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JRC Technical Report

Non-cognitive skills and other related concepts: towards a better understanding of similarities and differences

JRC Working Papers Series on Labour, education and Technology 2021/09

Maria Cinque, Stephanie Carretero, Joanna Napierala



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Non-cognitive skills and other related concepts Towards a better understanding of similarities and differences

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Abstract

The aim of this working paper is to discuss the existing terminology, taxonomies, frameworks and concepts used for non-cognitive skills contained in the literature on labour market and skills published between 2009 and 2019, as well as in international policy driven research, with a specific focus on European frameworks. In the comparison of different Socio-emotional Learning (SEL) models we took advantage of the tools created by Harvard University (*Explore SEL*). Our perspective is descriptive rather than prescriptive as we compared the most important frameworks, highlighting the different perspectives of using dissimilar – and sometimes contrasting - terminologies, the labels and definitions. We suggest a three-dimensional taxonomy composed by the economic, the social and the humanity discourses as first dimension, the global, national and personal perspectives as a second one and the labour market, education policies, personal development drivers as a third one.

Keywords: Non-cognitive Skills, Big Five, Cognitive Skills, 21st Century Skills, Social and emotional skills, Labour market, Taxonomy, Framework

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Introduction

Different studies have highlighted that, beyond knowledge, other skills related to individual patterns of behaviours, attitudes and personality traits are crucial both for professional success and for personal fulfilment. Nevertheless, the literature review shows that these skills can be found in researchers' discussions under different labels. Traditionally the literature related with labour economic recognise the importance of the term non-cognitive skills to refer to these set of skills. But we can also see that this term overlaps with other similar concepts such as socio-emotional skills, soft skills, transversal competences, social competences, '21st century skills', Key competences, generic competences, or even basic and life skills (Shapiro et al., 2011). '21st century skills' is for example, a term widely used by international research projects and institutions, whereas the Organisation for Economic Cooperation and Development (OECD) uses the term 'key competencies' (2003) or socio-emotional skills (2015). The Council of the European Union adopted the term "Key Competences for life-long learning" through which skills such as critical thinking, problem solving, teamwork, communication and negotiation skills, analytical skills, creativity, and intercultural skills are embedded (2006, 2018). Besides the names of these skills also change from one discipline to another, with preference of economists, as said, to use term non-cognitive skills, whereas 'socio-emotional skills' is preferred by psychologists, and 'soft skills' being mostly present in business and management or education studies (Sanchez Puerta et al., 2016).

This diversity in referencing to non-cognitive skills and other related concepts leads sometimes to confusion. The aim of this paper is therefore to discuss this variety of concepts in order to put some order in the different terminologies, to clarify their use and understanding in scientific and policy literature, without defending any specific concept or giving the supremacy of one against another. We aim to extend the previous clarification carried out on this topic by World Bank (Sanchez Puerta et al., 2016) by adding international and European policy driven research. We therefore:

- compare the most important frameworks on non-cognitive skills and similar concepts created by international institutions;
- analyse the labels, definitions and approaches to non-cognitive skills in a searchable and functional database containing papers extracted from a systematic literature review on labour market and skills (see Cabus et al., 2021);
- analyse the labels of the tools created to compare different Socio-emotional Learning (SEL) models carried out by Harvard University (*Explore SEL*).

Comparison of different terms used in the frameworks referring to noncognitive skills

The review and comparison of various competence frameworks, that are summarised in Table 1, allowed us the identification of different terms used to describe non-cognitive skills. We will introduce them in this section.

Some frameworks used the term competences instead of skills. As it is not the aim of this paper to enter into the discussion of both terminologies, it is important to note that different authors have already highlighted that skills and competences are frequently used imprecisely and interchangeably (see Rychen & Salganik, 2003; Murnane & Levy, 2001, p. 183). Consequently, both terms could be found when referring to the frameworks and we will respect the original names. Nevertheless, the term competence is broader than skills, as competence includes skills, knowledge and attitudes. We know that a reason for the lack of systematic use of one term or another could be a matter of language, as it has been indeed highlighted by the ESCO skills pillar taxonomy, saying that: "There is however no distinction between skills and competences. Each of these concepts comes with one preferred term and a number of non-preferred terms in each of the 27 ESCO languages¹."

Denomination	Examples				
Generic Competences	Tuning Educational Structures (Wagenaar & González Ferreras,				
	2008)				
Key Competences	UNESCO (1996), OECD (2003), EU (2006; 2018)				
Life Skills/Competences*	WHO (1993), UNICEF (2010), JRC LifeComp (2020)				
Transversal Skills	UNESCO (2015), ESCO (2019)				
Transferable Skills	EC (European Commission), (Balcar et al., 2011)				
21 st Century skills	OECD (2009), Partnership for 21st Century Learning (2015), World				
	Economic Forum (2015)				

Table 1: Different frameworks on skills/competences that embedded non-cognitive skills
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Note: * The JRC LifeComp refers to life competences

We found non-cognitive skills under the term "Generic Competences", for example in the framework developed in the project on "Tuning Educational Structures" (Wagenaar & González Ferreras, 2008). As stated already by Cinque (2016), the expression 'generic competences' refers to those skills that are applicable and useful in various contexts, and thus they can be supposedly transferred among different work occupations. They include soft skills and additional abilities, such as literacy, numeracy, technology use, etc. Soft skills are considered a subset of generic skills.

Non-cognitive skills are also reflected under the expression **key competences**. Cinque (2016) observed that key competences refer to those generic skills that warrant special recognition for their outstanding importance and applicability to the various areas of human life (educational and occupational, personal and social). The words 'generic' and 'key' are sometimes used synonymously (Repetto Talavera & Perez-Gonzalez, 2007). Despite their differing conceptualisation and interpretation of the term in question, the majority of experts seem to agree that for a competence to deserve attributes such as 'key', 'core', 'essential' or 'basic', it must be necessary and beneficial to any individual and to society as a whole (Hoskins & Fredriksson, 2008).

¹ https://ec.europa.eu/esco/portal/skill

Life skills is also another term used extensively in which non-cognitive skills appeared. This terminology is used by different international institutions, like the World Health Organization (WHO), the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and the United Nations Children's Fund (UNICEF). Even these organizations acknowledge that there is no universally accepted definition of life skills, they can be described as adaptive attitudes and behaviour to tackle life challenges (WHO, 1997). Sala et al. (2020) went beyond life skills and refer specifically to life competences in the LifeComp Framework (Sala et al., 2020). More details could be find in sub-section on *"European and International frameworks, models, and surveys"*.

Non-cognitive skills also appear in a study commissioned by the European Commission on the **transferability of skills** across different sectors (Balcar et al., 2011). Concretely, three categories of skills were identified: soft skills; generic hard skills; specific hard skills. Specific hard skills are characterised by their lower level of transferability, whereas soft skills and generic hard skills are skills with high transferability across sectors and occupations and can be identified as **transversal skills**.

Transversal skills are referred to as 'skills that cross the borders of disciplines or occupations and capture generic skills, such as adaptability, abilities of communication, learning, and problem solving, as well as languages and competences in information and communication technologies' (EC, 2014, p. 4). According to ESCO (2019), transversal knowledge, skills and competences are relevant to a broad range of occupations and economic sectors. They are 'the cornerstone for the personal development of a person' (p. 21).

Finally, non -cognitive skills are also assimilated to the so-called term of 21st century skills. We can find many different versions of the **21st century skills** framework (Ananiadou & Claro, 2009; Partnership for 21st Century Learning, 2015; World Economic Forum, 2015). Comparing them, we can observe that 21st century skills focus on higher-order thinking, problem solving, effective communication, self-directed and collaborative learning, required by a global and digital society.

Non-cognitive skills and other related concepts in the literature on labour market outcomes

In this part of the paper, our analysis we will take advantage of the searchable and functional database of articles created via the systematic literature review of articles published in English between 2009 and 2019. This review focused on articles on non-cognitive skills and outcomes on the labour market, on the one hand, and literature on broadly understood personality traits and outcomes on the labour market on the other hand (see Cabus et al. 2021 for more details on methodology). The final version of database includes 117 articles from different geographical areas, mainly from the US (30 articles), Germany (10 articles), United Kingdom (6 articles), Sweden (5 articles), Australia (4 articles), with a greater share of articles being published in the last four years (2016-2019). The authors have different backgrounds, with the majority of articles written by economists (50 articles), psychologists (20) and sociologists (9).

While analysing these articles we extracted concepts, definitions and classifications of non-cognitive skills and other related concepts. The term competence was rarely used as the majority of the articles focused on skills, traits and personality. Just by exploring the keywords, the frequencies of the most recurrent words are the following:

- skill(s) 118
- non-cognitive 45
- personal (attributes, characteristics etc.) 36

- personality traits – 29

We compared used concepts referring to skills in order to organise the existing knowledge in a sound terminology.

One basic definition of non-cognitive skills is provided by Anghel (2017), that used data coming from the Programme for the International Assessment of Adult Competencies (PIAAC) to construct several measures of non-cognitive skills and to analyse the relationship between non-cognitive skills and earnings. His definition of non-cognitive skills focuses on the fact that they are not directly related to an individual's own knowledge:

Non-cognitive skills (also known as soft skills or socio-emotional skills) are individual patterns of behaviors, attitudes and personality that are not directly related to individuals' knowledge (Anghel, 2017, p. 4)

As Acosta and colleagues (2015) remark, the term non-cognitive skills is mainly used in the economic literature as synonyms of different kind of skills (socio-emotional/soft/life skills), although psychologists claim that these skills are not deprived of cognition:

In the economic literature, the term socio-emotional skills is often used interchangeably with the terms of behavioural skills, life skills, non-cognitive skills, or soft skills. Nonetheless, these terms differ slightly and merit clarification. Non-cognitive skills refers to a broad range of behaviors, abilities, and traits that are not induced by intelligence or achievement. Soft skills and life skills usually include more technical skills such as language fluency and computer literacy [...]. Psychologists argue that many of the abilities and traits that economists intend to capture by use of the term non-cognitive skills are a result of cognition (Acosta et al., 2015, p. 4).

In the same article, Acosta et al. (2015) use the term socio-emotional skills, adopting the definition of Guerra et al. (2014) but also extending it to the personality traits (which creates a little confusion):

The term socio-emotional skills refers to a distinct set of skills that enable individuals to navigate interpersonal and social situations effectively [...]. These skills encompass behaviors and attitudes that are consistent patterns of thoughts, feeling, and conduct (such as commitment, discipline, or the ability to work in a team) and personality traits (such as self-confidence, perseverance, and emotional stability) that are broad facets relatively stable over time (Acosta et al., 2015, p. 4)

In a more recent article, Acosta & Muller (2018) distinguish between personality traits and socioemotional skills:

Economists commonly consider behavioral characteristics and personality traits under the umbrella of 'non-cognitive skills' or leave the distinction unexplained. Socio-emotional skills are understood here as behaviors and attitudes (commitment, discipline, ability to work in a team and determination) while personality traits designate a range of personal facets that are relatively stable over time (selfconfidence, sociability, emotional stability, among others). Personality traits are broad facets defining an individual. They influence socio-emotional skills as reactions.

A further distinction and, also, an attempt to analyse the relationship between personality traits (also called 'qualities') and soft skills has been illustrated by Adhitya et al. (2019). Balcar (2016) also highlighted the difference between these two concepts – soft skills and psychological traits –, highlighting that the second ones are also called non-cognitive abilities. He describes further this

distinction focusing on the difference between 'predisposition' and 'ability' (two terms that he does not explain):

The difference between these two categories can be illustrated by the distinction between communicativeness (a predisposition) and the ability to communicate effectively in a work environment (a soft skill) because even a person with a low degree of communicativeness can be a very good communicator (owing to knowledge of appropriate methods and tools) and can, for example, transmit complex information to others without any bias. [...] Moreover, some soft skills are more closely connected with cognitive than non-cognitive abilities (e.g. problem solving, planning and organising or exploring and orientation in information). (Balcar, 2016, p. 454)

The differences between hard and soft skills are highlighted by Balcar & Hedija (2019), saying that hard skills are related to knowledge and can be easily trained and measured, while soft skills are "more closely related to attitudes, being their development slower and more difficult". Gutman and Schoon (2013) highlight that the term 'non-cognitive' creates a false dichotomy "between cognitive abilities and what are often seen as psychosocial or soft skills ..] It is confusing to contrast cognitive and non-cognitive factors as 'few aspects of human behaviour are devoid of cognition'...

The relationship between cognitive and non-cognitive skills is also highlighted by Almlund et al. (2011), who quotes Binet (the inventor of the IQ test in order to prove that these concepts are closely interconnected:

Alfred Binet the creator of the first IQ test (the Stanford-Binet test), noted that: [Success in school] ...admits of other things than intelligence; to succeed in his studies, one must have qualities which depend on attention, will, and character; for example, a certain docility, a regularity of habits, and especially continuity of effort. A child, even if intelligent, will learn little in class if he never listens, if he spends his time in playing tricks, in giggling, in playing truant. (Almlund et al. 2011, p. 15).

Heckman & Kautz (2012) highlight the relationship between the Big Five personality traits and their 'facets' as non-cognitive skills, i.e. their visible aspects that can be measured and assessed (Table 2).

Big Five Personality Factor	APA Dictionary Description	Facets (and correlated traits and adjectives)	Related traits	Analogous Childhood Temperament Traits
Conscientiousness	'the tendency to be organized, responsible, and hardworking'	Competence (efficient), Order (organized), Dutifulness (not careless), Achievement striving (ambitious), Self- discipline (not lazy), Deliberation (not impulsive)	Grit, Perseverance, Delay of gratification, Impulse control, Achievement striving, Ambition and Work ethic	Attention / (lack of) distractibility, Effort control, Impulse control / delay of gratification, Persistence, Activity

Table 2. Examples of the relationship between the big five personality traits and their 'facets'

Openness	to	'the tendency to	Fantasy	Sensory sensitivity,
Experience		open to new	(imaginative),	Pleasure in low-
		aesthetic,	Aesthetic	intensity activities,
		cultural, or	(artistic), Feelings	Curiosity
		intellectual	(excitable),	
		experience'	Actions (wide	
			interests), Ideas	
			(curious), and	
			Values	
			(unconventional)	
Extraversion		'an orientation	Warmth	Surgency, Social
of one's		of one's	(friendly),	dominance, Social
		interests and	Gregariousness	vitality, Sensation
		energies toward	(sociable),	seeking, Activity,
		the outer world	Assertiveness	Positive
		of people and	(self-confident),	emotionally, and
		things than the	Activity	Sociability/affiliation
		inner world of	(energetic),	
		subjective	Excitement	
		experience,	seeking	
		characterized by	(adventurous),	
		positive affect	and Positive	
		and sociability'	emotions	
			(enthusiastic)	

Source: Elaborated from Heckman & Kautz, 2012

In another recent article, not included in the database, Heckman et al. (2019) highlight that the economic analysis clarifies psychological studies by establishing that psychological attributes are measured by performance on tasks. Nevertheless, as Heckman et al. (2019) admits, inferring skills from performance on tasks requires standardizing all the other contributing factors that produce the observed performance. The inability to parse and localize behaviours that depend on a single skill or ability gives rise to a fundamental problem of assessing the contribution of any particular skill to the successful performance on any task (or measure). Psychological attributes have different productivities in different tasks. Performance on tasks depends on incentives and multiple skills, giving rise to a fundamental identification problem when measuring any single skill. Furthermore, Heckman, Jagelka & Kautz (2019) note that the importance of cognitive and non-cognitive skills increases with the complexity of a task. The labour market rewards are increasing for those who have large bundles of both social and cognitive skills. Skills are stable across situations. However, their manifestations depend on incentives to apply effort in the situations where they are measured and also on other skills.

Nevertheless, as Heckman observes, skills are not set in stone. They change over the life cycle and can be enhanced by education, mentoring, parenting, and environmental influences, with different degrees at different ages.

Similarly, thinking in a development perspective, another article by Almlund et al. (2011) shows that personality traits are the relatively enduring patterns of thoughts, feelings, and behaviours that reflect the tendency to respond in certain ways under certain circumstances. The authors use Roberts's Model of Personality (Fig. 1) to show how complex and challenging is the measurement of personality traits based on observed behaviours.

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Figure 1: Robert's Model of Personality as the Output System Source: Almlund et al. (2011) – based on Roberts (2006)

Lundberg (2017) states that personality traits are strongly heritable, and in studies of twins the findings show that 40–60 percent of variation in personality is genetic. Advances in neuroscience, molecular biology, developmental psychology, and economics are beginning to link deficits in a broad range of behavioural, health, and cognitive abilities to early experiences and environmental conditions, including toxic stress and pollution (Shonkoff et al. 2012; Currie 2011). Lundberg (2017) also reports that many studies have objected to the use of the label 'non-cognitive' skills. This author explains that this is because behaviours such as task persistence and effective social interaction require cognitive input in a way that is not clearly distinct from the cognitive demands of completing a Raven's Matrices test (intelligence test). The unifying principle in this view of human skills is the psychological concept of executive functioning, an umbrella term for the management of cognitive processes. The role of the executive function in regulating behaviour will vary depending on circumstances and developmental stages, but the consistent importance of cognitive control in shaping a broad range of capabilities highlights the inaptness of the term 'non-cognitive.'

Relevant studies towards a taxonomy of skills

European and International frameworks, models, and surveys

In this part, we present and describe other international programs or frameworks that are related to non-cognitive skills or other similar concepts, , including the EU policy frameworks, such as EntreComp (Bacigalupo et al., 2016) and LifeComp (Sala et al., 2020). We compare them highlighting differences and similarities across them. Each of these frameworks was created with a specific purpose and the

final goal is very important in understanding the vision and their structure. Some frameworks were created for the development of curricula, some were conceived as tools to measure/assess the quality of education and to foster inclusion and economic growth, or to explore how broader policy, cultural and socio-economic contexts influence these skills. More recent frameworks also stress the importance of values and attitudes and the role of individuals in influencing people, events and circumstances around them for better agency.

The **World Bank's STEP Skills Measurement Program (STEP)** is an initiative created in 2014 to measure skills in low and middle-income countries². As explained on the website³, STEP "provides policy-relevant data to enable a better understanding of skill requirements in the labour market, backward linkages between skills acquisition and educational achievement, personality, and social background, and backward linkages between skills acquisition and living standards, reductions in inequality and poverty, social inclusion, and economic growth". STEP Surveys measure three broad categories of skills: cognitive skills, socio-emotional skills and job relevant skills.

In 2015, the **World Economic Forum** published a report that focused on the pressing issue of the 21stcentury skills gap and ways to address it through technology (*New Vision for Education: Unlocking the Potential of Technology*). In that report, WEF defined a set of 16 crucial proficiencies for education in the 21st century. Those skills include six 'foundational literacies', such as literacy, numeracy and scientific literacy, 4 skills that were labelled as 'competencies' and 6 skills named 'character qualities'. Competencies are the means by which students approach complex challenges; they include collaboration, communication, critical thinking and problem-solving. Character qualities are the ways in which students approach their changing environment; they include curiosity, adaptability and social and cultural awareness.

The OECD study "Skills for Social Progress, the Power of Social and Emotional Skills" (2015) aims to analyse how social and emotional skills affect the future "economic and social outcome" of children and how education systems can foster these skills. It examines the effects of skills on a variety of measures of individual well-being and social progress, which covers aspects of our lives that are as diverse as education, labour market outcomes, health, family life, civic engagement and life satisfaction. The report also discusses how policy makers, schools and families facilitate the development of socio-emotional skills through intervention programmes, teaching and parenting practices. The authors highlight that education systems should not only be seen as a social investment or be purely outcome orientated, instead they should enable people to increase their well-being and support social inclusion.

The Entrepreneurship Competence Framework – **EntreComp**- (Bacigalupo et al., 2016) is based on one of the key competences identified by the European Commission necessary for a knowledge-based society: the sense of initiative and entrepreneurship. The EntreComp framework consists of three interrelated and interconnected competence areas: 'Ideas and opportunities', 'Resources' and 'Into action'. Each of the areas is made up of five competences, which, together, constitute the building blocks of entrepreneurship as a competence. The framework can be used as a basis for the development of curricula and learning activities fostering entrepreneurship as a competence. Also, it

² The STEP collection currently hosts data collected between March 2012 and August 2017 in Albania, Armenia, Azerbaijan, Bolivia, Bosnia & Herzegovina, Colombia, Georgia, Ghana, Kenya, Kosovo, Lao PDR, Macedonia, Serbia, Sri Lanka, Ukraine, Vietnam, and the Yunnan Province in China.

³ https://microdata.worldbank.org/index.php/catalog/step/about

can be used for the definition of parameters to assess learners' and citizens' entrepreneurial competences.

The **OECD Study on Social and Emotional Skills** (2017) is an international survey that identifies and assesses the conditions and practices that foster or hinder the development of social and emotional skills for 10- and 15-year-old students. The study aims at:

- providing information about students' social and emotional skills in different countries;
- identifying factors in students' home, school and peer environments that promote or hinder the development of social and emotional skills;
- exploring how broader policy, cultural and socio-economic contexts influence these skills.

The framework includes 19 social and emotional skills, that are clustered in six groups, based on the well-known Big Five model, although modifying the names of some domains and adding further items: task performance, emotional regulation, collaboration, open-mindedness, engaging with others, additional indices. The study is based on the triangulated assessment, i.e. it assesses students' social and emotional skills combining three sources of information: students' self-reports and reports by parents and teachers.

In 2018 the **OECD** created another model, the **Learning Compass 2030**⁴, an evolving learning framework that sets out an aspirational vision for the future of education. The metaphor of a learning compass was adopted to emphasise the need for students to learn to navigate by themselves through unfamiliar contexts. The OECD Learning Compass 2030 is neither an assessment framework nor a curriculum framework. It recognises the intrinsic value of learning by elaborating a wide range and types of learning within a broad structure and acknowledges that learning does not only happen in school. The framework includes cognitive and meta-cognitive skills (e.g. critical thinking, creative thinking, learning to learn and self-regulation); social and emotional skills (e.g. empathy, self-efficacy and collaboration); and practical and physical skills (e.g. using new information and communication technology devices). The components of the compass also include core foundations, knowledge, skills, attitudes and values, transformative competencies and a cycle of anticipation, action and reflection. The concept of student agency is central to the Learning Compass 2030, as the compass is a tool that students can use to orient themselves as they exercise their sense of purpose and responsibility while learning to influence the people, events and circumstances around them for the better.

The **Council of Europe** developed a **Reference Framework of Competences for Democratic Culture** (Barrett, 2016), to be adapted for use in primary and secondary schools and higher education and vocational training institutions throughout Europe as well as national curricula and teaching programmes. The framework includes 20 competences divided into four areas – Values, Attitudes, Skills and Knowledge, Critical understanding. The heart of the Framework is a model of the competences that need to be acquired by learners if they are to participate effectively in a culture of democracy and live peacefully together with others in culturally diverse democratic societies.

In May 2018, the **Council of the European Union** adopted the revised **Recommendation on Key Competences for Lifelong Learning**. The aim is that everybody should have the essential set of competences needed for personal development, social inclusion, active citizenship, and employment. These competences include Literacy, Multilingual, Mathematical competence and competence in

⁴ http://www.oecd.org/education/2030-project/teaching-and-learning/learning/learning-compass-2030/

science, technology and engineering, as well as Digital, Personal, Social and Learning to Learn, Citizenship, Entrepreneurship, and Cultural awareness and expression.

In 2020 the **Joint Research Centre** (JRC) of the European Commission developed the European Framework for Personal, Social, and Learning to Learn Key Competence – **LifeComp** – (Sala et al., 2020), a conceptual framework for the "Personal, Social, and Learning to Learn", that was already illustrated earlier (see section on "Comparing different terminologies...") and is illustrated here again in order to highlight similarities and differences with similar international frameworks. The framework has undergone several consultations, over the course of which, the consensus was to come up with three areas encompassing three competences each. Every competence has three descriptors, following a model **'awareness, understanding, action'**.

From the chronological comparison of the frameworks, models and surveys, we can observe that the most recent one are focused on a dynamic vision of skills, stressing the importance of values and attitudes and the role of individuals as agent of changes in the democratic society.

INSTITUTION	NAME	SKILLS COVERED		
World Bank, 2014	STEP Survey	Cognitive skills Reading proficiency (direct measurement)		
		- Reading pronciency (unect measurement)		
		Socio-emotional skills		
		- Personality traits (Openness, Conscientiousness,		
		Extraversion, Agreeableness, Neuroticism, Grit)		
		- Behaviour (Hostile attribution, Decision making)		
		- Risk and time preferences (Risk taking preferences,		
		Time preferences)		
		Job relevant skills		
		- Qualifications required for the job and job learning		
		times (Qualification requirements for current job;		
		Learning times)		
		and repetitiveness. Computer use. Contact with		
		clients, Solving and learning, Supervision, Physical		
		tasks).		
World Economic	New Vision for	Foundational literacies		
Forum, 2015	Education	1. Literacy		
		2. Numeracy		
		3. Scientific literacy		
		4. ICT literacy		
		5. Financial literacy		
		6. Cultural and civic literacy		
		7 Critical thinking/problem solving		
		8. Creativity		
		9. Communication		
		10. Collaboration		
		Character qualities		
		11. Curiosity		

Table 3. Frameworks, models and surveys covering non-cognitive skills

		12. Initiative
		13. Persistence & grit
		14. Adaptability,
		15. Leadership
		16. Social and cultural awareness.
OECD 2015	Skills for Social	Achieving goals
	Progress	- Perseverance
		- Self-control
		- Passion for goals
		Working with others
		- Sociability
		- Respect
		- Caring
		Managing Emotions
		- Self-esteem
		- Optimism
		- Confidence
JRC 2016	EntreComp	Ideas and opportunities
		- Spotting opportunities
		- Learners can find opportunities to generate value for
		others.
		- Creativity
		- Vision
		- Valuing ideas
		- Ethical and sustainable thinking
		Resources
		 Self-awareness and self-efficacy
		 Motivation and perseverance
		- Mobilising resources
		- Financial and economic literacy
		- Mobilising others
		Into action
		- Taking the initiative
		 Planning and management
		 Coping with uncertainty, ambiguity and risk
		- Working with others
		- Learning through experience
OECD 2018	Studv on Social	Task Performance
	and	Achievement Orientation
	Emotional	Responsibility
	Skills (SSES)	Self-Control
		Persistence
		Emotional Regulation
		Stress Resistance
		Control
		• Empathy
		• Irust
		Co-Operation

		Open-Mindedness
		Tolerance
		Curiosity
		Creativity
		Engaging with others
		Sociability
		Assertiveness
		• Energy
		Compound Skills
		Self-Efficacy
		Critical Thinking/Independence
OFCD 2018	The Learning	Cognitive and meta-cognitive skills
0100,2010	Compass 2030	critical thinking
	2000	 creative thinking
		learning to learn
		• learning-to-learn
		• self-regulation
		• emparity
		• self-efficacy
		responsibility
		collaboration
		Practical and physical skills
		 using new information and communication technology devices
		• play musical instruments, craft artworks, play
		sports;
		• life skills, such as the ability to dress oneself,
		prepare food and drink, keep oneself clean
		• the ability to mobilise one's capacities, including
		strength, muscular flexibility and stamina
		• manipulate materials, tools, equipment and
		artefacts to achieve particular outcomes
Council of	Reference	Values
Europe, 2018	Framework	 dignity, cultural diversity, democracy
	Competences	Attitudes
	Democratic	 respect, openness, civic mindedness,
	Culture	responsibility, self-efficacy, tolerance of
		ambiguity
		Skills
		• autonomous learning skills, analytical & critical
		thinking skills, listening & observing, empathy,
		adaptability, communication & plurilingual skills.
		cooperation, conflict resolution.
		Knowledge and critical understanding of communication,
		self, the world.
JRC, 2020	LifeComp	the personal area
	- •	 self-regulation
		• flexibility
		wellbeing

the	social area
	• empathy
	communication
	collaboration
the	learning to learn area
	growth mindset
	critical thinking
	managing learning

A different perspective: Harvard Explore SEL (Socio-Emotional Learning)

The frameworks described in the previous part are the products of policy-driven research, commissioned by institutional bodies in order to influence education, to measure learning outcomes or to assess workers' competencies/skills. A different perspective is represented by the frameworks created by different organisations and focused on Socio-Emotional Learning (SEL), that have been analysed by Harvard University⁵.

The website includes 40 different frameworks and gives the possibility to:

- explore domain focus (i.e., see how much each framework focuses on six common areas);
- discover framework connections (i.e., see where skills in one framework are related with skills in another one);
- identify related skills (i.e., see where similar SEL skills appear across frameworks).

We used these tools on the website for two purposes:

- 1) to compare frameworks, both within the Explore SEL domain and between those frameworks and the ones collected in the previous sub-section (that are not included in this initiative);
- 2) to create repertories of terminology to be 'classified' according to the final taxonomy.

By comparing the frameworks, we observed that the majority of these frameworks include the **cognitive**, **emotional**, **social**, **values**, **perspective and identity domains**. Most frameworks include all the six domains, but some of them focus only on specific domain. For example, the **Emotional Intelligence model** (Mayer & Salovey, 1997; Mayer, Salovey & Caruso, 2008; Mayer, Caruso & Salovey, 2016) only includes three domains: the cognitive domain (7%), the emotional domain (87%) and the perspective domain (6%)⁶. The **Big Five Personality Traits model** (McCrae & John, 1992; John, Naumann & Soto, 2008) does not include neither cognitive skills nor the identity domain. It includes values (42%), social skills (21%), perspective (21%), emotion (15%). It is the only framework that does not include cognitive skills.

As far as the second task is concerned, we extracted 247 terms from the different frameworks. We used them to start creating a glossary, where the terms are 'classified' not only within their frameworks but also indicating synonyms and similarities with other terms and creating a link with character skills and personality traits.

⁵ All frameworks can be compared by using a tool available on the website <u>http://exploresel.gse.harvard.edu</u>.

⁶ In the graph the number is 7%; this is probably due to the rounding of decimal numbers.

TERM	DEFINITION	SOURCE	SYNONYMS	CHARACTER STRENGHTS	PERSONALITY TRAITS
academic tenacity	The beliefs and skills that allow students to look beyond short- term concerns to longer- term or higher-order goals and withstand challenges and setbacks to persevere toward these goals	Building Blocks for Learning	Persistence (Social and Emotional Skills: Well-being, connectedness and success)	grit, self- control	conscientiousness
accepting differences	Being open- minded and accepting of ideas, cultures, and ways of doing things that are different from his or her own	ACT Holistic Framework	Cultural competence (40 Developmental Assets for Adolescents (ages 12-18)	curiosity	openness to experience

Table 4. Example of Glossary based on the analysis of terms extracted from Harvard Explore SEL

In order to overcome the problems caused by terminological abundancy and, sometimes, confusion created by the different **SEL frameworks**, one proposal toward a taxonomy of SEL was already made by OECD in 2017 and by the SEL Assessment Group in 2018. The Group for the Assessment of SEL (Muraro et al., 2018) already stated that7: "the Big Five framework can be seen as a kind of 'Rosetta Stone', a well-established taxonomy to which essentially all social and emotional skills can be classified. Using this taxonomy as a framework is desirable because the Big Five factors are backed by decades of empirical support, show consistent relationships with desirable outcomes such as success at school and in the workforce, and are cross-culturally universal. Moreover, there is evidence that skills within these factors are malleable to change both across the lifespan and via deliberate intervention. Organizing social and emotional skills into these five 'buckets' gives us a parsimonious, yet comprehensive, way of conceptualizing different social and emotional skills and capturing validity evidence. Because of these advantages, large-scale studies like the OECD Study on Social and Emotional Skills (2017) use this model as their assessment framework". Muraro et al. (2018) associated in a different way the Big Five traits with the related skills and the correspondence between the area identified by OECD and the 'domains' included in the Big Five Model is the following:

⁷ <u>https://casel.org/use-big-five-model-sel-assessment-framework/</u>

- open-mindedness (corresponding to 'openness to experience' in the Big Five Model)
 - curiosity, tolerance, creativity;
- *task performance* (corresponding to 'conscientiousness' in the Big Five Model)
 - achievement motivation, responsibility, self-control, persistence;
- emotional regulation (corresponding to 'emotional stability in the Big Five Model)
 - stress resistance, optimism, emotional control;
- engaging with others (corresponding to 'extraversion' in the Big Five Model)
 sociability, assertiveness, energy;
- *collaboration* (corresponding to 'agreeableness' in the Big Five Model):
 - empathy, trust, cooperation;
- compound skills
 - critical thinking, metacognition, self-efficacy.

Muraro et al. (2018) pointed that social and emotional skills differ from personality traits in that they are context-dependent, include knowledge and attitudes, and can be behaviourally based⁸.

Discussion and conclusions

As we have shown in previous sections, non-cognitive skills could refer to a collection of skills, traits, behaviours, mindsets, and attitudes often labelled using different terms: social and emotional skills, soft skills, 21st Century skills, among others. It has been already observed by Camfield (2015) that a stable definition of what non-cognitive skills are has not been settled. Also, Petway and colleagues (2016) pointed out that the use of the term non-cognitive skills is a source of controversy, because some authors consider the term inappropriate since cognitive processes underlie thoughts and behaviours.

Moreover, we have seen that the distinction between non-cognitive skills and related concepts and personality is important. Personality is defined as the organization within the individual of the psychobiological systems by which a person shapes and adapts to ever-changing internal and external influences (Cloninger & Cloninger, 2011, p. 25). This is why it is considered 'relatively malleable' according to the widely accepted Big Five model. Personality traits are different from skills, that are 'behavioural components' that can be trained and are distinguished, only for study reasons, into:

- cognitive skills (low-order and high-order cognitive skills);
- non-cognitive skills (that are "facets" of personality and influence socio-emotional skills as reactions).

Usually cognitive and non-cognitive skills interact together, and it is difficult to distinguish them during an action. For example, one might debate if skills like 'critical thinking' or 'problem solving' might be considered emotional skills or, on the other hand, pure cognitive skills.

Another key issue observed in our study was the relationship between skills and competences. In some frameworks, both terms are used as synonyms or even in a reverse order, with competence subordinated to skills. For example, in American English 'competence' indicates the ability to do something well or effectively, so that it is more a 'quality' of the action rather than a specific construct.

⁸ It is interesting here to note that Muraro defined skills, similarly to the definition of competence as we saw in the introduction to this paper. As observed before, sometimes the difference among skills and competences is blurred.

Nevertheless, as the majority of studies and frameworks recognise, competence is a wider construct including knowledge, attitudes and skills. As Rychen & Salganik (2003, p.3) highlight, 'competent performance or effective action implies the mobilization of knowledge, cognitive and practical skills, as well as social behaviour components such as attitudes, emotions, and values and motivations.' The concept of competence is also forged by the culture, the human and social capital of a person (Büchner et al., 2012). As stated in some studies (for example McGuinness, 2018) we need to consider cultural, social, economic, ethical and civic dimensions in the definition of non-cognitive skills⁹.

In order to obtain a conclusion on the myriad of terminologies analysed in relation to non-cognitive skills, we may stress that the study of terminologies on non-cognitive skills is not only connected with education and employability, that it is to **base it on an economic discourse** following the terminology of the framework created by the UNESCO study on transversal skills in the Asia-Pacific Region (UNESCO, 2015). As pointed out by Cinque (2016) and following UNESCO Framework, the economic discourse appears as the most powerful driver to integrate non-cognitive skills in the university curriculum, both in a global and national perspective, i.e. to boost economic development and increase international competitiveness, but also to improve employability of young people (personal perspective). At the same time, some researchers (for example Barrett, 2016) also emphasise both the social and humanity discourses in which education is seen as a vehicle for fostering a number of social, ethical, and moral attributes among students, such as national identity, respect for diversity, tolerance, and empathy. Research makes it clear that all countries and economies seek the integration of transversal competencies as imperative to the holistic development of their youth, and consequently their societies. All reports mention changing global and social contexts as important factors driving the promotion of non-cognitive skills / transversal competencies as these are seen as integral to fostering the attitudes and inter-personal attributes necessary to manage and cope with, for example, uncertainty and changes.

In order to conclude, we can say¹⁰ that the study of the terminology on non-cognitive skills may intersect **the economic**, **the social and the humanity discourses together with different global**, **national and personal perspectives**. Sometimes the drivers for the integration of non-cognitive skills into education are built upon a combination of these discourses and perspectives.

	Economic Discourse	Social Discourse	Humanity Discourse
Global Perspective	Competitiveness	Social Progress	Global Citizenship
National Perspective	GDP* Growth	HDI** Growth	National identity
Personal Perspective	Employability	Community	'Holistic' formation
с <u>і і і і</u>	2015		

Table 5. Rationale for Integration of Transversal Competencies into Education

Source: adapted from Unesco, 2015

* GDP: Gross domestic Product - ** HDI: Human Development Index

⁹ Concretely, in the recent literature on non-cognitive skills, there is a tendency to focus on the concept of context and on the interplay between the environmental factor and the development of skills. Meanwhile, other studies on non-cognitive skills focus on the role of cultural and social capital (Büchner et al., 2012; Abbott & Reilly, 2019). Other research covers fields previously not included such as cultural contexts or preferences for social roles (Grove et al. 2011, Lundberg, 2017), cultural norms and women's human capital in developing countries (Chua, 2017), or the value of social skills in promoting the employability of individuals with disabilities (Agran et al. 2016).

¹⁰ The original framework consisted of the same categories but used, sometimes, different terms.

A sound taxonomy should also consider the goals of the 2020 European Skills Agenda¹¹, that pursues a real paradigm shift in skills to take advantage of the green and digital transitions and support a prompt recovery from the COVID-19 crisis, by:

- strengthening **sustainable competitiveness**, to implement the European Green Deal and putting its digital and industrial strategies into practice;
- ensuring **social fairness**, putting into practice the first principle of the European Pillar of Social Rights: access to education, training and lifelong learning for everybody, everywhere in the EU;
- building up **resilience** to react to crises, based on the lessons learnt during the COVID-19 pandemic.

This is why we may propose a **third dimension to be added to the existing UNESCO framework (2015)**, which is the '**drive**', i.e. the vision of the 'bigger picture' underlining the way we interpret the different discourses on competences and skills. The third dimension includes three components: labour market (for sustainable competitiveness), education policies (as far as social fairness is concerned) and personal development (resilience).

In table 6, we put together the three dimensions, each divided into three sub-dimensions.



Table 6. Rationale for a sound taxonomy of non-cognitive skills

Source: Own elaboration, based on UNESCO Framework (2015)

Taking the example of the well-known Bray & Thomas' Cube (1995), used for comparative analysis in education, we can imagine the different frameworks and classification of skills as 'embedded' in a cube with the three dimensions: perspective, discourse and drive. In this sense, we might get a more dynamic vision of the taxonomy, so that the terminology is 'placed' in a specific perspective, considering one of the different discourses and a particular drive.

For example, the Step Survey of the WorldBank has a global perspective, concerns mainly the economic discourse and is driven by the labour market needs. On the other hand, the JRC Lifecomp framework has a European (national) perspective, is based on a social discourse and is driven by education policies. Some of the SEL frameworks presented by Harvard have a personal perspective, are based on the humanity discourse (holistic formation) and on a personal development drive.

¹¹ <u>https://ec.europa.eu/social/main.jsp?catId=1223&langId=en</u>

Considering the three dimensions we can map the different frameworks and the terms of each framework on a continuum that might explain the different uses in the various fields and put order in the terminology in a **descriptive** and **non- prescriptive** way.

This vision highlights that there are tensions and polarities among different visions of competences and skills, sometimes focusing on '**potential**' versus '**development**', on '**habits**' versus '**performance**', on '**individual**' versus '**social/organisationa**l' perspectives. As a matter of fact, the different terms can't be used as synonyms. The economic literature clarifies psychological studies by establishing that psychological attributes are measured by performance on tasks. Heckman and Kautz (2012) highlighted the relationship between the Big Five personality traits and their 'facets' as non-cognitive skills, i.e. their visible aspects that can be measured and assessed. Nevertheless, inferring skills from performance on tasks requires standardizing all the other contributing factors that produce the observed performance. Furthermore, although some studies draw a conceptual distinction between **non-cognitive skills** and **cognitive skills**, it is not possible to disentangle these concepts fully. All non-cognitive skills involve cognition, and some portion of performance on cognitive tasks is made possible by non-cognitive skills. Usually cognitive and non-cognitive skills interact together, and it is difficult to distinguish them during an action.

References

Abbott, M., & Reilly, A. (2019). The Role of Social Capital in Supporting Economic Mobility. Institute of Research on Poverty. University of Wisconsin-Madison. Url. https://aspe.hhs.gov/system/files/aspe-files/261791/socialcapitalsupportingeconomicmobility.pdf

Acemoglu, D., & Autor, D. (2011). Skills, tasks and technologies: Implications for employment and earnings. In Handbook of labor economics (Vol. 4, pp. 1043-1171). Elsevier.

Acosta, P., Muller, N., & Sarzosa, M. (2015). Beyond qualifications: return to cognitive and socioemotional skills in Colombia. IZA Discussion Papers, No. 9403, Institute for the Study of Labor (IZA), Bonn, https://www.iza.org/publications/dp/9403/beyond-qualifications-returns-to-cognitive-andsocio-emotional-skills-in-colombia

Acosta, P., Müller, N. (2018). The role of cognitive and socio-emotional skills in labor markets. IZA World of Labor, DOI: doi: 10.15185/izawol.453.

Adhitya, D., Mulyaningsih, T., & Samudro, B. R. (2019). The Role of Cognitive and Non-Cognitive Skills on Labour Market Outcomes in Indonesia. Jurnal Ekonomi Malaysia, 53(1), 3-16.

Agran, M., Hughes, C., Thoma, C. A., & Scott, L. A. (2016). Employment social skills: What skills are really valued?. Career Development and Transition for Exceptional Individuals, 39(2), 111-120.

Almlund, M., Duckworth, A. L., Heckman, J., & Kautz, T. (2011). Personality psychology and economics. In Handbook of the Economics of Education (Vol. 4, pp. 1-181). Elsevier.

Anghel, B., & Balart, P. (2017). Non-cognitive skills and individual earnings: new evidence from PIAAC. SERIEs, 8(4), 417-473.

Ananiadou, K., Claro, M. (2009). 21st Century Skills and Competences for New Millennium Learners in OECD Countries. OECD Education Working Papers, 41, OECD Publishing. http://dx.doi.org/10.1787/218525261154.

Bacigalupo, M., Kampylis, P., Punie, Y., Van den Brande, G. (2016). EntreComp: The Entrepreneurship Competence Framework. Luxembourg: Publication Office of the European Union; EUR 27939 EN; doi:10.2791/593884

Bailly, F., & Léné, A. (2012). The personification of the service labour process and the rise of soft skills: a French case study. Employee Relations, 35(1), 79-97.

Balcar, J. (2016). Is it better to invest in hard or soft skills?. The Economic and Labour Relations Review, 27(4), 453-470.

Balcar, J., & Hedija, V. (2019). Influence of female managers on gender wage gap and returns to cognitive and non-cognitive skills. Gender, Work & Organization, 26(5), 722-737.

Balcar, J., Blažíčková, J., Braňka, J., Czesana, V., Gavenda, M., Grygerová, S., Havlena, J., Havlíčková, V., Hladká, M., Homolová, E., Janoš, J., Karásek, Z., Karásková, J., Kavan, L., Kotíková, J., Larsen, C., Mickova, E., Rand, S., Schmid, A., Zacharová, L. (2011). Transferability of Skills across Economic Sectors. Luxembourg: Publication Office of the European Union. 10.2767/40404.

Barrett, M. (2016). Competences for Democratic Culture: Living together as equals in culturally diverse democratic societies. Strasbourg: Council of Europe Publishing. Online. https://rm.coe.int/16806ccc07.

Benadusi, L., Molina, S. (2018). Le competenze. Una mappa per orientarsi. Bologna: Il Mulino.

Bellet, C. S., De Neve, J. E., & Ward, G. (2019). CEP Discussion Paper No 1655 October 2019 Does Employee Happiness Have an Impact on Productivity?. Saïd Business School WP 2019-13. Available at SSRN: https://ssrn.com/abstract=3470734

Bergner, S., Neubauer, A. C., & Kreuzthaler, A. (2010). Broad and narrow personality traits for predicting managerial success. European Journal of Work and Organizational Psychology, 19(2), 177-199.

Borghans, L., Ter Weel, B., & Weinberg, B. A. (2014). People skills and the labor-market outcomes of underrepresented groups. ILR Review, 67(2), 287-334.

Bray, M. and Thomas, R. (1995). Levels of comparison in educational studies: different insights from different literatures and the value of multilevel analyses. Harvard Educational Review, 65(3), 472-491.

Büchner, C., Cörvers, F., Traag, T., & Velden, R. (2012). How do education, cognitive skills, cultural and social capital account for intergenerational earnings persistence? Evidence from the Netherlands. Researchcentrum voor Onderwijs en Arbeidsmarkt, Faculteit der Economische Wetenschappen. ROA Research Memoranda No. 7 https://doi.org/10.26481/umaror.2012007

Business Dictionary, Framework, url: http://www.businessdictionary.com/definition/framework.html

Brown, A., & Bimrose, J. (2014). Model of learning for career and labour market transitions. Research in Comparative and International Education, 9(3), 270-286.

Cabus, S., Napierala, J., Carretero, S. (2021) The Returns to Non-Cognitive Skills: a Meta-Analysis,Seville:EuropeanCommission,2021,JRC123308.https://ec.europa.eu/jrc/sites/jrcsh/files/jrc123308.pdf

Camfield, L. (2015). 'Character matters': How do measures of non-cognitive skills shape understandings of social mobility in the global North and South?. Social Anthropology. 23. 10.1111/1469-8676.12103.

Carnochan, S., Taylor, S., Pascual, G., & Austin, M. J. (2014). Employer perspectives on the role of soft skills in subsidized employment relationships. Families in Society, 95(3), 187-194.

Cedefop (2018). Insights into skill shortages and skill mismatch: learning from Cedefop's European skills and jobs survey. Luxembourg: Publications Office. Cedefop reference series; No 106. http://data.europa.eu/doi/10.2801/645011

Chiacchio, F., Petropoulos, G., & Pichler, D. (2018). The impact of industrial robots on EU employment and wages: A local labour market approach (No. 2018/02). Bruegel working paper.

Chowdhury, S., Ham, J. C., Dhabi, N. A., & Schildberg-Hörisch, H. (2017). Self-Employment, Family Production and the Returns To Cognitive and Non-Cognitive Skills in Rural Bangladesh. Available at: http://conference.iza.org/conference_files/VWPreferences_2017/6591.pdf

Christensen, T. N., Nielsen, I. G., Stenager, E., Morthorst, B. R., Lindschou, J., Nordentoft, M., & Eplov, L. F. (2015). Individual Placement and Support supplemented with cognitive remediation and work-related social skills training in Denmark: study protocol for a randomized controlled trial. Trials, 16(1), 280.

Chua, K. (2017). Skill achievement and returns in developing countries: Evidence from adult skills surveys. European Journal of Education, 52(4), 498-510.

Cinque, M. (2016). "Lost in translation". Soft skills development in European countries. Tuning Journal for Higher Education, Volume 3, Issue No. 2, May 2016, 389-427

Cloninger, C. R., & Cloninger, K. M. (2011). Person-centered Therapeutics. International journal of person centered medicine, 1(1), 43–52. https://doi.org/10.5750/ijpcm.v1i1.21

Colman, A.M. (2009). A Dictionary of Psychology. Oxford: Oxford University Press.

Colomeischi, A. A., Colomeischi, T., & Clipa, O. (2014). Teachers' Work Mentality and Work Satisfaction in Relation with their Personality Traits. Procedia-Social and Behavioral Sciences, 159, 345-349.

Costa, P.T., McCrae, R. R. (1985). The NEO personality inventory manual. Odessa, FL: Psychological Assessment Resources.

Council of the European Union (2006). Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning. Official Journal of the European Union, L394/310. Retrieved from: http://eur-lex.europa.eu/legal-content/HR/ALL/?uri=URISERV:c11090

Council of the European Union (2018). Council Recommendation of 22 May 2018 on the key competences for lifelong learning Url: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H0604(01)&from=IT

Currie, J. (2011). Inequality at Birth: Some Causes and Consequences. American Economic Review 101 (3): 1–22.

Di Fabio, A., Palazzeschi, L., & Bar-On, R. (2012). The role of personality traits, core self-evaluation, and emotional intelligence in career decision-making difficulties. Journal of Employment Counseling, 49(3), 118-129.

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. Journal of Personality and Social Psychology, 92(6), 1087–1101

Durlak, J.A., Weissberg, R.P., Dymnicki, A.B., Taylor, R.D., & Schellinger, K.B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. Child Development, 82(1), 405-32. doi:10.1111/j.1467-8624.2010.01564.x.

EC, European Commission (2011), Transferability of Skills across Economic Sectors: Role and Importance for Employment at European Level. Luxembourg, Publications Office of the European Union.

EC, European Commission (2012), New Skills and jobs in Europe: Pathways towards full employment. Bruxelles: European Commission.

EC, European Commission (2014). Skills-based profiling and matching in PES. Luxembourg: Publications Office of the European Union.

EC, European Commission (2015). Skills panorama. https://skillspanorama.cedefop.europa.eu/en

EC, European Commission (2016). A New Skills Agenda for Europe: Working together to strengthenhumancapital,employabilityandcompetitiveness',Brussels.https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-381-EN-F1-1.PDF

Elias, M. J., Zins, J. E., Weissberg, R. P., Frey, K. S., Greenberg, M. T., Haynes, N. M., Kessler, R., Schwab-Stone, M. E., and Shriver, T. P. 1997. Promoting social and emotional learning: Guidelines for educators. Alexandria, VA: Association for Supervision and Curriculum Development.

Empowering Dance Research Report (2020). Empowering Dance – Developing soft skills. http://empowering.communicatingdance.eu/files/EmpoweringDance_Project_Report.pdf

Erikson, E. H., Paul I. H., Heider. F., & Gardner, R. W. (1959). Psychological issues (Vol. 1). International Universities Press.

ESCO (2019). ESCO handbook. European Skills, Competences, Qualifications and Occupations, European Union. Url: https://ec.europa.eu/esco/portal/document/it/0a89839c-098d-4e34-846c-54cbd5684d24

Fernandez-Macias, E. and Bisello, M. (2020). A Taxonomy of Tasks for Assessing the Impact of New Technologies on Work, No 2020-04, JRC Working Papers on Labour, Education and Technology, Joint Research Centre (Seville site), https://EconPapers.repec.org/RePEc:ipt:laedte:202004.

Gardner, H., Csikszentmihalyi, M., & Damon, W. (2001). Good work: When excellence and ethics meet. Basic Books.

Geisinger, K. F. (2016). 21st century skills: What are they and how do we assess them?. Applied Measurement in Education, 29(4), 245-249.

Glewwe, P., Huang, Q., & Park, A. (2017). Cognitive skills, noncognitive skills, and school-to-work transitions in rural China. Journal of Economic Behavior & Organization, 134, 141-164.

Gertler, P., Heckman, J., Pinto, R., Zanolini, A., Vermeerch, C., Walker, S., ... & Grantham-McGregor, S. (2013). Labor market returns to early childhood stimulation: A 20-year followup to an experimental intervention in Jamaica. The World Bank.

Gonzalez Vazquez, I., Milasi, S., Carretero Gomez, S., Napierala, J., Robledo Bottcher, N., Jonkers, K., Goenaga, X. (eds.), Arregui Pabollet, E., Bacigalupo, M., Biagi, F., Cabrera Giraldez, M., Caena, F., Castano Munoz, J., Centeno Mediavilla, C., Edwards, J., Fernandez Macias, E., Gomez Gutierrez, E., Gomez Herrera, E., Inamorato Dos Santos, A., Kampylis, P., Klenert, D., López Cobo, M., Marschinski, R., Pesole, A., Punie, Y., Tolan, S., Torrejon Perez, S., Urzi Brancati, C., Vuorikari, R. The changing nature of work and skills in the digital age, EUR 29823 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-09206-3, doi:10.2760/679150, JRC 117505.

Goodman, M., Finnegan, R., Mohadjer, L., Krenzke, T., & Hogan, J. (2013). Literacy, Numeracy, and Problem Solving in Technology-Rich Environments among US Adults: Results from the Program for the International Assessment of Adult Competencies 2012. First Look. NCES 2014-008. National Center for Education Statistics.

Goos, M., Arntz, M., Zierahn, U., Gregory, T., Gomez, S. C., Vazquez, I. G., & Jonkers, K. (2019). The Impact of Technological Innovation on the Future of Work (No. 2019/03). JRC Working Papers Series on Labour, Education and Technology.

Grove, W. A., Hussey, A., & Jetter, M. (2011). The gender pay gap beyond human capital heterogeneity in noncognitive skills and in labor market tastes. Journal of Human Resources, 46(4), 827-874.

Guerra, N., K. Modecki, and W. Cunningham. (2014). Social-emotional Skills Development across the Life Span: PRACTICE. Policy Research Working Paper 7123, World Bank, Washington, DC.

Gutman, L. M., & Schoon, I. (2013). The impact of non-cognitive skills on outcomes for young people. Education Endowment Foundation, 59(22.2), 2019.

Hanushek, E. A., Schwerdt, G., Wiederhold, S., & Woessmann, L. (2015). Returns to skills around the world: Evidence from PIAAC. European Economic Review, 73, 103-130.

Hartog, J., Van Praag, M., & Van Der Sluis, J. (2010). If you are so smart, why aren't you an entrepreneur? Returns to cognitive and social ability: Entrepreneurs versus employees. Journal of Economics & Management Strategy, 19(4), 947-989.

Heckman, J.J. & Rubinstein, Y. (2001). 'The Importance of Noncognitive Skills: Lessons from GED Testing Program', The American Economic Review, 91(2), Papers and Proceedings of the Hundred Thirteenth Annual Meeting of the American Economic Association, pp. 145-149.

Heckman, J.J. & Kautz, T. (2012). 'Hard Evidence on Soft Skills', Labour Economics, 19(4): 452.

Heckman, J.J., Jagelka, T., Kautz, T. (2019). Some Contributions of Economics to the Study of Personality, IZA Discussion Papers, No. 12753, Institute of Labor Economics (IZA), Bonn.

Hoskins, B., Fredriksson, U. (2008). Learning to learn: What is it and can it be measured?. European Commission, Joint Research Centre, Institute for the Protection and Security of the Citizen, Centre for Research on Lifelong Learning (CRELL).

John, O.P., Naumann, L.P., & Soto, C.J. (2008), Paradigm Shift to the Integrative Big Five Trait Taxonomy in Handbook of Personality: Theory and Research, 114-156.

Kankaras, M., & Suarez-Alvarez, J. (2019). Assessment framework of the OECD study on social and emotional skills. OECD Education Working Paper No. 207. OECD

Khine, M.S. (2016) Non-Cognitive Skills and Factors in Educational Success and Academic Achievement. In: Khine M.S., Areepattamannil S. (eds) Non-cognitive Skills and Factors in Educational Attainment. Contemporary Approaches to Research in learning Innovations. SensePublishers, Rotterdam

Lundberg, S. (2017). Non-cognitive skills as human capital. In Education, Skills, and Technical Change: Implications for Future US GDP Growth. University of Chicago Press.

Maldonato, N. M., Sperandeo, R., Dell'Orco, S., Iennaco, D., Cerroni, F., Romano, P., et al. (2018a). Mind, brain and altered states of consciousness. Acta Medica Mediterranea 34, 357–366.

Maldonato, N. M., Sperandeo, R., Moretto, E., and Dell'Orco, S. (2018b). A non-linear predictive model of borderline personality disorder based on multilayer perceptron. Front. Psychol. 9:447.

Mayer, J.D., & Salovey, P. (1997). What is emotional intelligence? In P. Salovey & D. Sluyter (Eds.), Emotional development and emotional intelligence: Educational implications. New York, NY: Basic Books.

Mayer, J. D., Salovey, P., & Caruso, D.R. (2008). Emotional Intelligence: New Ability or Eclectic Mix of Traits? American Psychologist, 63, 503-517.

Mayer, J.D., Caruso, D.R., & Salovey, P. (2016). The ability model of emotional intelligence: Principles and updates. Emotion Review, 8, 1-11.

McCrae, R. R. and John, O. P. (1992), An Introduction to the Five?Factor Model and Its Applications. Journal of Personality, 60: 175-215

McDougall, W. (1932). Of the words character and personality. Character & Personality; A Quarterly for Psychodiagnostic & Allied Studies, 1, 3–16.

McGuinness, C. (2018). Research-Informed Analysis of 21st Century Competencies in a RedevelopedPrimaryCurriculum.NCCAkeycompetencies.Url:https://www.ncca.ie/media/3500/seminar_two_mcguinness_paper.pdf

McGuinness, S., Pouliakas, K., & Redmond, P. (2019). Skills-Displacing Technological Change and Its Impact on Jobs: Challenging Technological Alarmism?. Url: https://www.iza.org/publications/dp/12541/skills-displacing-technological-change-and-its-impacton-jobs-challenging-technological-alarmism

McMahon, W. W., & Oketch, M. (2013). Education's effects on individual life chances and on development: An overview. British Journal of Educational Studies, 61(1), 79-107.

Murnane, R.J., & Levy, F. (2001). Key Competencies Critical to Economic Success. In D. Rychen and L. Salganik (Eds.) Defining and Selecting Key Competencies. Kirkland, WA: Hogrefe & Huber Publishers.

Muraro, D., Way, J., Anguiano-Carrasco C., Walton, K.E., Burrus, J. (2018). On the use of the big five model as a SEL Assessment Framework. Measuring SEL. Using Data to Inspire Practice. Url: https://measuringsel.casel.org/use-big-five-model-sel-assessment-framework/

Mýtna Kureková, L., Beblavý, M., Haita, C., & Thum, A. E. (2016). Employers' skill preferences across Europe: between cognitive and non-cognitive skills. Journal of Education and Work, 29(6), 662-687.

OECD, Organisation for Economic Co-operation and Development, (2003). Definition and Selection of Competencies: Theoretical and Conceptual Foundations (DeSeCo), Summary of the final report Key Competencies for a Successful Life and a Well-functioning Society, Paris: OECD Publishing.

OECD (2011). OECD skills strategy. Paris: OECD Publishing.

OECD (2015). Skills for Social Progress the Power of Social and Emotional Skills. OECD Skills Studies, Paris: OECD Publishing.

OECD (2017). Social and Emotional Skills. Well-being, connectedness and success. Paris: OECD Publishing.

OECD (2018). OECD Future of Education and Skills. Learning Compass 2030. Skills Studies, Paris: OECD Publishing.

Partnership for 21st Century Learning (2015). Framework for 21st Century Learning. Retrieved from http://www.p21.org/about-us/p21-framework.

Pellerey M. (2004), Competenze individuali e portfolio, La Nuova Italia, Scandicci.

Peter, F. (2016). The effect of involuntary maternal job loss on children's behaviour and non-cognitive skills. Labour Economics, 42, 43-63.

Petway, K., Brenneman, M., Kyllonen, P. (2016). Connecting Noncognitive Development to the Educational Pipeline. 10.1007/978-94-6300-591-3_2.

Sanchez Puerta, M., Valerio, A., & Bernal, M.G. (2016). Taking Stock of Programs to Develop Socioemotional Skills: A Systematic Review of Program Evidence, Washington DC, The World Bank Group.

Repetto Talavera, E., Perez-Gonzalez, J.C. (2016). Training in socioemotional skills through on-site training. European journal of vocational training, No 40, 2007/1

Roberts, B.W. (2006). Personality Development and Organizational Behavior. In B. Staw, B. Research on Organizational Behavior., ed. Oxford, UK, Elsevier Science/JAI Press. 27: 1-41.

Rychen D.S. & Salganik Laura. H. (2003) 'A holistic model of competence' in Dominique Simone Rychen and Laura Hersh Salganik (eds). Key Competencies for a successful life and a well-functioning society (pp. 41-62). Hogrefe & Huber: Cambridge, MA.

Sala, A., Punie, Y., Garkov, V. and Cabrera Giraldez, M. (2020). LifeComp: The European Framework for Personal, Social and Learning to Learn Key Competence, EUR 30246 EN, Luxembourg: Publications Office of the European Union.

Shapiro, H., Keller Lauritzen, J.R., Irving, P. (2011). Emerging Skills and Competences- A transatlantic study. EU-US Study for the European Commission. European Commission, DG EAC

Shonkoff, J. P., Garner, A. S., Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, Adoption, and Dependent Care, & Section on Developmental and Behavioral Pediatrics (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, *129*(1), e232–e246. https://doi.org/10.1542/peds.2011-2663.

Sklad, M., Diekstra, R., Ritter, M.D., Ben, J. and Gravesteijn, C. (2012), Effectiveness of school-based universal social, emotional, and behavioral programs: Do they enhance students' development in the area of skill, behavior, and adjustment?. Psychol. Schs., 49: 892-909.

Tough, P. (2013). How Children Succeed: Grit, Curiosity, and the Hidden Power of Character. New York, NY: Mariner Books.

UNESCO (1984). Terminology of Technical and Vocational Education. Geneva: UNESCO.

UNESCO, International Bureau of Education (2013). IBE Glossary of Curriculum Terminology. Geneva: UNESCO.

UNESCO (2015) Asia-Pacific Education Research Institutes Network (ERI-Net), Regional Study on Transversal Competencies in Education Policy and Practice, Regional Report. Paris: UNESCO.

UNESCO (2016). Non-cognitive skills: Definitions, measurement and malleability. Global Education Monitoring Report.

UNICEF (2010). Life Skills Learning and Teaching: Principles, concepts and standards. New York: UNICEF.

van Rees, R. (2003). Clarity in the usage of the terms ontology, taxonomy and classification. Civil Engineering, 20(432), url:

https://pdfs.semanticscholar.org/b3e0/86fade8cbf248a3633e96b244611bbba26ce.pdf

Wagenaar, R., & González Ferreras, J. (2008). Tuning Educational Structures in Europe. Universities' Contribution to the Bologna Process. An Introduction. Bilbao: Publicaciones de la Universidad de Deusto.

WHO, World Health Organizations (1993). Life Skills Education in Schools. Skills for Life , 1, Genève: WHO.

World Economic Forum (2015). New Vision for Education: Unlocking the Potential of Technology. repared in collaboration with The Boston Consulting Group. Geneva: WEF.

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