



FUTURE COMPETENCIES FOR THE INNOVATIVE INDUSTRY

Veneta Hristova

Piotr Wołęjsza

„St. Cyril and St. Methodius” University of VelikoTarnovo, Bulgaria
Maritime University of Szczecin, Poland

Abstract: In the last published PISA results (2015, Programme for International Student Assessment) Bulgarian and Polish fifteen-year-olds scored differently. While Polish teenagers ranked 10th in the category of Sciences, the 5th in Reading and 8th position in Mathematics category, the Bulgarian Peers took respectively 26th, 28th and 27th position. While Bulgarian well below the European average, Polish far above the European average. Two different worlds? Really? In the ranking of innovativeness of the European Union, Poland usually takes around the 25th place (ranking covers only 28 countries). The number of patents per capita is even worse. Bulgaria in this ranking is next to Poland. Authors of the article try to answer the question, why Bulgaria and Poland are far behind European leaders and what is the way to be on the top? The analysis was carried out in the context of future competences taking into account that 65% of children starting education will work in occupations that do not exist yet (2016, OECD).

Keywords: competences, education, innovation, Industry 4.0, entrepreneurship.

JEL: I25, I28, E02, J00

INTRODUCTION

The main function of educational systems is to train today those competencies which will be relevant in the future. This complex task is accomplished through the study of many diverse disciplines, applying a wide range of methods, approaches and techniques. They aim to develop, on the one hand, the potential of every child, young and adult, and, on the other, to help their worthy realization in the labour market. Today, this multidimensional task becomes even more complex due to the dramatic changes both in young people's attitudes towards education and learning and because of the extraordinarily dynamic business environment created by the advent of information and communication technologies. The big challenge nowadays is how to transform educational systems so they to attract, develop and refine people in their future work. The reason for this is that the focus is placed on the competencies around which the efforts of both consumers - business organizations and creators - schools are concentrated. The present article aims to identify the key competencies that should be shaped in terms of the needs of innovative industrial development. It analyzes the educational systems of Bulgaria and Poland, post-communist countries that have undergone major transformations in their societies and economies since 1990 through the point of the OECD's Program for International Student Assessment results¹.

1. On the changing nature of competencies for future

Education plays central to every person's life and is crucial for their professional realization. It provides a purposeful acquisition of general and specific knowledge, skills and attitudes, enabling their owners to find a worthy place in the economy and society. Education is also a major “provider” of a set of competencies necessary for the adequate employment of individuals.

¹ The authors participation in the article is as follows: Veneta Hristova – introduction, part 1, 2; Piotr Wołęjsza – part 3,4 and conclusion.

In the last few years, there has been a new increased interest in competencies, and modern Human resource management is considering a competency-based approach as a powerful tool (Vachkova, 2007, p. 1). The reasons for this are rooted in the growing perception that the use of competency frameworks promotes a clear understanding of the profile of the profession by displaying the necessary knowledge and skills that individuals should possess. Framework competencies are widely applied in practice: they can serve as a guide for the development of training programs; identify competencies gaps in individuals and organizations; to support guidance service providers and to establish common benchmarks (Sultana, 2009, p. 16).

What are competencies? The term is not new and its etymological meaning shows variations from definitions: from psychologists' understanding of "the ability of individuals to cope with expectations of the environment" (Vachkova, 2007, p. 1) to the contemporary interpretation of the concept in the Harvard university competence dictionary according to which "... competencies, in the most common lines, are "things" that a person must demonstrate to be effective at work, role, function, task, or obligation". These "things" include work-appropriate behavior (what a person says or does that leads to good or poor performance), motivation (how one feels about work, organization, or geographical location), and technical knowledge / skills (what one knows (demonstrates in terms of facts, technology, profession, procedures, work, organization, etc.)). Competencies are identified through job and role research" (Competency Dictionary).

In fact, the article that really promotes the concept is „Testing For Competency Rather Than „Intelligence” by Harvard researcher David McClelland's, published in 1973 (McClelland, 1973). He aimed to find tests that help the measurement of competencies. In it, the author considers that the basic competence in the organization is integrated into the systems, values, motives, mechanisms and processes in the work. It develops competency tests through behavioural interviews and critical case techniques. These methods compare managers above average, average and below average to understand how they are doing the work (based on critical cases of good and poor performance), and then use comparisons to identify competencies that lead to successful performance. This creates a vocabulary behind each competency that characterizes the profile of the successful performer (<http://mycompetence.bg/>).

Competence researchers give a variety of definitions of their nature:

- durable features and performance-defining features (Zvell);
- distinctive features that distinguish the exceptional performer from the others (Katano);
- ability to achieve goals (Moloney);
- the intrinsic characteristics of a person that enable him to better represent himself in a given task, role or situation (Spencer);
- knowledge, skills, abilities, etc. Job-related characteristics (Ksaos);
- improving the efficiency of a person in their work (Hoffman);
- the main personality traits that characterize the contribution needed to demonstrate quality work (Boyatzis, Ulrich);
- a measure of the results of what has been learned (Boam, Sparrow).

Despite the diversity of definitions in the literature, there is no generally accepted concept of competence. A broad enough understanding is the interpretation adopted by the Bulgarian Industrial Association as a set of knowledge, skills, attitudes and behaviours to achieve results (levels of presentation) in a professional role or a particular organization (<http://mycompetence.bg/>).

From the point of emerging Industry 4.0, a significant evolution has also been observed in understanding what the key competencies for this new business environment are. During the last years, many studies have been conducted to outline the competencies needed.

Key skills desired by future employers according to RBC Economic Research, 2018 (Grzybowska& Jupicka, 2017, pp. 250–253) include active listening (58% of jobs), communication (52%), critical thinking (49%). Graduate Management Admission Council report presented on fig. 1 confirms that communication and listening are crucial skills for employers. It is worth to mention that the top 5 skills are connected with communication and teamwork, while technical or managerial skills are not in the top 10. Similar skills as trending for 2022 are outlined at The Future of Jobs Report 2018 by World Economic Forum (p. 12): analytical thinking and innovation; active learning and learning strategies; creativity, originality and initiative; technology

design and programming; critical thinking and analysis; complex problem-solving; leadership and social influence; emotional intelligence; reasoning, problem-solving and ideation; systems analysis and evaluation.



Fig. 1.What do employers want from new hires? (mid-level position)

Source: <https://www.gmac.com/market-intelligence-and-research/research-library/employment-outlook/2018-corporate-recruiters-survey-report>

According to K. Grzybowska and A. Łupicka (Grzybowska & Łupicka, 2017, pp. 250–253) who concentrate on competencies needs contemporary managers to cope with new challenges in Industry 4.0, they identified eight managerial competences. They tested identified competencies: creativity, entrepreneurial thinking, problem-solving, conflict solving, decision making, analytical skills, research skills and efficiency orientation into automotive and pharmaceutical sectors and on their base outlined three competences for Industry 4.0 to be considered as most important: decision making, conflict solving and problem-solving.

P. Fitsilis, P. Tsoutsas and V. Gerogiannis worked on competence model for Industry 4.0 that could be used to create training proposal for individuals or for assessing the knowledge gaps existing in an enterprise (Fitsilis, Tsoutsas & Gerogiannis, 2018). They suggest six outlined dimensions (technology, industry sector, software lifecycles, transversal skills, proficiency, and job profiles) that should be analyzed in order to produce the training needs of current employees for Industry 4.0 realities (their model is presented in fig. 2). According to authors after proper analysis of the dimensions three categories of skills will arise for updating: technological, transversal and contextual.

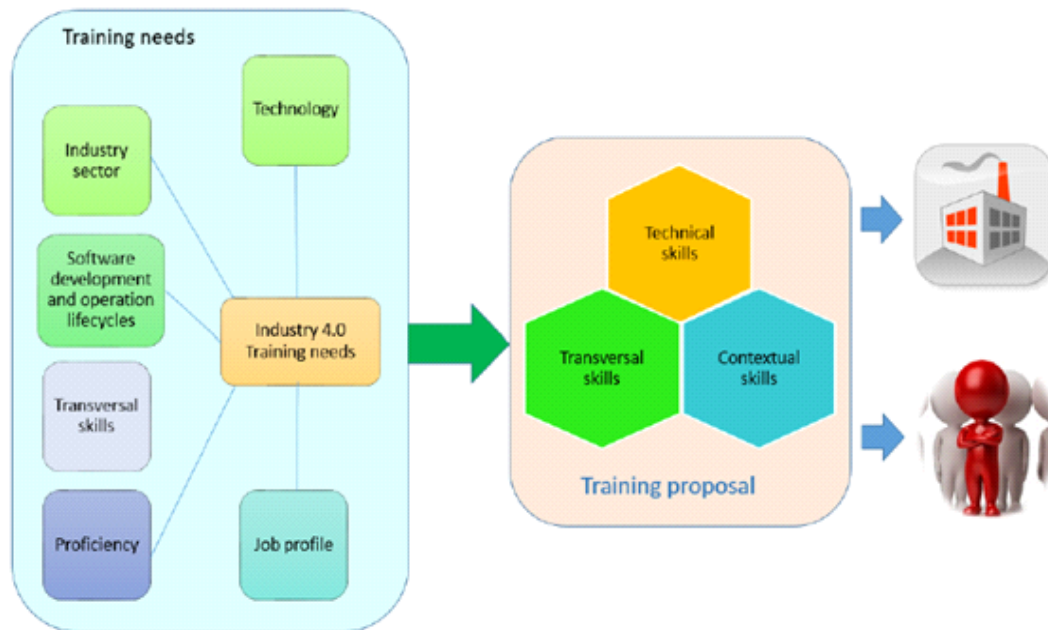


Fig. 2. Industry 4.0 competence framework

Source: Fitsilis, P., Tsoutsas, P. and V. Gerogiannis, Industry 4.0: Required personnel competences, conference paper, 2018, p. 4, <https://www.researchgate.net/publication/335210375>

An interesting model for Industry 4.0 higher education employees was developed by L. Prifti, M. Knigge, H. Kienegger and H. Krcmar (2017, p. 46–60). The researchers used behavioural approach and on the base of literature review and focus groups outlined three hierarchical levels' (the “Great Eight”, the competency dimensions and the competency components) model adapting the third level – competencies with evidence from a study they have conducted. It has been considered 68 competencies for Industry 4.0 as relevant (fig. 3).

Number of competences	2	1	3	3	3	3	3	2	21	4
Competency Dimensions	Deciding and Initiating Action	Leading and Supervising	Working with People	Adhering to Principles and Values	Relating and Networking	Persuading and Influencing	Presenting and Communicating Information	Writing and Reporting	Applying Expertise and Technology	Analyzing
Big Eight	Leading & Deciding	Supporting and Cooperating		Interacting and Presenting			Analyzing and Interpreting			
	Creating and Conceptualizing	Organizing and Executing		Adapting and Coping			Enterprising and Performing			

Competency Dimensions	Learning and Researching	Creating and Innovating	Formulating Strategies and Concepts	Planning and Organizing	Delivering Results and Meeting Customer Expectations	Following Instructions and Procedures	Coping/Adapting and Responding to Change	Persuading and Influencing	Achieving Personal Work Goals and Objectives	Entrepreneurial and Commercial Thinking
Number of competences	2	4	3	3	2	3	4	1	1	2

Fig. 3. Industry 4.0 competence model (*modified*)

Source: Prifti, L.; Knigge, M.; Kienegger, H.; Krcmar, H. (2017): A Competency Model for “Industrie 4.0” Employees, in Leimeister, J.M.; Brenner, W. (Hrsg.): Proceedings der 13. Internationalen Tagung Wirtschaftsinformatik (WI 2017), St. Gallen, p. 56–57

At the model is visible that most widely represented competences will be at the competency dimension *Applying Expertise and Technology* – 21! as follows:

1. Service Orientation/ Product Service Offerings
2. Business Process Management
3. Business Change Management
4. Understand and Coordinate Workflows
5. Network Security
6. IT Architectures
7. Machine Learning
8. System Development
9. Integrating Heterogeneous
10. Technologies
11. Mobile Technologies
12. Sensors/Embedded Systems
13. Network Technology /M2M Communication
14. Robotics/Artificial Intelligence
15. Predictive Maintenance
16. Modelling and Programming
17. Big Data/Data Analysis and Interpretation
18. Cloud Computing /Architectures
19. In-Memory DBs
20. Statistics
21. Data Security

Summing up for Industry 4.0 mostly expanded will be competences connected with technology, but competences in analyzing, adapting and responding to change and creating and innovating also will take a very important role. According authors the model can be used as a schema which will help different profiles to be defined for different jobs in the new industrial environment as well as good point for curriculum development.

In preparation for future of jobs in the framework of Industry and Society 4.0 we have at least to mark:

- Curriculum for all educational levels will undergo a serious transformation;
- Technical skill will play a very important role;
- A creative way of thinking, problem solving and originality will be keys for managerial success.

2. Bulgarian education process and PISA results

Each society is searching for its own ways and models for the effective management and functioning of the education system. They are determined by the socio-political and economic characteristics of the community and by the main trends in the development of education. In Bulgaria, there is a centralized model of education system governance, which is distinguished by its moderation. Since the fall of the communist regime, this system has undergone a major transformation and is now divided into primary, upper secondary, secondary and vocational education. School education up to the age of 16 is compulsory and the learning process is organized as shown at fig. 4.

Higher education is optional, it takes place in accredited institutions as colleges, universities, specialized higher education institutions and scientific organizations, and is organized in 4 educational levels: professional bachelor (3 years), bachelor (5 years), master (5 years after secondary school for law and international relations specialities); 2 years after professional bachelor or 1 year after bachelor) and doctoral degree (3 years after masterdegree). Higher education institutions can provide postgraduate training, without acquiring a degree from higher education or a new speciality.

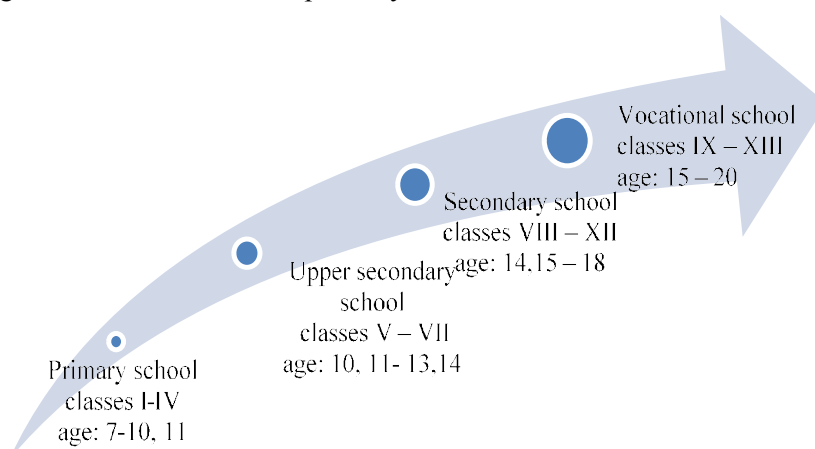






Fig. 4. Organization of Bulgarian school education

Since the transition from 1989, the quality of education in its various degrees has become of particular importance to society and economy. One of the benchmarks for quality of education in primary and secondary education is the studies conducted by the OECD through the International Student Assessment Program (PISA). The 2015 PISA surveys for Bulgaria show the following results:

 SCORES OVER TIME			
	SCIENCE 	READING 	MATH 
2000	448	430	430
2003	-	-	-
2006	434	402	413
2009	439	429	428
2012	446	436	439
2015	446	<u>432</u>	<u>441</u>

Scores underlined indicate a statistically significant change between 2006 and 2015

Fig. 5. PISA results in Bulgaria for 2003–2015

Source: Bulgaria – PISA 2015 brief, World Bank Group, <http://documents.worldbank.org/curated/en/932461485945004426/pdf/112355-BRI-PISABulgaria-PUBLIC.pdf>

Fig. 5 shows that Bulgaria's performance remains stable over the period in which it is included in the survey. From the point of OECD average for all the studied countries, Bulgaria has stable indicators in all three survey types below the average. In the table. 1 also shows data for Poland, which results are far better, however, finally in the innovation index, both countries are neighbouring.

Table 1. Snapshot of performance in science, reading and mathematics for Bulgaria and Poland

	Science		Reading		Mathematics		Science, reading and mathematics	
	Mean score in PISA 2015	Average three-year trend	Mean score in PISA 2015	Average three-year trend	Mean score in PISA 2015	Average three-year trend	Share of top performers in at least one subject (Level 5 or 6)	Share of low achievers in all three subjects (below Level 2)
	Mean	Score dif.	Mean	Score dif.	Mean	Score dif.	%	%
OECD average	493	-1	493	-1	490	-1	15.3	13.0
Bulgaria	446	4	432	1	441	9	6.9	29.6
Poland	501	3	506	3	504	5	15.8	8.3

Source: PISA Results in Focus, OECD, 2018, <https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf>

As regards the quality of higher education, discussions have not subsided over the last nearly 30 years. At the beginning of the transition, there were 32 public universities in Bulgaria, territorially and conceptually constructed to serve the needs of the planned economy. As of August 2019, there were 51 accredited higher education institutions, with only private higher education institutions being established during the period, and no public higher education institutions closed. This sphere of society also has been transformed but reforms carried out during the period were characterized by spontaneity, inconsistency and ultimately seriously impair the quality of education. Bulgarian universities are missing from the world rankings of prestigious universities, and the only one in the top 1000 in the last year goes down in this ranking. The long years of mismanagement in this field have led to a serious outflow of young people from education in the country, poor quality, asymmetric training in different branches of science. The academic community as a whole is characterized by a high degree of resistance to the introduction of new management systems. The lack of sufficient support and commitment to innovations by the senior management is compounded by an inertia in the activities of the higher education institutions, a fragmentation of decision-making structures, an inadequate communication and cooperation between departments, teachers and students, as well as difficulties in carrying out audits and an inefficient control over the implementation of recommendations (Byanova, 2011, p. 41). All of this has logically led to a devaluation of higher education.

It can be concluded that Bulgarian students have a level of Science, Reading and Mathematics competences around the average of the countries studied, and higher education institutions train in extremely complex and hostile environments. It is clear that the challenges facing the Bulgarian education system in the light of the needs of Industry 4.0 are serious, and delaying them over time will diminish long-term competitiveness. Despite the ongoing reforms, the readiness of the Bulgarian education system is still not high, and the labour market lacks trained personnel for the new economy. It can not be ignored that the trained personnel is one of the key issues for development of all sectors of the economy and increasing its' competitiveness which is a cornerstone for stability of main driving sectors, including traditional agricultural sector and rural areas of Bulgaria (Byanov, 2017, p. 149).

3. Polish education process

The education system in Poland is heavily influenced by politicians, which has a direct influence on students. During two decades, Poland has shifted from the system of primary (8 years) and secondary school (4 years) into the system of primary (6 years), secondary (3 years) and high school (3 years). Now the system

was reversed again. Despite the pros and cons of both systems, such changes are challenging for children, teachers and parents.

Reforms brought, as usual, some advantages and disadvantages. It is impossible to verify, how they influenced PISA results because PISA started in 1997 and the first results were collected in 2002 i.e. already after implementation of reforms in Poland. The “reversed” system was just introduced in 2019, so for the first results, we have to wait a few years.

How the system works now? Children can attend kindergarten from 3 to 6 years old; however, this stage of education is not compulsory in Poland and additionally is not free of charge (while the academic level is free of charge!!!). So children start primary schools at the age of 7 and for the first three years execute the course of “integrated education”. In practice it means, they have one teacher, who plays “all” roles i.e. educator, tutor, preceptor, mentor etc. These three years are in subjective author’s opinion critical for basic skills i.e. reading and understanding the text, calculating, understating basic processes in nature. This course is also critical for acquisition of skills such as cooperation in groups and other “soft skills” which are actually not precisely measured by PISA.

Children at this level do not receive any marks. The teacher gives a description, which covers all the acquired skills. The evaluation is based on the progress comparing the beginning and end of the semester. All “subjects” like native language, maths and nature are mixed and children “do not see” the hard border between them.

After three years, when children are around 10 years old, the system change completely. Each subject is carried out by the teacher, who is an expert in this limited subject and delivers a huge amount of knowledge. Of course “this subject” is the most important. At the end of each semester, pupils received a final grade, which is usually an “average” of all marks collected during the semester. Plays and group exercises, which are common during the first period, are exchanged by intensive individual homework. During whole secondary school (3 years), pupils have one group project, which is compulsory. At the end of the school, there are exams in the form of tests. There are very important when children want to continue education because the better results obtained the wider options to choose the next level school, children have. The last semester of the school is usually devoted to preparation for tests because everything that was during the whole education process is now not so important in comparison with tests results. It is particularly visible before choosing the study programme. Teenagers very often wait one year to repeat the mature exams despite they were passed last year.

And of course, almost all teenagers want to study, because other colleagues do this because it prolongs their “childhood” because parents did it, or parents just “press” their children to do it.

At the end of the education process, we have highly educated young people, who know how to pass the test.

After a short analysis, the following questions arise:

1. How the education process (from the kindergarten to the end of study) supports acquiring required skills by pupils?

2. What are the best ways to acquire skills by pupils?

4. Diagnosis

We can clearly observe the loss of natural creativity of children and teenagers during the education process (fig.6).

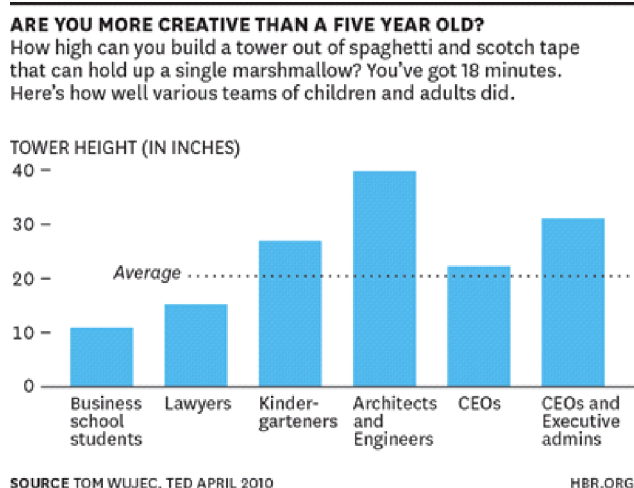


Fig. 6. Creativity level measured by the result obtained in the Marshmallow Challenge
Source: https://www.ted.com/talks/tom_wujec_build_a_tower/transcript

After some time spent at school, pupils afraid to take a risk, because they know, that for the “bad” action or answer they can be punished. It is strictly connected with “test mania”. In tests, there are good or bad answers and everybody want to avoid bad answers. Kindergartners are not influenced by test yet. They are not afraid to try many solutions or options. If one does not work, they will try the next one. This is why they build much higher macaroni towers (fig. 2.) than students of the business school after over a dozen years at school. Students start from the discussion. They want to find theoretically the best solution and execute it in one approach. While students are deliberating, kindergartners are prototyping, because they are not influenced by the education process. For them, it’s OK to fail.

Another important factor is that curricula do not stimulate collaboration in projects. Each child/student is evaluated separately and only in a very limited time, they work in the common projects. This leads to competing behaviour instead of cooperation action, which is expected by employers (fig. 1.)

Finally, we (teachers) are in position, that we know everything and we generate full answers i.e. delivering knowledge instead of generating powerful questions i.e. forcing pupils to find answers. Pupils are not curious and become “lazy”, because they receive answers.

To sum up, the education system is not adjusted to the future needs of INDUSTRY & SOCIETY 4.0.

Are there any solutions? Based on PISA results (Polish teenagers ranked 10th in the category of Sciences, the 5th in Reading and 8th position in Mathematics category), we can say, that so-called “integrated education” brought good results.

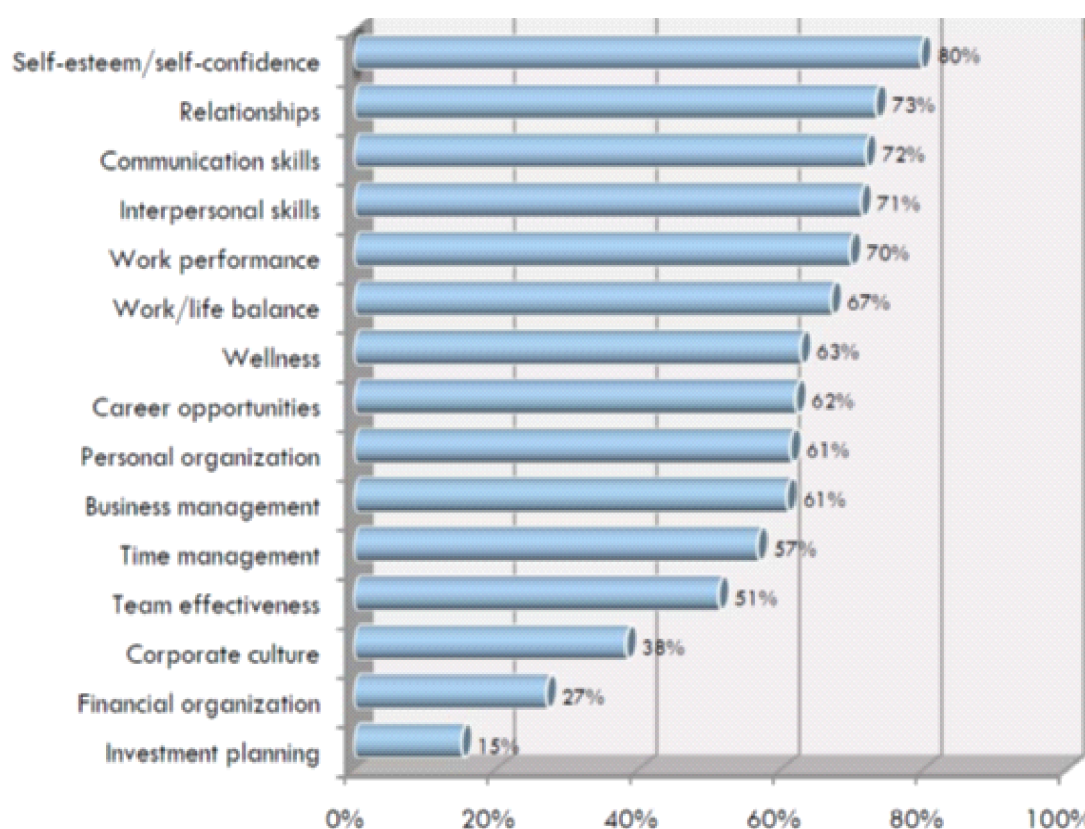


Fig. 7. The positive impact of coaching

Source: PwC for ICF – Global Coaching Client Study Executive Summary, p. 8, 2009

(<http://www.gos-coaching.ch/pdf/2009-ICF%20Global%20survey.pdf>)

We were looking also for education effective methods of developing human potential. When comparing coaching method results (fig. 7) with employers requirements (fig. 1), we can notice common areas, particularly in the most required areas i.e. the communication and teamwork. Coaching is a highly effective method in the following areas shown at fig.7. Coaching method in education was already successfully used during ancient time. In the author’s opinion, it is worth to consider including this method also in present time.

CONCLUSION

Eight key competencies have been defined at EU level (source: Recommendation 2006/962/EC of the European Parliament and the Council of 18 December 2006 on key competences for lifelong learning, OJ L 394, 30.12.2006.), which represent a combination of knowledge, skills and attitudes that are considered necessary for personal fulfilment and development; active citizenship; social inclusion; and employment:

- communication in the mother tongue;
- communication in foreign languages;
- mathematical competence and basic competences in science and technology;
- digital competence;
- learning to learn;
- social and civic competences;
- sense of initiative and entrepreneurship;
- cultural awareness and expression.

Authors would like to underline the role of entrepreneurship. Usually, it is defined as the activity of setting up a business or businesses, taking on financial risks in the hope of profit. However, it has many different definitions. If we look wider, we can assume Entrepreneurship as the ability to take advantage of the opportunities present in the environment and take creative (innovative) actions or projects. Is that what we expect from our children?

1. During Entrepreneurship classes, we do stimulate teamwork, leadership, communication etc – MELES (More Entrepreneurial Life at European Schools) – www.meles-project.eu

2. We have a differentiated approach to the teaching process, using different methods, e.g. coaching – ABC – MELES 2.0 (Academic Business Coach) – www.meles-project.eu

3. We are planning to use tools which are acceptable for the young generation – MELES 3

4. And finally prepare curricula, which stimulate skills desired by employers – MELES 4.0

In the end, inspiration from Albert Einstein: "Imagination is more important than knowledge", "Creativity is intelligence having fun". Are those competencies of the future? Imagination and creativity? We are sure about this.

REFERENCES:

1. **Bulgaria – PISA 2015:** brief, World Bank Group, <http://documents.worldbank.org/curated/en/932461485945004426/pdf/112355-BRI-PISABulgaria-PUBLIC.pdf>
2. **Byanov, I. 2017:** Implementation of Common agricultural policy and agriculture development in Bulgaria (p. 149-163). in: Bulgarian economy 10 years in European Union. ISBN 978-619-7312-71. (in Bulgarian)
3. **Byanova, N. 2011:** Standard ISO 14001:2004 – Development and Application in Higher Education - in: Contemporary Dimensions of Quality in Higher Education, V. Tarnovo, pp. 28-43 (in Bulgarian).
4. Competency Dictionary, Harvard University, © Development Dimensions Int'l, I, http://campusservices.harvard.edu/system/files/documents/1865/harvard_competency_dictionary_complete.pdf
5. **Corporate Recruiters Survey Report 2018:** <https://www.gmac.com/market-intelligence-and-research/research-library/employment-outlook/2018-corporate-recruiters-survey-report>
6. **Fitsilis, P., Tsoutsas, P. and V. Gerogiannis, 2018:** "Industry 4.0: Required personnel competences", conference paper, <https://www.researchgate.net/publication/335210375>
7. **Grzybowska, K. and Łupicka, A. 2017:** "Key competencies for Industry 4.0, Economics & Management Innovations", *ICEMI*, 1(1), ISBN: 978-1-948012-02-7, pp. 250–253.
8. **McClelland, D. 1973:** "Testing for Competence Rather Than for "Intelligence", *American Psychologist*, January, <http://www.therapiebreve.be/documents/mcclelland-1973.pdf>
9. MELES (More Entrepreneurial Life at European Schools) – www.meles-project.eu
10. My competence official project site: <http://mycompetence.bg/>
11. PISA Results in Focus, OECD, 2018: <https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf>
12. **Prifti, L., Knigge, M., Kienegger, H., Kremer, H. 2017:** A Competency Model for "Industrie 4.0" Employees, in Leimeister, J.M.; Brenner, W. (Hrsg.): Proceedings der 13. Internationalen Tagung Wirtschaftsinformatik (WI 2017), St. Gallen, p. 46–60.
13. **PwC for ICF – Global Coaching Client Study Executive Summary, 2009,** <http://www.gos-coaching.ch/pdf/2009-ICF%20Global%20survey.pdf>
14. Royal Bank of Canada, <http://www.rbc.com/newsroom/reports/index.html>

15. **Sultana, R. 2009:** “Competence and competence frameworks in career guidance: complex and contested concepts”, Int J Educ Vocat Guidance, 9, pp. 15–30.
16. **The Future of Jobs Report, 2018:** World Economic Forum, http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf
17. **Vachkova, El. 2007:** Competency-Based Human Resource Management Training, http://ibset.eu/docs/Ljubliana_BG.pdf (in Bulgarian)
18. **Wujec, T.** Build a tower, build a team, TED 2010, https://www.ted.com/talks/tom_wujec_build_a_tower/transcript

Contact information:

Name: Veneta Hristova, Academic position, scientific degree: Associated Professor, PhD
Office address: “St. Cyril and St. Methodius” University of VelikoTarnovo
Faculty of Economics, Management Department
1 Arh. Georgi Kozarov Str, office 201
VelikoTarnovo 5000, Bulgaria
E-mail: vhristova@ts.uni-vt.bg

Name: Piotr Wojejsza, Academic position, scientific degree: Assistant Professor, PhD
Office address: Maritime University of Szczecin
Faculty of Computer Science and Telecommunication
1-2 Wały Chrobrego Str.
Szczecin 70-500 Poland
E-mail: piotr@am.szczecin.pl
