21st Century Skills for Higher Education Students in EU Countries: Perception of Academicians and HR Managers

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Abstract

The main objective of the study is to analyze the EU labor market needs and expectations in 21st Century skills in five countries from the point of view of academicians and HR managers. The meta-analysis research method was used to analyze the current reports of Turkey, the Czech Republic, Italy, Bulgaria, and Spain. The research results and findings of each country report have been comparatively analyzed. The research sample consists of five national reports. All views obtained from 28 human resources managers and 14 academicians were examined. According to research results, HR managers have more practical and pragmatist expectations from graduates such as business intelligence, knowledge of foreign languages, and continuous learning. Academicians emphasize graduates' data mining ability, which refers to critical thinking. While academicians give high priority to communication and problem-solving, HR managers prioritize collaboration/team working skills. Agility skills defined as the ability to adapt to the changing conditions, are put in the second place by HR managers. According to academicians and HR managers, the most important 21st Century skills, in five countries, are communication, collaboration, and self-direction. There exists a need for innovative teaching materials to teach aforementioned skills to higher education students.

Keywords: 21st century skills, future skills, demand for skills, higher education

1. Introduction

1.1 Introduce the Problem

The rapid change in society and information technologies has brought about some important transformations in education systems. Education and training play a crucial role in enabling young people to develop these skills and competencies as well as allowing them the best possible start in life (European Commission, 2019). Technological developments lead to significant changes in teaching and learning process. And in connection with this, the skills demanded by markets are also evolving. Producing qualified graduates with relevant skills have come to be a focus of interest in our education systems. As cited in Global Partnership for Education, 21st Century skills are abilities and attributes that can be taught or learned to enhance ways of thinking, learning, working, and living in the world (Binkley et al., 2012). These skills include creativity and innovation, critical thinking/problem solving/decision making, learning to learn/metacognition, communication, collaboration (teamwork), information literacy, ICT literacy, citizenship (local and global), life and career skills, and personal and social responsibility (including cultural awareness and competence). 21st century skills that comprise skills, abilities, and learning dispositions have been identified as basic requirements for the future sustainability. Learning is an ongoing process, starting from childhood to adolescence and beyond. Referring to higher education, teaching and learning in the 21st century is undergoing many changes. Therefore, these changes will definitely challenge educators to produce dedicated students as a specific response to modernization (Ismail et al., 2021). Educational institutions should always be ready to sustain learning under similar or more complicated situations. To achieve this aim associated with the required quality, they believe there is a need to enhance the problem solving and decision-making skills, as well as to foster critical thinking of the participants in the education process (Sherouk & Raad, 2020). Those skills are widely known as 21st Century skills or future skills related to future work or new existing jobs. Organization for Economic Co-operation and Development (OECD) defines 21st Century skills as communication, collaboration, cooperation, creativity and innovation, self-direction, making global and local connections, using technology as a learning tool, and critical thinking (Annaniadou, 2009). The main frame of this study is based on this classification

outlined by OECD.

This study is a meta-analysis of research reports prepared in the context of the Erasmus+ KA2 project namely 21st Century Skills: Changing Approach to Teach in Higher Education in Turkey, Italy, Spain, Bulgaria, and the Czech Republic. All educators, researchers, and labor market representatives are agreed with the importance of above-mentioned skills, yet there is a lack of teaching materials, methodology and a gap between the skills of HIE graduates and the demand in the labor market. In all partner countries, there is a strong requirement for the development of curricula and teaching materials concerning 21st Century skills (Huedo, Romero, & Prieto-Andreas, 2021; Duru, Paksu, Balkıs, & Duru, 2021; Jordanova, Snehotova, & Smekalova, 2021; Crosta & Banda, 2021; Stefanova, Nikolina, Minhev, & Antonova, 2021).

The main objective of educational organizations is to prepare students for the future to fulfill the human resource needs of the labor market. On this point, the main question of the study is to have a larger point of view concerning required skills in investigated countries. This study intends to analyze the EU labor market needs and expectations in 21st Century skills in five countries. To dealt with the main question, the study seeks to answer the folowing questions:

1) What is the opinion of academics and human resources managers about the necessary skills for work and skills that university graduates should have? To what extent do the opinions of both groups overlap?

2) Is there any difference between the findings of investigated countries in terms of skills needed by the labor market?

1.2 Explore Importance of the Problem

As the world faces the transformative economic, social, and environmental challenges of globalization 4.0, it has never been more important to invest in people. Valuing human capital not only serves to equip individuals with the knowledge and skills to respond to systemic shifts, but it also empowers them to take part in creating a more equal, inclusive, and sustainable world (Brende, 2019). Many institutions and organizations such as the World Bank, OECD, European Union, and the World Economic Forum carry out important studies to adapt the human resources to the rapidly changing world, and to equip them with the skills to do new jobs. There are two main problems. The first is to equip students with skills that enable future generations to do the future jobs with ease. The second is to ensure that the existing human resources in the rapidly changing and developing job markets are constantly trying to improve and renew themselves. If we fail to do the first one, young people will not be able to find a job, and if we fail at the second one, many people will lose their jobs. According to Brende (2021) 75 million jobs are expected to be displaced by 2022 in 20 major economies. At the same time, technological advances and new ways of working could also create 133 million new roles. Keeping up with this change and raising the human resources required by the age has become the most important challenge of educational institutions.

The skills needed by the labor market are also changing based on new technologies, and it can be clearly seen that the labor market is more adaptive to transformation than the academic world. To be successful in the next decade, individuals will need to demonstrate foresight in navigating a rapidly shifting landscape of organizational forms and skill requirements. They will be increasingly called upon to reassess continually the skills they need, and quickly put together the right resources to develop and update them. Workers in the future will need to be flexible lifelong learners (Davies, Fidler, & Gorbis, 2011). In the light of these explanations and in the era of rapid change, the skills to be taught to university students are not determined solely by our decision or foresight. Will students be able to find a good job after they graduate? Will they be happy with the jobs they find? The answers to these questions should be considered while designing the curriculum of universities. While preparing the curricula, it is extremely important to know what the business world thinks and expects, what kind of personnel they need and what knowledge, skills, and competencies these personnel should be equipped with. This study is carried out to seek answers to the above-mentioned needs. Although the study is based solely on research results prepared in five different countries, it is potentially important to contribute to the preparation of curricula for the skills to be taught in the future. On the other hand, this study is important in terms of comparing the perspectives of academics and human resources managers on the skills required by the new era.

1.3 Describe Relevant Scholarship

When the literature is examined, there are a high number of publications and frameworks related to 21st century skills in the last three decades. Discussions about the concepts of knowledge, skills, abilities, attitudes and how to teach to students are as old as the history of education. The main reason for existence of educational institutions is to train the human resources needed by the labor market. For that reason, the debate on this issue has continued throughout history, and no consensus has ever been reached on this issue. This is because of the changing new

skills needed due to the rapid and continuous change of job markets. Today, this debate continues, and different perspectives emerge. While educators consider equipping students with better personality, social and emotional skills, the labor market demands staff that are equipped with more practical knowledge and skills. In other words, while educators emphasize cognitive skills, HR managers care more about behavioral skills.

The Explore SEL online platform is a product of the Taxonomy Project belongs to the Harvard University. The platform, which is an ongoing project designed to create a scientifically grounded system for organizing, describing, and connecting frameworks and skills across the non-academic domain (Harvard University, 2021). There are a few frameworks trying to explain 21st Century skills or future skills. In this study, the frameworks and publications are firstly selected and then summarized. "Skill" and "Competence" are related to each other, but they are different concepts. Skill is the ability to perform tasks and solve problems, while a competence is the ability to apply learning outcomes adequately in a defined context (education, work, personal or professional development). A competence is not limited to cognitive elements (involving the use of theory, concepts or tacit knowledge); it also encompasses functional aspects (involving technical skills) as well as interpersonal attributes (e.g. social or organizational skills) and ethical values. A competence is therefore a broader concept that may comprise skills (as well as attitudes, knowledge, etc.) (Annanadiou & Claro, 2009). As explained above, there are many framework concerning skills, and each framework focuses on different domains such as cognitive, emotion, social, values, perspectives, and identity.
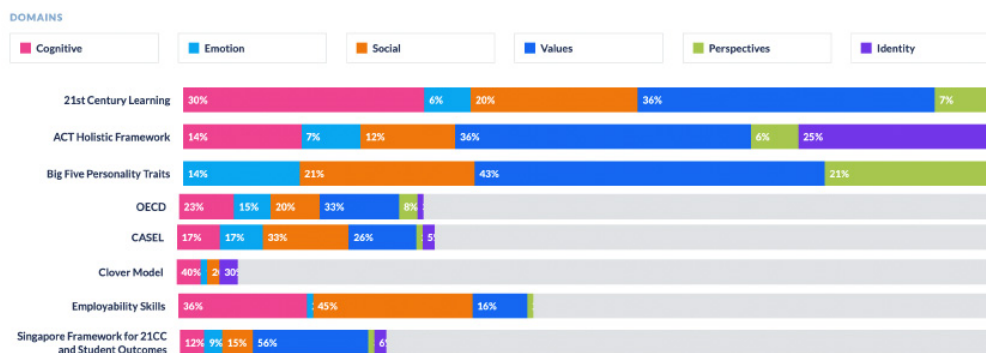

Figure 1. Frameworks by domain (Harvard University, 2021)

When the frameworks are examined, almost all frameworks are dealing with similar domains. Yet, some of them give more importance to some domains than others. While Singapore Framework for 21CC and Student Outcomes (56%), Big Five Personality Traits (43%), ACT Holistic Framework (36%) and 21st Century Learning (36%) focuses on values, Employability Skills (45%) focuses on social domain.

The Battelle for Kids P21 Framework for 21st Century Skills is a framework designed to help practitioners integrate 21st century skills into the teaching of core academic subjects. It focuses on the skills and knowledge needed to succeed in work, life, and citizenship in today's world. Within the context of key knowledge instruction, students must also learn the essential skills for success in today's world, such as critical thinking, problem solving, communication, and collaboration. The Framework provides a detailed list of skills and explanations (P21.org, 2017).

The "Big Five" model comprises five broad personality dimensions: Conscientiousness, extraversion, agreeableness, emotional stability (also called neuroticism), and openness to experience. Each represents a cluster of related thoughts, feelings, and behaviours (McCrae & John, 1992; Chernyshenko, Kankaraš, & Drasgow, 2018).

The Work Ready Now! (WRN) Framework focuses on the cross-cutting and transferable knowledge, skills, and behaviors/attitudes young people in emerging economies require to succeed in the workplace and earn a living (Education Development Center, 2019).

Singapore Framework for 21CC and Student Outcomes identify a list of competencies that are essential for children to develop to prepare them for the future. The framework suggests three main domains. These are core values (respect, responsibility, resilience, integrity, care, and harmony), social emotional competencies (Self-awareness, self-management, responsible decision-making, social awareness and relationship management) and competencies for a globalized World (civic literacy, global awareness and cross-cultural skills, critical and

innovative thinking, communication, collaboration and information skills) (Singapore Ministry of Education, 2021).

Voogt and Roblin (2012) analyzed 32 reports examining 21st Century competencies and abilities. They observed that collaboration, communication, information technology literacy, citizenship, creativity, critical thinking, and social/cultural skills were conceptualized as 21st Century skills. Voogt and Roblin (2012) emphasize that some 21st Century skills, such as technology literacy, are relatively new, but some skills, such as cooperation and communication, are as old as human history. Soulé and Warrick (2015) emphasize that many new jobs will be needed in the coming years, and most of these jobs will be associated with 21st Century skills.

In the study prepared by Cohen, Renken, and Calandra (2017), the perception of STEM_ICT professionals' perception on 21st century skills are investigated. It is indicated that while problem solving, critical thinking and communication were the most valued and the most frequently used skills in their environments, students underestimated the amount of critical thinking and systematic design. Among skills highly valued by ICT professionals, students reported significantly lower ability levels in problem solving, critical thinking, communication, use of technical systems and information literacy.

The studies on the assessment of 21st Century Skills carried out by Global Partnership for Education (2020) in Asia and Africa both show that while countries generally do not have many existing assessment tools that directly assess 21CS, there is a rich potential to adapt the existing tools and items to indirectly capture some of these skills. To facilitate such processes, the field needs more research on the nature and development of these skills. In addition, there is a need for knowledge generation and sharing as to how these skills can best be integrated in curricula (particularly through existing subjects), how teachers can be better equipped to teach in these areas, and how these skills can be assessed in ways that are authentic and connected to the realities of classrooms and schools.

2. Method

2.1 Methodology of the Study

The meta-analysis research method was used to analysis of the current reports of Turkey, the Czech Republic, Italy, Bulgaria, and Spain. Well-conducted meta-analyses allow a more objective appraisal of the evidence than traditional narrative reviews. They provide a more precise estimate of a treatment effect and may explain heterogeneity between the results of individual studies (Egger, Smith, & Philips, 1997). The research results and findings of each country report have been compared with the meta-analysis method.

A semi-structured interview method was used to collect data for the national reports. The researches in the countries were carried out in January-April 2021. Collected data were analyzed with content analysis method. In this study, the data obtained in the aforementioned reports were analyzed.

2.2 Participant Characteristics

The data concerning participants are given in the Table 1.

Table 1. Demographic information about participants by country

	Academic		HR Manager		
	Male	Female	Male	Female	Total
Turkey	4	1	3	2	10
Spain	2	1	4	2	9
Bulgaria	1	1	5	2	9
Czech Republic	2	1	1	4	8
Italy	1	0	4	1	6
Total	10	4	17	11	42

The research sample consists of 28 human resources managers and 14 academicians from 5 different countries. While 27 of the participants are male and the rest of 15 participants are female.

2.3 Sampling Procedures

All national reports were selected for meta-analysis. There is no sampling method applied in this stage. But for the sampling stage of national reports, two different groups were selected to collect data. The first group, the academicians, was sampled according to their fields of expertise, experience, and being from different faculties. In the selection of human resources managers, they were selected from different sectors and participate voluntarily to

the research. Semi-structured interviews lasting 30-50 minutes were conducted with the participants. Before each interview, participants were given the "Informed Consent Form". To protect the confidentiality of the data regarding the participants, codes such as P1, P2 were given to each of them, and the data was reflected in the report. In this respect five country reports were comparatively analyzed.

2.4 Ethical Issues

To carry out the study, written permissions were obtained from the authors of the national reports, and thus this comparative study was prepared.

2.5 Limitations

The results obtained in the research are limited to the results of the 5 country reports. Therefore, the results cannot be generalized. However, it can be used to interpret and apply to similar situations. On the other hand, the results of the research are limited to the perceptions of HR managers and academicians in different countries. The results obtained within the scope of the research are based on the content analyzes made by the authors of the country reports.

3. Results

The first specific question of the study was: What is the opinion of academics and human resources managers about the necessary skills for work and skills that university graduates should have? To what extent do the opinions of both groups overlap? The findings related to this specific question, are presented below.

The findings are addressed under 4 main themes, preserving the structure of national reports. These are knowledge, skills, personal traits, and attitudes. The data collected from academics and human resources managers were combined and compared with each other, and the results were analyzed and presented. The data collected from both groups related the knowledge theme is presented in the Table 2.

Table 2. Categories obtained from academicians and HR managers concerning knowledge theme

Themes	Categories (obtained from academicians)	Categories (obtained from HR managers)
Knowledge		Business Intelligence
	Data mining	Basic ICT knowledge
	Basic ICT knowledge	Continuous learning
	Knowledge related to the content area	Knowledge of a foreign language
		Knowledge related to the content area

When responses by academics and HR managers are examined, both groups express common views on ICT skills and knowledge related to the content area. While academics care about data mining, HR managers state that continuous learning, knowledge of foreign language and business intelligence are also important. HR managers expect more from university graduates than academics do. While academicians give privilege to data mining, HR managers think that the business intelligence is the most important knowledge area.

The categories listed under the skills theme are presented in Table 3.

Table 3. Categories obtained from academicians and HR managers concerning skills theme

Themes	Categories (obtained from academicians)	Categories (obtained from managers)
		Collaboration (Team working skill)
		Agility
	Communication skills	Computer literacy/ Programming
	Problem-solving skill	Foreign language skill
	Collaboration skill	Problem-solving skill
	Self-motivation	Critical thinking
Skills	Creativity (innovation) skill	Leadership skill
	Computer literacy	Creativity (innovation) skill
	Critical thinking	Change management skill
	Foreign language	Customer orientation skill
	Leadership skill	Global and local connections
	Listening	Intercultural skill
		Negotiation skills
		Self-management skill

Considering the answers given by both groups about skills, it can be said that there are significant differences between them. While academics express the most necessary skill as communication, it is respectively followed by problem-solving skill, collaboration skill, self-motivation skill, and creativity/innovation skill. These skills are then followed by computer literacy, critical thinking, foreign language, leadership skill and listening. These skills are finally followed by computer literacy, critical thinking, foreign language, leadership skill and listening.

HR managers, on the other hand, find state collaboration/team working skill as the most important skill. Collaboration is respectively followed by agility, computer literacy, foreign language skill and problem-solving skill. These skills are then followed by critical thinking, leadership skill, creativity (innovation) skill, change management skill, customer orientation skill, global and local connections, intercultural skill, negotiation skill and self-management skills. While academics highlight 10 important skills, HR managers express 14 skills.

The categories listed under the personality traits' theme are presented in Table 4.

Table 4. Categories obtained from academicians and HR managers concerning personality traits' theme

Themes	Categories (obtained from academicians)	Categories (obtained from managers)
		Responsibility
		Confident
		Empathic
		Entrepreneur
		Sociable
		Adaptation to corporate culture
		Assertive
		Autonomous
	Confident	Disciplined
	Disciplined	Extroversion
	Responsible	Fair-minded
	Entrepreneur	Flexible
Personality Traits	Empathic	Goal Orientation
	Deepness	Growth mindset
	Passion	Integrated
	Realistic	Mature
		Motivation (Eagerness)
		Polite
		Proactive
		Realistic
		Stress resistant
		Training in human values
		Versatility
		Vocational Self-development

When the data obtained within the scope of this research is examined, academicians express the characteristics that undergraduate graduates should have within the scope of personal traits are in order of importance as: confident, disciplined, responsible, entrepreneur, empathic, deepness, passionate and realistic. HR managers, on the other hand, specify 24 personal traits that undergraduate graduates should have. These personal traits are listed in order of importance as: responsible, confident, emphatic, entrepreneur, sociable, adaptive to corporate culture, assertive, autonomous, disciplined, extroverted, fair-minded, flexible, goal oriented, having growth mindset, integrated, mature, eagerness, polite, proactive, realistic, stress resistant, training in human values, versatility and vocational self-development. While academics describe 8 personal traits as necessity, HR managers find 24 of them as necessary.

The categories listed under the attitudes' theme are presented in Table 5.

Table 5. Categories obtained from academicians and HR managers concerning attitudes' theme

Themes	Categories (obtained from academicians)	Categories (obtained from managers)
Attitudes	Self-drive Awareness Bond with professional institutions Curiosity Desire to outperform its own results Early interaction with the sector Goal Orientation Motivation Personal Ambition Sociability Kindness Vocational Self-development	Motivation (Eagerness) Awareness Early interaction with the sector Goal Orientation Loving one's job Self-drive Initiative Sociability Kindness Resilience against adversity Enthusiasm Commitment Extroversion Sociability Optimistic Open for changes Emotional intelligence

Considering the data collected from academics on the theme of attitudes, self-drive stands out as the most important attitude, followed by awareness, bond with professional institutions, curiosity, desire to perform its own results, early interaction with the sector, goal orientation, motivation, personal ambition, sociability, kindness, and professional self-development.

HR managers also highlight a longer list of attitudes than academics in this theme. The most important attitude for HR managers is motivation (eagerness), followed by awareness, early interaction with the sector, goal orientation, loving one's job, self-drive, initiative, sociability, kindness, resilience against adversity, enthusiasm, commitment, extroversion, sociability, optimistic, open for changes and emotional intelligence.

The second specific question of study was: Does 21st century skills in the order of importance differ from one country to another one? Findings concerning the specific question are presented in Table 6.

Table 6. Rankings of 21st Century skills by countries

List of 21st Century Skills	Turkish Case Mean	Spanish Case Mean	Bulgarian Case Mean	Italian Case Mean	Czech Case Mean	General Mean
Communication	8.67	9.44	9.11	8.4	9.5	9.02
Collaboration	7.33	9.33	9.33	9	10	8.99
Self-Direction	7.83	8.63	7.78	8.8	8.67	8.34
Critical Thinking	6.83	8.11	8.33	9	8.83	8.22
Creativity and Innovation	8.17	8.44	6.33	7.8	7.33	7.61
Using Technology as a Tool for Learning	5.67	7.33	7.22	8.6	7.83	7.33
Making Global and Local Connections	5.5	7.11	3.89	5.8	7	5.86

When national reports are examined, the most important skills are emphasized by academics and HR managers are communication (mean=9.02) in the first place, and cooperation (mean=8.99) in the second place. Then, it is followed in the order of importance, by self-direction (mean=8.34); critical thinking (mean=8.22); creativity and innovation (7.61); using technology as a tool for learning (mean=7.33), and making global and local connections (mean=5.86).

4. Discussion

It is very difficult to deal with 21st century skills separately. When national reports are examined, it is observed that authors have also difficulty in making this distinction. Communication, cooperation, self-direction, creativity [S1] and innovation, critical thinking, using technology as a tool for learning and making local and global skills are completely intertwined: sometimes they are perceived as the cause of each other, while other times as the complement of each other. Despite this difficulty, the data obtained from national reports in this study are

interpreted as knowledge, skills, personal traits, and attitudes.

In all national reports, it has been underlined that the role of universities is to provide high-quality theoretical training, practical programming skills in the specific subject fields, and relevant field knowledge by academicians and HR managers. While educators have a philosophical and holistic perspective, it can be said that HR managers have more result-oriented and pragmatist expectations from graduates such as business intelligence, knowledge of foreign languages, and continuous learning. On the other hand, academicians emphasize the significance of data mining ability of graduates which refers to critical thinking. Knowledge of foreign language skills is emphasized as a necessity by both groups as it is seen as a must for a globalized world.

Looking at the skills category, it can be clearly seen that there is an important difference in the perceptions of both groups. While academicians give high priority to communication and then problem-solving, HR managers give privilege to collaboration/team working skills. The most interesting finding is that HR managers put the agility skills- as the ability to adapt to the changing conditions- to the second place. The notion of agility is defined as the capacity to respond, adapt quickly, and thrive in the changing environment (Holbeche, 2018). While academicians never mention agility skills, HR managers give importance to agility skills that has to be explored in detail. This can be explained as a defense mechanism of the companies as the fast changes affect the companies more than the educational organizations. When the expected skills of both groups are compared, it can be clearly said that HR managers are more concerned about the qualification of graduates more than academicians. Because their future depends on the quality of people they are employed.

In terms of personality traits, both groups have similar expectations, but HR managers again in this category have more demand in personality traits of employees. While academics describe 8 personal traits as a necessity, HR managers find 24 of them as necessary. Including eight personal traits by academicians, HR managers expect more personality traits, which can be explained as "super workforce". The expectations of HR managers might be relevant to market needs, but it seems to be not realistic in terms of human beings. The reason for this high expectation might be related to limited job positions and existence of many job seekers.

The attitudes expected from graduates for both groups show a great deal of similarity. Both groups emphasize motivation and self-drive as the most important attitudes. Although HR managers have again more expectations than academicians' concerning attitudes.

It is not surprising that communication and cooperation skills, which are as old as human history (Voogt & Roblin, 2012), stand out as the first two important skills in all countries in this research. It can be said that there is a common understanding of the subject in all countries, as similar results emerged after examination of all country reports regarding the importance of 21st century skills. These findings are also consistent with the literature. In this study, emphasizing the self-direction skill as the third most important skill is consistent with the findings of the study of van Laar, van Deursen, van Dijk, and de Haan (2019). They argue that the self-directed learning contributes positively to the level of information management and evaluation, collaboration, and problem-solving skills in case of employed professionals. It is possible that this new situation emerged due to the inability to control physically the work environment and the introduction of concepts such as remote working into business life. Self-learning and self-education of employees will save employers from investing more in human resources.

All educators are faced with the fact that communication, cooperation, and self-direction skills are expressed as the most important skills in all countries and there are not enough resources to teach these skills to students. It can be said that more concrete and useful materials should be produced to close this gap. Although this study seems to focus on the three most important skills, other skills are also extremely perceived as important for academicians and HR managers as future needed skills.

Acknowledgments

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