learning outcomes in VET; b) initiatives for internationally comparable assessment of vocational skills, including PISA-VET and WorldSkills competitions; c) national initiatives for assessment of VET learning outcomes in the cases of Germany and Russia; d) labor market- and industry-driven initiatives in skills assessment for job seekers and qualification assurance. This paper contributes to the literature on skills assessment by providing a more comprehensive picture of approaches to skills assessments, including well-established ones and emerging initiatives outside the field of measuring learning outcomes in education.

**Key words:** skills assessment, vocational education and training (VET), large-scale assessment, skills competition, certification of skills.

#### RESUMEN

Existe una creciente necesidad de herramientas válidas para evaluar las capacidades y certificar las cualificaciones en el contexto del aumento de la migración laboral y la movilidad. Debido a la creciente internacionalización de las actividades empresariales, las empresas están interesadas en evaluaciones de habilidades estandarizadas que garanticen calificaciones válidas y comparables de los solicitantes de empleo y los empleados. Al mismo tiempo, la evaluación de las competencias profesionales, que son muy específicas y numerosas, sigue siendo un reto, especialmente en términos de comparabilidad. Por lo tanto, la evaluación objetiva de las capacidades encabeza la lista de desafíos a los que se enfrentan los sistemas nacionales de EFP.

Este documento presenta una visión general de las prácticas y herramientas para evaluar las habilidades vocacionales y los resultados de aprendizaje de la FP, y cubre los siguientes temas: a) prácticas actuales y desafíos en la medición de las habilidades vocacionales y los resultados de aprendizaje en la FP; b) iniciativas para la evaluación comparable internacionalmente de las habilidades vocacionales, incluidos los concursos PISA-FP y WorldSkills; c) iniciativas nacionales para la evaluación de los resultados de aprendizaje de la FP en los casos de Alemania y Rusia; d) iniciativas impulsadas por el mercado laboral y la industria en la evaluación de habilidades para los solicitantes de empleo y el control de las cualificaciones. Este documento es un aporte a la bibliografía sobre el tema en cuestión, al proporcionar una imagen más completa de los enfoques de evaluación de habilidades, incluidos los bien establecidos y las iniciativas emergentes fuera del campo de la medición de los resultados de aprendizaje en la educación.

**Palabras clave:** evaluación de habilidades, educación y formación profesional (EFP), evaluación a gran escala, competencia de habilidades, certificación de habilidades.

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## INTRODUCTION

Accelerating technological innovation has resulted in new challenges confronting national vocational education systems. The nature of the global workforce is rapidly changing. Employment in traditional industries and professions is quickly shrinking, under pressure from automation and robotics (WEF, 2018). On the other hand, changing technologies create new industries, professions, and jobs (Bakhshi et al, 2017). Technological change is transforming the nature of labor. Demand for nonroutine, creative labor is constantly increasing. The beneficiaries of this shift in demand are not only the workers who offer highly-qualified intellectual labor, who have access to new, highly-paid jobs; new jobs are also being created for workers capable of nonroutine tasks that combine manual and intellectual skills. However, workers engaged in highly-qualified routine labor are at the highest risk of layoffs and of being forced out by automation (WTO, 2017). In addition, the environment of rapid changes in the nature and conditions of labor is increasing the importance of universal skills, which allow workers to adapt to multiple job changes and shifting social dynamics (World Bank, 2019).

Consequently, vocational training and job preparation systems around the world are facing difficult and multifaceted transformations. These are tectonic shifts in the traditional institutions of mass education that came into being in the industrial age, leading to the emergence of completely new education providers that take on the responsibility for teaching modern skills to young people and adults. The transformation of education institutions includes a shift in approaches and practices of skills assessment. One aspect of this process is a new demand for modernizing assessment of learning outcomes. Tools must be developed to assess the results of a course of study taken by an individual student, as well as the effectiveness of a given module or education program (CEDEFOP, 2017). The second, broader context, involving the interplay of technology and society, is equally important. There is a demand to confirm the readiness of a worker to enter the labor market, and to diagnose the deficit or skills gap that must be compensated with further education (Sanchez et al, 2018).

This paper aims to provide an overview of key projects and initiatives in assessment of vocational skills and learning outcomes that have emerged on the international, national, industry, and corporate levels in the past 20 years. It describes methods of individual skills assessment, analyzing research frameworks and assessment tools for vocational graduates. The paper also describes the political and social contexts that impact the training and assessment of modern skills. The analytical framework consists of three pillars:

- a) **Key stakeholders defining the parameters of skills assessment systems.** The growing and diversifying demand for skills assessment has led to a widening circle of players carrying out long-term strategies in this field. They include well-respected international organizations (UNESCO, OECD, World Bank, and others), individual governments, large corporations, research groups, and education institutions.
- b) **The institutional landscape within which skills assessment takes place.** Labor markets of the industrial age were limited by national borders, which meant that the institutions for skills development, assessment, and accreditation (professional standards, certification systems, etc.) remained enclosed and defined by national boundaries. Today's globalized economy and international division of labor has reached the point where skills standards for mid-level personnel have become part of the international discussion (Zhao et al, 2019). As a result, new international institutions for carrying out skills certification have emerged. These new international organizations are, to some degree, in conflict with traditional institutions operating on the national level.

- c) **The relationship between specific and generic skills.** Demand for skills in the post-industrial sector of the economy has become much more multifaceted than 50 years ago, or even 15 years ago. Previously, an assembly line worker was primarily responsible for carrying out a narrow range of manual tasks; today, the demands are more intellectually complex. Universal competencies, including problem-solving, working effectively with others, and self-organization, represent a separate skill set, which is viewed not just as a supplement to hard skills, but also as a mandatory requirement for a worker's adaptation in a rapidly changing technological environment. As a result, assessing worker skills has transformed into a complex field, within which several independent aspects are in play. Depending on which skills or combination of skills are prioritized by specific stakeholders, different tools for objectively assessing these skills are being developed. There is a demand to ensure the validity and reliability of these tools.

The structure of this paper takes the following form: part 1 describes the projects and initiatives for multifaceted international comparison of VET systems that are being carried out by international organizations (OECD, World Bank, and others). Emphasis is placed on the ways in which these projects analyze education outcomes for VET students and graduates. Part 2 looks at several international projects aimed exclusively at internationally comparable skills assessment. Part 3 analyzes examples of skills assessment projects carried out on the national level, with case studies of the ASCOT system in Germany as well as the Russian Federation initiative in which a national exam system is being implemented on the basis of the WorldSkills International methodology. Part 4 studies labor-market and industry-driven skills assessment initiatives. The concluding section summarizes insights and directions for further study of this topic.

## **1. ASSESSMENT OF LEARNING OUTCOMES IN THE VET SECTOR: STAKEHOLDERS OF COMPARATIVE STUDIES**

Despite their complexity, comparative studies in the field of VET learning outcomes are a constant priority for international organizations in the education policy field. International comparisons of the level of preparation achieved by vocational institutions make it possible to identify successful practices and scale them up. We will now take a closer look at some of the key stakeholders taking part in international studies of learning outcomes in the VET sector.

The Organization for Economic Co-operation and Development (OECD) is one of the world's largest international organizations. It aims to solve social, ecological, and economic problems attendant to the globalization process. One of its tasks is to create an information environment for exchanging knowledge and experience, as well as for fostering cooperation among partner countries. Education issues fall within the OECD mandate. The key OECD projects covering vocational education are Learning for Jobs and Skills Beyond School.

The OECD carried out the Learning for Jobs project between 2007 and 2010 (OECD, 2010). 17 countries took part: Australia, Austria, Belgium, Canada, Chile, China, Czech Republic, Germany, Hungary, Ireland, Korea, Mexico, Norway, Sweden, Switzerland, Great Britain, and the USA. The goal of Learning for Jobs was to collect data on the condition of VET systems, as well as to produce recommendations for improving coordination between national VET systems and labor market demand. The study's methodology included a questionnaire for administrators in different countries, covering issues involved in training a highly-qualified workforce. The answers received, together with contextual information, were synthesized in interviews with experts from participating countries. The

international comparison phase of the project combined qualitative reports on the institutional structures of national VET systems with statistical data.

The total set of data analyzed was extremely wide, and included measures of VET enrollment rates, levels of funding for vocational training, levels of investment in the VET system on the part of industry, ratios of general and professional education components in VET programs, as well as data on opportunities for job placement of VET graduates in different countries. One of the most important indicators used in the international survey was a measure of the quality of professional education at companies that carried out practical training. It is important to highlight that the students' levels of professional skills were not measured directly via a vetted testing procedure. Indirect indicators were used, such as the presence of norms and standards in the practical training programs run by companies.

The Skills Beyond School project is another OECD initiative in the field of comparative study of national systems of vocational education. It has been ongoing since 2012. The participating countries are Austria, Denmark, Egypt, Germany, Israel, Kazakhstan, Korea, the Netherlands, Peru, Slovakia, South Africa, Switzerland, Great Britain (England) and the United States. The study aims to analyze existing best-practices, as well as challenges, in the relationship between VET systems and the labor market. Additional questions include issues of inclusivity, accessibility, professional orientation, financing, governance, education quality, implementation of practical professional training, assessment of learning outcomes, and ties to other levels of education. As was the case with previous studies, Skills Beyond School did not measure the level of professional skills of students in different countries. However, this study included an analysis of linguistic and mathematical literacy among VET students, based on OECD PIAAC data. These educational accomplishments were viewed as an important predictor of graduates' professional success (OECD, 2014).

The World Bank is a leading international financial institution which aims to support socioeconomic progress in developing nations. The World Bank is active in a number of areas, including fighting poverty, supporting economic growth, and improving quality of life in developing countries. Education is one of its most important endeavors in the course of creating a foundation for stable, long-term development. The key World Bank project in the field of vocational education is SABER Workforce Development, launched in 2011. It aims to analyze VET systems, assessing and diagnosing potential development strategies for them. Participating countries include Armenia, Bulgaria, Vietnam, Georgia, Granada, Egypt, Iraq, Ireland, Jordan, Yemen, China, Korea, Macedonia, Malaysia, Moldova, Morocco, Romania, Singapore, Tanzania, Tunisia, Turkey, Uganda, Chad, and others. One of the core aims of the project is to aggregate data on national VET systems for comparative study. An analysis of the project's data gives a clear picture of what it takes for countries to systematically improve their VET systems.

The SABER Workforce Development methodology uses a benchmarking approach. The application of benchmarks is done not to create a rating system, establishing leaders and outsiders. Rather, the benchmarking strategy seeks to give each participating country the opportunity to compare itself to other countries so as to reveal weak and strong points. This allows them to improve their VET systems, bringing them in line with the leading countries. SABER Workforce Development conducts an analysis of the factors contributing to the behavior of education institutions, employers, and consumers of education services. This is done in a three-part framework: workforce training strategies, systems of governance and oversight, and the education process. Data for the study is gathered via interviews and surveys of decision-makers in the field of education policy, as well as other stakeholders interested in workforce development (Tan et al, 2013).

In studying strategies for VET development in various countries, World Bank experts analyzed VET development priorities, and how these priorities correspond to development priorities for the country's economy as a whole (economic growth, fighting poverty, etc.). Among the key indicators used in the SABER Workforce Development methodology is the information provided to education institutions about the labor markets demands vis-à-vis workforce qualification. Another important indicator describes the extent to which employers are engaged in the process of establishing priorities in workforce development. One of the key vectors of analysis is the level of cooperation among all interested parties involved in decision-making in the development of national VET systems.

The World Bank study includes assessments of the quality of preparation of workers who participated in the VET system. The questions looked at in this portion of the study include analysis of the structures of national accreditation systems, assessment of the reliability of existing certification and skills testing procedures, as well as analysis of the extent to which accreditation standards are enforced, and the support and incentives for their fulfillment on the part of education institutions. As we can see, this international study also uses indicators derived from analysis of assessment procedures instituted within a given country, rather than assessing the skills of individual VET graduates.

Another research center developing metrics for assessing national VET systems with an eye to gauging education quality is the Inter-Agency Working Group on TVET Indicators (IAG-TVET). It was created in 2008 under auspices of the International Labour Organization (ILO), The United Nations Educational, Scientific and Cultural Organization (UNESCO), the World Bank, the European Commission, the European Training Foundation (ETF), the African Development Bank, and the Asian Development Bank. Its aim is to study issues of workforce training in both developed and developing countries. The IAG-TVET project "Proposed indicators for assessing technical and vocational education and training" attempts to develop indicators of the effectiveness of national VET systems. It is important to note that this project does not conduct targeted gathering of either quantitative or qualitative data. The study was more of a research initiative, aimed at systematizing existing approaches to assessing the quality and effectiveness of national VET systems. All data on the development of vocational education systems were categorized into four aspects, which described key variables of VET systems: funding, accessibility and participation, relevance, and quality (Inter-Agency Working Group, 2014).

Analyzing the indicators related to funding makes it possible to draw conclusions about the efficiency and fairness of resource allocation in VET systems. The second aspect, accessibility, reflects the extent to which various types of VET contribute to equality and social inclusion. This component provides answers to questions about how the national systems of vocational training respond to the social tasks allotted to them. Indicators related to the relevance aspect described the responsiveness of the VET system to labor market demands. This group of indicators aims to study the relationship between entrepreneurs and vocational institutions, as well as the mechanism of school-work transition for VET program graduates. Finally, the indicators in the quality assessment group determine the extent to which the system prepares students well for their role in the workplace. The indicators used to assess professional training quality include the level of modern industrial equipment and modern learning environments available to students.

Thus, we see that questions of education quality, workforce preparedness, and modern skills acquisition for VET graduates are at the center of attention of major international organizations involved in comparative studies in the field of vocational education. All studies conducted in this field in recent years include in their toolkit a set of indicators to gauge the learning outcomes of education programs. However, it is important to note that assessment of program effectiveness vis-à-vis learning outcomes tends to be done using indirect data. This may be data on the presence of qualification

standards and certification procedures, on qualitative parameters of the education process and learning environment, or reporting on graduates' success in the job market. As of now, indicators based on direct assessments of individual students have yet to be included in international comparative studies. This is explained by the lack of needed tools, which are difficult to develop. Attempts to create such instruments for assessing VET students' skills are presented in parts 2 and 3 of this paper.

## **2. INITIATIVES FOR INTERNATIONALLY COMPARABLE ASSESSMENT OF VOCATIONAL SKILLS**

### **2.1 LARGE-SCALE ASSESSMENT IN VET: THE CASE OF PISA-VET**

There is a wide diversity of national vocational education systems around the world (CEDEFOP, 2019). The diversity stems from varying socioeconomic conditions as well as national traditions of job preparation. In countries like Germany, Switzerland, and Austria, work-based VET programs play a leading role (Comyn and Brewer, 2018). In other countries, such as Russia, France, and Poland, school-based programs are more widespread. Countries also differ in the amount of demand for education programs of different levels (3, 4, or 5 ISCED) as well as in the content of VET curricula. In practice, the same vocational areas are often covered by different education programs, with different approaches to particular jobs, different ISCED levels, and organized in totally different institutional frameworks. This diversity adds to the challenge of conducting comparative studies of the efficiency and quality of national VET systems.

The Large Scale Assessment for Vocational Education and Training (VET-LSA) was an attempt to create a toolkit for measuring professional competencies with the aim of international comparison of VET learning outcomes. The project was initiated in Germany in 2003 (Achtenhagen and Winther, 2014). VET-LSA was coordinated by experts at the Georg August University of Göttingen<sup>1</sup> between 2006 and 2009 (Baethge et al., 2009). The study focused on the following fields: automotive mechatronics, electrical engineering, business and management, social work and healthcare. Eight European countries took part: Austria, Denmark, Finland, Germany, Norway, Slovenia, Sweden, and Switzerland.

The first stage of the initiative was a preliminary study to assess the viability of the planned project (Baethge et al., 2009). In this stage, certification profiles in the chosen fields were analyzed, as well as education outcomes upon completion of the corresponding vocational programs. The study's strategy included expert assessment of outcomes achieved by graduates at a national level, followed by international comparison. There was a plan to develop tests for professional competency containing realistic tasks in a computer-simulated work environment (Baethge et al., 2009). The results of this work demonstrated the relevance of further initiatives towards developing an assessment tool. However, for political reasons, the project was not developed further (Weber and Achtenhagen, 2017). The basis of the VET-LSA approach was an attempt to develop a framework for measuring and comparing learning outcomes via the inductive method: from analysis of the situation in participating countries to developing indicators for international benchmarking. It is important to note that the choice of this approach was not made due to a lack of alternatives, but rather from the principle of subsidiarity, which is fundamental to the political structure of the European Union (Treaty on

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<sup>1</sup> Georg August University of Göttingen. Retrieved March 7, 2021, from <https://www.uni-goettingen.de/en/ongoing+activities/98863.html>

European Union, Article 5)<sup>2</sup>. The VET-LSA project was initiated in the context of the Copenhagen process, which sought to increase transparency and comparability of results across national VET systems. Measuring the effectiveness of the systems, as with other initiatives, would be done “taking account of national situations and respecting national competences” (Maastricht Communiqué, 2004). The emphasis on these aspects made it impossible to use an external framework to assess the VET systems of countries involved in the initiative.

The achievements of the VET-LSA project were incorporated into the “ASCOT” initiative for measuring professional competencies in Germany. One of the subprojects of this initiative was developed in collaboration with Switzerland, which points to the potential for graduating to the international level. However, despite clear potential, the VET-LSA approach has not led to the creation of an international study that would be at least somewhat comparable to the scale of PISA or PIAAC.

## 2.2 SKILLS ASSESSMENTS VIA WORLDSKILLS COMPETITIONS

The international WorldSkills competition offers an answer to the challenge of developing general approaches to assessing and standardizing requirements for professional skills. WorldSkills organizes vocational skills competitions on the international, national, and regional levels. Originating in postwar Spain (the first competition was held in 1950) as a national competition for artisans, the movement gradually expanded to include more countries and categories of skills competitions (table 1). WorldSkills works both to boost the popularity of vocational jobs as well as to promote high standards of vocational work.

Table 1: International WorldSkills competitions in numbers

<i>Indicator</i>	<i>2013</i>	<i>2015</i>	<i>2017</i>	<i>2019</i>
<i>Number of competitors</i>	1,000	1,189	1,251	1,354
<i>Number of countries participating</i>	56	59	59	63
<i>Number of competencies</i>	43	46	51	56

Source: WorldSkills, 2013; Ibid 2016; Ibid 2017; Ibid 2019

International WorldSkills competitions take place every two years, and represent a global expo of vocational education, reflecting best practices for training vocational skills. The contestants, who are usually students of vocational institutions, undergo a multilevel selection process in their home countries. In the course of the competition, participants carry out assignments in their chosen competencies. The international competition includes not only well-established skills such as Hairdressing and Automobile Technologies, but also high-tech and emerging skills (Cloud Computing, Reverse Engineering, UAV operation). In addition to international competitions, WorldSkills member countries conduct national and regional championships such as EuroSkills, WorldSkills Asia, etc.

The WorldSkills approach to assessing vocational skills consists of two key components. Assessment is conducted in the course of completion of competition assignments in environments simulating work in the given industry, certified by the relevant WorldSkills experts. This assessment corresponds with verified international standards, as required within the given profession (WorldSkills Occupational Standards/ WSOS<sup>3</sup>). WSOS is used not only as reference points for the WorldSkills

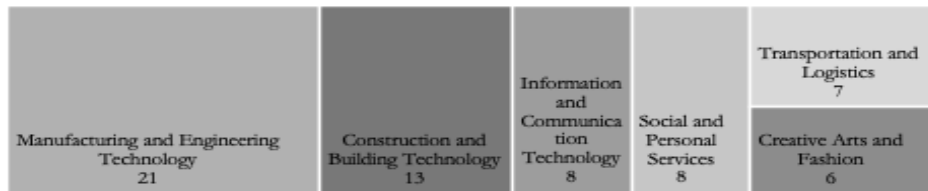
<sup>2</sup> Article 5. (2012) Treaty on European Union C 326/18, Volume 55, 26 October 2012, 18. [https://eur-lex.europa.eu/resource.html?uri=cellar:2bf140bf-a3f8-4ab2-b506-fd71826e6da6.0023.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:2bf140bf-a3f8-4ab2-b506-fd71826e6da6.0023.02/DOC_1&format=PDF)

<sup>3</sup> The WorldSkills Occupation Standards, WorldSkills International. URL: <https://worldskills.org/what/projects/wsos/>



competition, but also as an international benchmark for national and regional standards. WorldSkills standards include both general and professional skills. They are developed by international WorldSkills experts, renewed twice annually with input from industry and business. There are a total of 63 skills for which WSOS have been developed and international WorldSkills competitions conducted (figure 1). Additionally, WorldSkills member countries can introduce their own skills standards and conduct national competitions on their basis. The Russian Federation has the widest spectrum of skills, with 222 standards as of February 2021<sup>4</sup>.

Figure 1: Number of competencies covered by the WorldSkills Occupation Standards, by industry (total=63)



Source: The WorldSkills Occupation Standards, WorldSkills International. URL: <https://worldskills.org/what/projects/wsos/>

Tasks completed by competition participants are judged according to a vetted rubric in accordance with the WSOS. The rubric includes basic criteria, broken down into subcategories, which are further divided into aspects. An example of an assessment rubric for Mechanical Engineering CAD is presented in table 2. According to competition rules, one aspect cannot account for more than 2% of the overall score, and the total number of aspects cannot exceed 300. Aspects can be of two types: measurable, and judgment-based. Measurable aspects are used when it is possible to objectively assess the correct completion of a task. For example, a machined part can be measured to a standard, or a drafted design can include all the needed elements. Judgment-based scores are given when it is necessary to judge the quality of work in comparison to an exemplary sample, in accordance with accepted industry standards.

Table 2: Skills assessment rubric according to WorldSkills Occupation Standards (Mechanical Engineering CAD)

<i>Criteria</i>	<i>Description</i>	<i>Marks</i>	<i>Allotted time (hours)</i>
<i>Criterion A</i>	Mechanical assemblies and detail drawing for manufacture	25	6
<i>Sub Criterion A2</i>	Assembly Modeling	3.8	NA
<i>Aspect A1</i>	Fasteners all present (according to parts list)	1.0	NA
...	...	...	...
<i>Criterion B</i>	Mechanical Fabrication	25	6
<i>Criterion C</i>	Mechanical Design Challenge	25	6
<i>Criterion D</i>	Reverse Engineering from a Physical Model	25	4
<i>Total</i>		100	22

Source: WorldSkills Mechanical Engineering CAD Marking Scheme. Available at: <https://worldskills.org/>

<sup>4</sup> List of competencies. WorldSkills Russia. URL: <https://worldskills.ru/assets/docs//1310/01.02.2021-14.pdf>

International WorldSkills competitions host competitors who are the best of the best, which makes them inapplicable to large-scale assessment. Therefore, national practices of implementing WorldSkills methodologies deserve particular attention. It is at the national level that internationally comparative assessments of vocational skills can be conducted using the WorldSkills method. The guarantor of comparability is the use of WSOS for developing assignments for national and regional championships. As our study showed, (Dudyrev et al, 2019), organizers of internal national competitions modify the assignments taken from international championships in order to use them on a mass scale. These changes include removing certain modules from international assignments, as well as proportional reductions in allotted time. Additionally, organizers of national competitions add additional requirements, and make changes to the assignment structure. Ultimately, however, competition assignments used by individual countries are based on international WorldSkills assignments. Thus, international WorldSkills competition assignments serve as a model that unites standards across all countries.

The correspondence between national and international standards is a prerequisite for international comparison of education outcomes for VET students. Its presence allows for countries to assess their competitive position not only in terms of talent, but also in terms of workforce preparation on a mass scale. There is further opportunity to standardize assessment procedures for national and international competitions via partial or total automation, especially in the fields of engineering, construction, IT, and communications technology. Pilot projects in automation have already begun in the Russian Federation and China (Dudyrev et al, 2019).

Surveys of initiatives to implement the WorldSkills methodology into vocational education systems have shown that these competitions have become a mass phenomenon in many countries (Dudyrev et al, 2019; LSIS 2012; Zwieten, 2018). Tens of thousands of VET students have undergone assessment. This creates new opportunities to assess learning outcomes in VET systems (James, 2016). Today, national WorldSkills organizations already aggregate large datasets on competition results, which can be used productively for further analysis. Nevertheless, many questions remain regarding the process of creating an internationally comparable and valid assessment system on the basis of the WorldSkills approach (Rauner et al, 2013). One of these is the question of how to provide for multifaceted assessment of skills: not only specific skills, but also general skills. Another is the possibility of assessing digital skills in the context of growing digitization in all modern professions. The high cost of assessment procedures remains a major problem for the WorldSkills approach.

### **3. NATIONAL INITIATIVES FOR ASSESSMENT OF LEARNING OUTCOMES IN VET: THE CASES OF GERMANY AND RUSSIA**

Certifying the level of professionalism of workers and assessing their qualifications is a key aspect of the knowledge economy. As a rule, graduates of VET programs entering the workforce must undergo certification procedures to confirm the results of their education. This is done using qualifying exams. Assignments for these examinations are developed on the basis of professional standards which describe the functions of a given job, and the knowledge and skills required to be successful in the workplace. The requirements established by professional standards are usually correlated with certification levels, which are adopted on the national level. The organizational structures within which professional qualifications are assessed vary from country to country, and respond to the specificities of national labor markets and technological development.

In Ireland, Germany, and Finland, professional certification occurs after completion of an education program. The tests are administered not by education institutions, but by independent experts. Assignments are developed by the employers themselves. In Germany, the content of assessment procedures is determined by industrial or business groups. They are the ones who give certification documents to those who successfully pass the tests. The certification exam is incorporated into the process of qualifying for graduation. A number of countries, including Great Britain, Australia, and the USA, place the responsibility for certification assessment not on employers, but on independent certification centers. These organizations have gained the right to award certifications, either by law or by regulations of the corresponding national office.

The majority of countries in the Commonwealth of Independent States, including the Russian Federation, give a leading role in certification assessment to education institutions. A set of standardized tests are a prerequisite for VET program graduates to receive their diploma. This process simultaneously confirms mastery of the education program and awards a level of certification. The role of the employer in the certification exam is often merely a formal one, which decreases faith in the results. For this reason, the Russian Federation is gradually transitioning to the first model, where exit exams are combined with independent assessment and certification processes conducted by specially-created centers (Dudyrev et al, 2019).

Despite differences in the procedures and administering organizations, the forms of examination and the institutions of assessment are similar across many countries. The test generally consists of theoretical and practical parts. The theoretical exam includes written work or standardized testing, while the practical part involves carrying out core tasks for the given profession, emulating real-life work as closely as possible. The candidate must manufacture a part, cook a dish, write a computer program, etc. The theoretical and practical parts may be separated in time. The practical task is given the same amount of time as would be needed to complete the same task in real-world conditions.

Many countries have a great interest in modernizing skills assessment to increase objectivity and comparability. We will take a closer look at the situations in Germany and Russia, where key international initiatives in assessment of work skills and vocational education outcomes have been adapted to national needs.

In 2011 the Federal Ministry of Education and Science of Germany launched the ASCOT project (Technology-based Assessment of Skills and Competences in Vocational Education and Training) (BMBF, 2012).<sup>[4]</sup> This initiative aimed to improve methods of assessment of the skills of students and graduates of VET programs by using modern technologies. Researchers placed an emphasis on the following VET categories: motor vehicle mechatronics technician, electronics technician for automation technology, industrial clerk, care for the elderly, and medical assistant. ASCOT made use of the work done by VET-LSA, which is also often referred to as VET-PISA (Weber and Achtenhagen, 2017)<sup>[5]</sup>. In part, modelling and measurement strategies used by the ASCOT instruments are based on Item Response Theory, which is claimed to be the most optimal solution for skills assessment by the VET-LSA feasibility study.

The first step was to determine the most important skills for each of the chosen vocations. For example, the “CoBALIT: Commercial jobs” project, one of the subprojects of ASCOT, chose an assessment mechanism addressing three competency areas: commercial literacy (applying mathematical algorithms and linguistic concepts to commercial situations), business process competency (acting appropriately in commercial-vocational situations), and entrepreneurship

competency (the ability to use entrepreneurial opportunities in vocational situations, developing and implementing ideas) (BMBF, Forschungsinitiative ASCOT (2011-2015))<sup>5</sup>.

The next step was developing assessment items, with special attention paid to corresponding professional tasks that may be assigned to workers in real-world conditions. In addition, researchers took into account the content of the relevant vocational education programs.

This work resulted in more than 800 test assignments using computer modeling or video. This instrument was tested with the participation of more than 12,000 students from more than 300 vocational institutions. The ASCOT instruments for assessing learning outcomes demonstrated a higher level of objectivity as compared to traditional forms of assessment carried out by VET educators (BMBF, 2018)<sup>4</sup>. Based on these data, a follow-up project called “ASCOT+” was launched in 2018. It aimed to implement the newly-developed approaches to skills assessment into a more large-scale system for VET providers in Germany.

In Russia, the basis for modernizing assessment of VET learning outcomes used an entirely different logical approach. The goal was not only to increase the precision of measuring skills that were currently in demand on the labor market, but also to shift towards a globalized perspective on high-level professional training. To this end, the agency for developing professional communities and workforce participants “Young Professionals (WorldSkills Russia)” launched a pilot project to test run a new exam based on WorldSkills standards.

The pilot exam aimed to test the completion of professional tasks in a context that closely emulates a real working environment. The procedure for carrying out the tasks of this exam, as well as assessment, were carried out at certified centers. Assessments were carried out by independent experts certified as having mastered the WorldSkills methodology. The assignments were chosen by an automated system of selection from an assignment pool, standardized by level of difficulty and corresponding to the equipment available at the testing center.

Methodologically independent expert assessment of practical assignments, based on prepared rubrics, as used in the pilot exam, is not a new phenomenon. It was used, for example, in the final chamber examination in the German dual system (OECD, 2010)<sup>5</sup>. The innovation here lies in the accompanying evaluation of standards for skills-testing procedures from the point of view of technology and requirements for learning outcomes. There is also a greater correspondence with internationally recognized WorldSkills standards. Since 2020, Russian experts have matched 285 programs within the national VET system to 125 WorldSkills categories. Assessment procedures have been developed for all of them, taking into account examinations conducted in educational institutions with varied levels of available technology (Worldskills Russia, 2017)<sup>6</sup>.

Each rubric of assessment has a minimum level of correspondence to WorldSkills standards. Each participant in the exam ends up with a skills passport, which indicates their level of achievement in different vocational skills, broken up into different modules and criteria of assessment. These documents are stored on the digital WorldSkills Russia platform, and are available to both participants and employers.

Since participation in the pilot exam is voluntary, the data collected up to this point is not representative for the whole VET system in Russia. Nevertheless, we can note a positive trend in participation (table 3). This trend has exceeded the goals set by national educational policy. According

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<sup>5</sup> Forschungsinitiative ASCOT (2011-2015) <https://www.ascot-vet.net/de/forschungsinitiative-ascot-2011-2015.html>

<sup>6</sup> Union Agency for the Development of Professional Communities and Workers "Young Professionals (WorldSkills Russia)" (2017, November 6) Order № PO-495/2017/2 from 6 November, 2017. [https://cdn.dp.worldskills.ru/esatk-prod/public\\_files/f1f12182-2ff4-4d2f-a601-e652eb183e8e-f87f56d1d376aba8b11e6662a108c24e.pdf](https://cdn.dp.worldskills.ru/esatk-prod/public_files/f1f12182-2ff4-4d2f-a601-e652eb183e8e-f87f56d1d376aba8b11e6662a108c24e.pdf)

to the national project “Education,” affirmed on 24.12.2018 by the Presidential Council of the Russian Federation, by 2019 the share of participants in the pilot exam should reach 5% of VET graduates, increasing to 6% in 2020. The actual share of participants in the pilot exam in 2019 was more than 7%, and more than 8% in 2020. These figures point to a level of success exceeding the national goal of 25% of VET graduates tested by 2024.

Table 3: Russia WorldSkills Standards Demonstration Exam in Numbers

<i>Indicator</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>
<i>Participating regions</i>	26	59	82	83
<i>Number of participants (VET students)</i>	13,999	30,579	53, 520	58, 247
<i>Competencies</i>	73	77	92	110
<i>Share of VET graduates participating in the exam, %</i>	2	4,4	7,6	8,4

Source: Worldskills Russia, authors’ calculations based on statistics of the Russian Ministry of Education

The COVID-19 pandemic created added difficulties for organizing the pilot test according to WorldSkills standards, and served as an impetus for developing new digital solutions. Under normal conditions, the pilot exam required gathering test takers and judges in a location equipped with the appropriate infrastructure, in accordance with the list of equipment requirements. The task of the judges, led by the head judge, was to provide the proper conditions for test-taking and assessment. The decision was made to partially transition the pilot exam to a remote format.

The number of skills covered by the exam in 2020 was 110. The wide variety of skills made it more difficult to find solutions for adapting to the remote format. As a result, unique solutions were developed for each skill category. Wherever possible, assessment rubrics were adapted to the new situation. Assignment modules were deleted or changed in cases where the presence of test takers in specialized workplaces was required. Additionally, testing environments were augmented to take into account social distancing requirements. In a number of skills areas, additional instructions were added for participants to demonstrate their work in cases where it was impossible for judges to directly view the results.

The adaptive strategies of organization not only ensured the health of judges and participants, but also provided opportunities to decrease the number of experts needed to judge the work. The solutions arrived at in this period thus reduced the costs of conducting examinations remotely. Furthermore, the digitization of assessment procedures increases their accessibility for participants from various regions, including those that are far away from specialized examination centers.

The experiences of both Russia and Germany demonstrate the successful development of international initiatives of skills assessment on the national level. Despite the difference in approaches, the solutions arrived at contribute to the development of an objective assessment of vocational education outcomes, improving upon traditional VET assessment methods. Furthermore, they contribute to the standardization of assessment, which allows for reaching verified conclusions on the quality of vocational training in various countries and regions. The methodology of the Russian pilot exam, based on WorldSkills and ASCOT standards, has the potential to be scaled up by other countries interested in participating in international comparative studies. There are a number of advantages to the testing mechanisms that make use of computer simulations, including decreased cost in time and money. The approach used by the Russian pilot test is already closely tied to international standards and stable international collaborations within the WorldSkills movement. The failure of the VET-LSE initiative points to the fact that international initiatives truly require cooperation between various

stakeholder countries. With a consistent reliance on existing, robust international institutions, an assessment approach may emerge that can lead to comparability of VET outcomes in all countries.

#### **4. LABOR-MARKET AND INDUSTRY-DRIVEN INITIATIVES IN SKILLS ASSESSMENT**

Aside from national and international projects to develop universal metrics for assessing vocational skills, initiatives on the part of the labor market itself deserve special attention. The primary vector of development is skills certification undertaken by industry leaders, who become providers of assessment and formulate benchmarks for various skill sets. Secondly, there are emerging practices of employability skills assessment. Such initiatives represent working mechanisms for skills assessment aimed at solving practical problems such as recruiting and professional development. Such initiatives do not aim to give aid to researchers or to improve comparability of results. However, these tools allow us to look at options for responding to key challenges of international and national skills assessment, as well as to affirm sets of requirements for testing specific skills.

##### **4.1 INDUSTRIAL CERTIFICATION OF SPECIFIC SKILLS: THE CASE OF IT SKILLS**

Certification allows workers to receive credentials according to specific skills and requirements for professional success. Under conditions of continuously increasing technological innovation and increasing specialization of personnel, skills certification can compensate for differences in education and training. It can also provide for greater international labor mobility.

Certification implies affirmation of the corresponding skill sets via specialized, independent testing procedures. Vendors of industrial certification can be industry-leading companies, which determine requirements for various skill sets, including on the international level. However, the majority of vendors carrying out skills certification are focused on specific products or a narrow line of products. Let us take a closer look at the process of skills certification in the case of information technology. This industry has the highest rate of obsolescence of skills, which applies to assessment systems as well. The largest and most popular certification system in the IT sector is run by Pearson VUE.<sup>7</sup> Pearson VUE is an international provider of certification, with a computerized testing system and a global network of testing centers carrying out certification for IT giants such as Cisco, Microsoft, and others. Pearson VUE testing centers are located in 180 countries, with about 20,000 such centers in total. According to Pearson VUE data, the most sought-after certifications were those required by key IT companies: Microsoft, Cisco, Oracle, CompTIA, IBM, VMware, HPE, and Dell EMC. One half of all specialists undergoing certification at Pearson VUE centers in 2017 participated in programs run by Microsoft, Cisco, and Oracle.

Psychometric experts and industry specialists were recruited to design certification exams. Exam questions reflect ways of using vendor products in various organizations. Based on expert assessment, job tasks are identified that correspond to specific positions and the use of specific technologies. On these bases, test questions are developed for assessing key skills for the given profession. All test questions and assignments are regularly renewed based on changing labor market demands and technological progress. Each certificate is marked with an expiration date, which may differ by vendor, as well as by level of qualification or skills area.

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<sup>7</sup> Pearson VUE 2017 Value of IT Certification Survey

Let us look at the case of Cisco, a leading company in network infrastructure, cloud computing, and cybersecurity solutions. The company's business model is unique in its multilevel system of engineer certification by type of computer system. Cisco certification includes not only knowledge of Cisco products, but also more general knowledge of network protocols and technologies. Many companies, even those who are competitors in the sphere of network technologies, acknowledge the high value of Cisco certification. The expert level of certification within the Cisco system (CCIE), for example, is one of the most well-known and respected certifications in the computer industry<sup>8</sup>.

The Cisco system has five levels of certification: Entry, Associate, Professional, Expert, Architect (the highest level), as well as a separate certification of Specialist<sup>9</sup>. Different certification levels may involve different numbers of test assignments. Laboratory assignments are also included in the different forms of testing. Certification tests are conducted strictly within the territories of Cisco test centers. The certification procedure is a paid one, ranging from 150 to 400 USD. Testing for laboratory tasks may cost 2000 USD.

The value in the Cisco certificate for IT specialists lies in the fact that they achieve an internationally recognized credential and an objective confirmation of their knowledge and skills, as well as of their persistence in their chosen career. According to surveys of more than 10,000 specialists from 138 countries who underwent testing at Pearson VUE centers in 2018, more than 80% of test takers had a higher education. The main motives for taking the certification exams were developing industry-specific skills, as well as the benefits of certification, such as increased pay and career growth. For potential employers, having a Cisco certificate also indicates that the job applicant has the practical experience, as well as mastery of technical English, that will allow them to succeed on the international labor market.

On one hand, industrial certification in IT, with its transparency and access to training programs, allows for workers to enter the profession. On the other hand, IT certification remains a mechanism for career growth for specialists within the industry, including for workers at major companies. Over a third of all certified specialists are employees of companies with over 5000 staff members. With the exception of Cisco certification, where the tests go beyond knowledge of the specific company's products, the majority of IT vendors conduct certification only for their own set of technologies. For this reason, when a specialist changes jobs, they have to undergo certification from another vendor. Therefore, the system of industry-based skills certification cannot be described as universal, or as a candidate for scaling up to a broader system of professional certification.

#### 4.2. ASSESSMENT OF ESSENTIAL WORK SKILLS: THE CASE OF ACT WORKKEYS

In addition to specific vocational skills and VET learning outcomes, general skills are getting more and more attention among the expert community and in academic literature. These include employability skills and essential work skills, which are necessary for successful job placement and career growth (Carnevale, 1990). The focus on these skills is linked to challenging issues of graduate job readiness and the school-to-work transition (Suleman, 2018; Tomlinson, 2012) in the context of an increasingly precarious job market and rapid changes in the content of various professions (WEF 2020).

Educators, education researchers, and policymakers have long discussed the topic of developing and assessing general skills needed for success in any workplace. The OECD Programme for the International Assessment of Adult Competencies (PIAAC) has participated in this discussion.

<sup>8</sup> <https://www.crn.ru/news/detail.php?ID=146284>

<sup>9</sup> [https://www.cisco.com/c/dam/en\\_us/training-events/certifications/career-path.pdf](https://www.cisco.com/c/dam/en_us/training-events/certifications/career-path.pdf)

However, the most important stakeholder in assessment of essential work skills is the labor market. Employers approach this problem in a practical way, from the point of view of matching an applicant to a specific job. However, employers are the ones who create skills benchmarks, and who have the ability to stimulate the creation of new systems of assessment and relevant credentials.

One such solution has been designed by the WorkKeys<sup>10</sup> project, which has been conducted since 1992 by the American College of Testing (ACT). WorkKeys assessments cover essential work skills, evaluating job readiness. They are oriented towards graduates of education institutions, from schools to universities. More than 20 million tests have been administered since 1992.

WorkKeys assessments include six tests: Applied Math, Workplace Documents (or Reading for information), Graphic Literacy, Applied Technology, Business Writing, and Workplace Observation. The advantage of WorkKeys assessments lies in the fact that scoring is based on a constantly renewing database called JobPro,<sup>11</sup> which contains skills standards for each profession. The JobPro database is based on the O\*NET<sup>12</sup> job classification taxonomy, and include information on job tasks and requirements for the above-mentioned essential work skills (levels from 3 to 7). JobPro contains 21,884 professions, which covers 86% of the actual jobs available on the US labor market (LeFebvre, 2016, p.18).

Skills are assessed through testing, either online or in written form, supervised by the ACT<sup>13</sup>. Online test takers immediately get a score indicating their level of mastery of the skill (levels from 3 to 7), and information on the extent to which they meet the requirements of the given profession. After taking several tests, they receive personalized recommendations on how they can improve their skills. From 2006, participants who take three tests (Applied Math, Workplace Documents, Graphic Literacy) are awarded a National Career Readiness Certificate (NCRC). The credential is awarded in four levels – platinum, gold, silver, and bronze. As of 2018, 4.4 million total certificates have been given out; the NCRC is recognized by HR departments at 22.2 thousand companies in the US.

NCRC certificates have also been incorporated into the education process. In 2016, the American Council on Education published recommendations for universities and vocational colleges to award three credits for quantitative reasoning and one credit for information literacy to students working towards bachelor's or associate's degrees. This applies to all students who gained the platinum or gold certificate, and to VET students who received the silver certificate (Langenfeld, 2018). Half of all high school graduates undergo WorkKeys testing. 2018 data shows that more than 1/4 of them had essential work skills at the NCRC gold certificate level, which is required by 93% of jobs in the JobPro database (table 4).

Table 4. ACT WorkKeys foundational skills assessments and the ACT WorkKeys National Career Readiness Certificate in numbers

NCRC		Jobs profiled in the ACT JobPro with corresponding skill levels, percent	<i>ACT-tested 2018 high school graduates who earned a score corresponding to the level of an NCRC, percent*</i>	<i>All ACT-tested examinees who earned an NCRC, percent</i>
Level of NCRC	Level of skill proficiency			
<i>Platinum</i>	>6	99	0	1
<i>Gold</i>	>5	93	26	18

<sup>10</sup> ACT WorkKeys. URL: <http://www.act.org/content/act/en/products-and-services/workkeys-for-employers/assessments.html>

<sup>11</sup> ACT Job Profile. URL: <http://jobprofiles.act.org/>

<sup>12</sup> O\*NET Resource Center. URL: <https://www.onetcenter.org/>

<sup>13</sup> Testing examples are presented on the ACT WorkKeys project website. For example in Applied Math URL: <https://www.act.org/content/act/en/products-and-services/workkeys-for-employers/assessments/applied-math.html>



<i>Silver</i>	>4	67	47	47
<i>Bronze</i>	>3	15	23	21

Footnote. \*1.9 million high school graduates were tested in 2018.

Source: (Anderson et al, 2018; ACT, 2018)

Analysis of WorkKeys assessments from 2010 to 2014 (table 5) shows that skill gaps are more prevalent among test takers with higher education. The high-education group showed significantly higher test results than the low and middle-education group of examinees, but this level turned out to be insufficient to meet the requirements for jobs that demand higher education. The largest skills gaps were seen in graphic literacy. ACT researchers hypothesized that this problem arose out of school and post-secondary education, where there is an absence of learning activities directed specifically at developing this skillset (ACT, 2011, p. 19).

Table 5: Skill gaps by career cluster, percent of all WorkKeys examinees that meet or exceed median skill requirements, in 2010-2014

<i>Skill assessment</i>  <i>Career Cluster</i>	<i>Applied Math</i>			<i>Workplace Documents</i>			<i>Graphic Literacy</i>		
	Low ed.	Middle ed.	High ed.	Low ed.	Middle ed.	High ed.	Low ed.	Middle ed.	High ed.
<i>Agriculture</i>	55	72	86	92	81	65	77	27	94
<i>Architecture and Construction</i>	55	72	58	92	81	65	77	27	45
<i>Arts, Audio Video Technology, and Communications</i>	77	90	86	60	81	91	77	88	45
<i>Business Management and Administration</i>	77	NA	86	92	NA	91	77	NA	45
<i>Education and Training</i>	77	NA	86	92	NA	91	77	NA	45
<i>Finance</i>	77	NA	86	60	NA	65	20	NA	45
<i>Government and Public Administration</i>	77	72	86	60	81	65	77	88	45
<i>Health Care</i>	77	72	86	60	81	91	77	27	45
<i>Hospitality and Tourism</i>	77	NA	86	92	NA	65	77	NA	45
<i>Marketing, Sales, and Service</i>	55	NA	58	60	NA	91	20	NA	2
<i>Manufacturing</i>	77	72	58	92	81	65	77	27	45
<i>STEM (Science, Technology, Engineering, Mathematics)</i>	NA	72	58	NA	81	91	NA	27	45

Footnote: The low-education group includes the following levels of education: some college or no degree, high-school diploma or equivalent, less than high school; middle education group – associate’s degree, postsecondary non-degree; high-education group – bachelor’s degree, master’s degree, doctoral degree.

Source: (LeFebvre 2015)

The emergence of NCRC certificates made it easier to assess the effects of the implementation of the WorkKeys project. Overall, all participants in the labor market experienced positive effects from the essential work skills certification. In addition, NCRC is viewed as a predictor of success in the

workplace, as well as in education and professional development (Langenfeld, 2018). For workers, the effects include increased ability to find jobs, decreased chance of losing a job, and increased average income for holders of high-level certificates regardless of education level (LeFebvre, 2016). A worker with a bachelor's degree and a gold NCRC certificate earns 15% more than a worker with the same education but with the silver certificate. For associate's degree holders the gap is 14% (Neely, 2013). US employers gain significant benefit from the essential work skills certification system: a 23% increase in the productivity of workers; 19% decreased expenditures on finding new employees due to increased productivity and a 22-75% decrease in turnover; 70% savings on employee selection; 50% savings in time spent on additional training for employees (ACT, 2017). Researchers also showed a positive correlation between ACT WorkKeys test results and worker productivity, as well as a negative correlation between test scores and the number of vacancies in the discipline (ACT, 2017). The ACT WorkKeys case is an example of essential work skills certification that satisfies the interests of employers as key stakeholders, while also being scaled up to a national level.

## 5. DISCUSSION

The issues surrounding assessment of vocational skills and VET learning outcomes are at the forefront of efforts to develop the TVET sector and to improve its effectiveness. At the same time, the challenge of vocational skills assessment reaches beyond the boundaries of the TVET sector, as it is part of the broader discussion surrounding assessment of specific skills and the creation of valid and comparable tools. This all takes place in the context of the high level of contextuality in the specific skills domain, as well as the rapid obsolescence of technologies. In this article, we attempted to survey the field of vocational skills assessment, taking into account the variety of stakeholders and levels on which assessment is conducted, from international and national to industry-specific, from transnational organizations to individual companies.

Assessment of vocational skills is gradually shifting beyond the boundaries of national initiatives and traditional form of certification testing. With the increasing globalization of labor and rapid spread of technologies, international assessment initiatives are becoming more and more relevant. We are referring not primarily to the traditional formats of large-scale skills assessment linked to internationally comparative research initiatives, but rather to practical initiatives aimed at providing for international comparability by finding a consensus regarding assessment of professional skills and recognized credentials. While the importance of national worker qualification assessment projects remains high, international initiatives seem to be especially relevant today. This applies not only to multilateral or bilateral formats, but also at the meso-level, within the logic of international industry-specific certifications.

The field of skills assessment has a wide spectrum of stakeholders. Researchers and policymakers are interested in understanding the effectiveness of systems of education, human capital development, and labor productivity. It is also an important topic for educators interested in finding reliable tools for assessing learning outcomes and in gaining timely information about skills requirements. However, the most important stakeholders in skills assessment are employers, whose business success is directly dependent on the quality of their human resources. For this reason, new initiatives on the part of the labor market, conducted at the level of individual companies, may be valuable sources of new solutions in skills assessment.

At the same time, there is new discussion about the role of education institutions within the ever more complicated landscape of stakeholders and skills-assessment providers. The vocational college as a provider of VET training is undergoing repositioning, expanding beyond purely education activities,

engaging in measurement of learning outcomes, and further integrating into the labor market. Skills assessment is becoming one of the key factors of this integration. One option may be to turn VET institutions into hubs for international industry-based certifications, examinations in the format of WorldSkills competitions, or other forms of comparable assessment. These may be widely integrated into the education process, replacing conventional assessment of learning outcomes, which do not allow for comparative analysis of the skills of students and graduates.

In the discussion of issues of skills assessment, the main stakeholder remains outside the frame of the debate: the individuals themselves, who possess measurable human capital. If the end goal of any certification system is the well-being and professional success of each student or worker, we must account for the fact that skills assessment is just one part of the process of skill development. Keeping in mind the short cycle of qualification and the sensitivity of professional skills to technological change, skills assessment becomes a stage in an ongoing process of skills development and professional certification. The importance of this issue for the national and international skills agenda requires an intensification of the discussion on the search for optimal approaches to vocational skills assessment.

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