THE COMPETENCES THAT HUMANS NEED IN A NEW ERA

Ricardo Cayolla, Universidade Portucalense
Paula Marques, NOVA School of Business and Economics

ABSTRACT

The purpose of this article is to present a conceptual model of the future competences needed for human beings to be successful. Starting from the theory of constructivism, we argue that in an increasingly faster and unpredictable, more automated and digital world, human beings who improve an intrinsically human set of competences will have a better chance of future success. More than skills, these competences must be developed from an individual responsibility, always integrated in a social context. Possible outcomes include the focus of lifelong learning, as well as the importance of holistic learning.

Keywords: Superhumans, Competences, Sub-Competences, Future, Education

INTRODUCTION

History tells us that technology growth is a source of disruption (Peralta-Alva & Roitman, 2018) and throughout history we have seen that technological innovations are accelerating, thereby increasing the potential for disruption (van Dam, 2017). We are living in a unique time, a new revolution, completely different from earlier ones. This fourth industrial revolution is not an extension of the third but rather disruptive. Three causes support this change: 1) speed; 2) range and depth; and 3) impact on systems, interfering with almost all industries in all countries (World Economic Forum, 2016).

According to the Global Talent Trends Study, a worldwide study performed by Mercer (2019), 73% of organizations foresee a significant disruption to their business and 99% of these organizations are planning to redesign their structure over the next few years, adapting to the future of work. The world is increasingly global and success in future markets depends on a set of core skills (Harris & Clayton, 2018). Throughout the world, we are witnessing organizational changes that go from the disappearance of more hierarchical models of command structure to more holocratic models. Therefore, this new age demands new and different human beings, with different competences, and more prepared for more complex and demanding times. To face this challenge, it is not just a matter of up skilling and reskilling, but a combination of new competences and a new mindset. We use the term "Superhumans" for all human beings prepared with this set of competences and new mindset, humans with enhanced human qualities and abilities.

In an era where a great deal of routine work processes will be automated and where humans will have to work side by side with machines (Goldberg, 2018), the comparative advantage of human beings will be the focus on developing their human competences (Wilson & Daugherty, 2018). Humans focused on the development of their human competences are coined in this work as "Superhumans". The paper focus is to present a list that defines which competences and not how to develop them. In an increasingly automated and digital world, knowing how to learn and embrace new skills will improve the quality of life for human beings.

Constructivism

Constructivism has its origin on several works (Bruner, 1961; Piaget, 1980; Vygotsky, 1962). Cognitive development in constructivism, whether at the most individual level (Piaget,

Citation Information: Cayolla, R., & Marques, P. (2021). The competences that humans need in a new era. *Journal of Management Information and Decision Sciences, 24*(S6), 1-8.

1972) or at the socio-cultural level (Vygotsky, 1978) affirms that learning is constructed and not passively assimilated. There are two major constructivist theories, the cognitive (Piaget, 1972) and the social (Vygotsky, 1978), that differ essentially in the importance that the context has in the cognitive development.

With roots in areas such as philosophy, psychology, education and sociology, the central idea of constructivism is based on the fact that the creation of new knowledge is preceded by previous learning (Tam, 2000). The meaning that each event has is interpreted, or constructed, in the light of previous experiences and by the construction of the meanings attributed to them (Cunningham, 1991; Fannon, 2014). The essential assumption of constructivism lies in the fact that it is the individual who actively builds his knowledge, thus expanding his skills (Bruner, 1990; Foulkes & Robb, 2019). Learning is not a phenomenon that can be characterized as a stimulus and response, it requires reflection and the capacity for abstraction for its development (Glaserfeld, 1995). People learn by building their own understanding and knowledge of the world around them, as well as having experiences and reflecting on those same experiences (Bereiter, 1994).

In the construction of knowledge, according to Philips (1995) there are two important concepts: 1) learning is structured on what is already known. New learning situations are preceded by previous experiences and these influence the way of building new knowledge, 2) learning is active, not passive. It is in the lack of understanding of a particular subject that the possibility of change arises, thus integrating the new experience. This is an active process of comparison, which allows for a change in the knowledge generated.

RESEARCH METHODS

For data collection and analysis we use the rapid review (Ganann, Ciliska, & Thomas, 2010; Khangura, Konnyu, Cushman, Grimshaw, & Moher, 2012). The specificity of this methodology allows to rapidly assess a problem, supporting decision-making based on evidence. Given the context of this study, this seems to us to be the most appropriate approach for examining the current state of future competences. This typeof rapid review is conducted for a shorter period of time, specifying the research question. Although the sources can be limited, the strategies are clear, the source selection criterion is applied in a coherent way and the data review is descriptive in nature (Khangura et al., 2012)

The selection of articles for this rapid review was as follows: 1) the articles to be published or being published in a scientific journal or in a report, 2) the articles must be written in English, 3) the articles must be published between June 2008 and June 2018, 4) the articles relate to four specific disciplines of the scientific search engine b-on: economics, education, marketing, business and management, 5) the articles must present research related to the future skills needed to develop of a particular task or job. Articles must meet these criteria to be included in the analysis.

The Online Knowledge Library (aka b-on) was founded in 1984. It provides unlimited and permanent access to full texts of thousands of scientific journals and reports. It is currently a reference in access to international scientific information. It brings together institutions of different types: higher education, scientific research and technological development, hospitals, public and private non-profit administration. B-on has at its disposal a list in several domains, from Anthropology to Zoology, including Cinema, Informatics and Psychology, in a total of sixty-eight subjects that can be researched.

The review team was formed by two specialists, the protocol was designed as well as its steps and actions to be carried out. The specific words related to the focus of the study and used in the research were: future, competences or skills. In the four disciplines researched in the scientific search engine b-on (economics, education, marketing, business and management), sixty-two articles and twenty-six reports emerged. Both researchers shared the work, with each researcher with thirty-one articles and thirteen reports. After reading the title and abstract (or

Citation Information: Cayolla, R., & Marques, P. (2021). The competences that humans need in a new era. *Journal of Management Information and Decision Sciences, 24*(S6), 1-8.

executive summary), only articles and reports that met the defined criteria were chosen. The length of this task was one month.

Subsequently, an initial pool of 66 possible competences was defined. After the advice of two other teachers, the ten most important competences were selected. Of these, we defined three competences as "structuring" and seven as "current". Finally, each of the current competences aggregates three sub-competences, giving content and dynamics to its own composition. This entire collection, analysis and categorization process took three weeks.

Objectives

We conducted a rapid review to examine how researchers respond to trends and developments in a world increasingly dominated by machines. The research question that guided this rapid review was the following: What are the future skills needed to succeed in an increasingly digitalized world? Our specific objectives were: 1) to identify academic work related to future skills, 2) to identify non-academic work (reports, working papers) related to future skills, 3) to find out if there are any gaps between published works and our perception reality (individual and in the labour market). That said, this rapid review aimed to identify the work carried out between June 2008 and June 2018. The rapid review included only articles published or in press in the Online Knowledge Library (b-on), in the four defined disciplines (economics, education, marketing, business and management) and only written in English.

Competences *vs* Skills

Competence is presently defined as "the developmental capacity to interactively mobilize and ethically use information, data, knowledge, skills, values, attitudes, and technology to engage effectively and act across diverse 21st century contexts to attain individual, collective, and global good" (International Bureau of Education, 2017).

The fullness of this definition makes it very clear that the mere acquisition of knowledge or skills on the part of human beings is no longer sufficient to be better prepared for the challenges they will face in the future. The definition in question reinforces the intelligence capacity that is necessary but in a logic of connection and integration, being subsequently properly contextualized. In a world that is increasingly digital, fast, unpredictable and with disruptive contexts, it is essential to know how to apply what is known. To these qualities we add others such as adaptability, agility in adaptation, and resilience. Competences have to prepare those who acquire them for an unknown future. In an increasingly digital world, human capabilities such as trust, sharing and grit will make a difference. We will use the term competence due to its greater scope in relation to the skill.

Future Competences

There are several studies related to skills or competences to be developed. We chose three studies, in three areas (strategic, economic and curricular) as a reference for what has been reflected on the main skills and competences for the future (Table 1).

Table 1
SKILLS AND COMPETENCES FOR THE FUTURE

Title	Future work skills 2020	The Future of JobsReport Top 10 skills 2020	Future competences andthe future of curriculum
Author	(Institute for the Future,2011)	(World EconomicForum, 2016)	(International Bureau of Education, 2017)
1	Sense Making	Complex Problem Solving	Lifelong learning
2	Social Intelligence	Critical Thinking	Self-Agency

Citation Information: Cayolla, R., & Marques, P. (2021). The competences that humans need in a new era. *Journal of Management Information and Decision Sciences, 24*(S6), 1-8.

3	Novel & AdaptiveThinking	Creativity	Interactively using diversetools and resources
4	Cross –CulturalCompetency	People Management	Interacting with others
5	Computational Thinking	Coordinating with Others	Interacting in and with the world
6	New-Media Literacy	Emotional Intelligence	Multi-literateness
7	Transdisciplinarity	Judgment and Decision Making	Trans-disciplinarity
8	Design Mindset	Service Orientation	
9	Cognitive LoadManagement	Negotiation	
10	Virtual collaboration	Cognitive Flexibility	

The Institute for the Future (2011) main objective is to identify trends that will transform society in a ten-year future. More than reporting future professions, it focuses on future work skills – qualities and skills to perform different jobs indifferent contexts. The ten skills for the future workforce (see table 1) are a consequence of major disruptive changes, likely to shape a future professional context.

The fourth industrial revolution and the changes produced are evaluated in the World Economic Forum (2016) report Jobs for the future. Skills needed in jobs in the future (see table 1) will be different due to a fundamental transformation in consumption, production and employment. Re-training and having a proactive approach are critical for all individuals. Lifelong learning is mandatory to become better prepared.

Preparing all learners for industry 4.0 is the aim of the International Bureau ofEducation (2017). The authors define competences and present a framework of competences (see table 1) to help as a worldwide reference, serving as an endorsement for future curricular transformations. It relates future competences to the future of the curriculum and, by summarizing the main challenges, reveals howcompetences can be kept up to date.

RESULTS

We defined three competences as "core" and seven as "current". By core competenceswe mean those that are part of our human evolution during the times. We consider current competences, in light of today challenges, the ones most important. Each current competence should consist of three sub-competences. Fig. 1 shows the model.

Citation Information: Cayolla, R., & Marques, P. (2021). The competences that humans need in a new era. *Journal of Management Information and Decision Sciences, 24*(S6), 1-8.

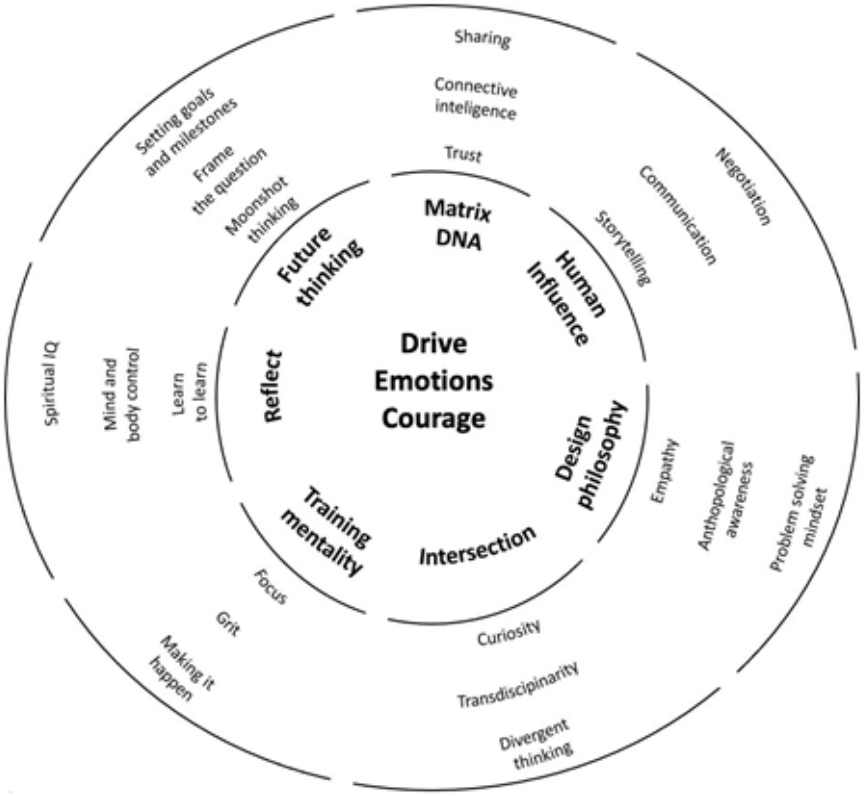

FIGURE 1
COMPETENCES MODEL – "SUPERHUMANS".

This set of competences and sub-competences are not static, are a work base, which every *x* years must be reviewed and updated. However, we must clarify that if core competences can be added (never diminished), current competences (and their sub- competences) can, and should, be analysed according to new realities (e.g., leaving, giving way to others, or switching places). We believe that it is a dynamic process that requires a constant interaction between reality and literature, always taking into consideration the individual and the organizations.

As noted earlier, the three core competences – drive, emotions, and courage – are independent of the times we live. The other seven current competences – future thinking, matrix DNA, human influence, design philosophy, intersection, trainingmentality, and reflection – are important for the present we live, and each one is madeup of three sub-competences. We now present the constructs in a more particular way. The processes of the core, current and sub-competences are examined.

Core Competences

#1 Drive: is the foundation of human life. Life is the energy generated by constant movement.
#2 Emotions: certain components of emotions are universal and probably biological. Humans need to learn how to recognize, control, and express their emotions.
#3 Courage: is a human expertise that can be experienced by everyone ona daily basis. Is the conscious decision to move forward, regardless of fear.

Current Competences and Sub-Competences

#1 Future Thinking: is the potential to imagine and visualize the future. *Moonshot thinking:* thinking and aiming to achieve something considered unthinkable so far. It is

Citation Information: Cayolla, R., & Marques, P. (2021). The competences that humans need in a new era. *Journal of Management Information and Decision Sciences, 24*(S6), 1-8.

imagining what the world might become after tomorrow, exploring all possibilities. *Frame the question*: is asking the right questions for the purpose of defining the problem. Inquiring questions implies a kind of highly sophisticated thinking that only humans can do. *Setting goals and milestones:* human beings avoid loss by its very nature. Humans want everything simultaneously and this innate condition goes against the act of setting goals and milestones.

#2 Matrix DNA: is the ability to live and think within a network and a matrix of connections. *Trust:* having reliance on other people. Trust is the great human competence that feeds human networks. *Connective intelligence:* to create connections at a global scale. It means the human capacity to solve a problem or to implement an idea through networking and in a global, systematic, and sustained way over time, using knowledge of the moment. *Sharing:* it is in the sharing of information and knowledge that we will leverage its value. Relationships are the structuring base of the human being.

#3 Human influence: is our proficiency to influence and impact other humans. *Storytelling:* the ability to express an idea through a story. Involves our whole emotional, cultural, and intellectual reality. *Communication:* is the ability to clearly deliver a message, actively listen, and read and interpret signals in order to understand others' messages. *Negotiation:* the talent to resolve conflict, tension, or antagonistic interest through an iterative process of communication between parties in order to reach consensus.

#4 Design philosophy: is the talent to look at the world and see opportunities, to constantly find solutions to problems. *Empathy:* is to perceive the needs and imbalances of the human being. Human survival depends on the ability to know how to be framed in a social context and to perceive behaviors, feelings, and emotions (Singer et al., 2004). *Anthropological Awareness:* understanding the different human dimensions in a global and holistic way. It is wanting to perceive the world from an internal, adaptive perspective, which allows functioning between the physical and social environment. *Problem Solving Mindset:* the faculty to have attention and concentration on the solution, be focused on others, their needs and be able to change the possible best solutions in order to solve the challenge.

#5 Intersection: is the power to connect realities that apparently have nothing to do with each other. *Curiosity:* is a unique feature of humans distinguishing them from all other species. Curiosity changes the chemistry of the human brains, activates the reward system and increases our internal motivation to learn, thereby expanding our learning ability. *Transdisciplinarity:* is speaking and understanding the language of various disciplines, areas, and sciences. *Divergent Thinking:* the proficiency to generate many ideas, to be open, generate many options, combine ideas, and think of uncommon or unusual possibilities.

#6 Training mentality: is the capability to persistently experiment and train, knowing very well the qualities and the areas to improve. *Focus:* is the capability to be engaged in an activity without interference from other stimuli. *Grit.* Passion and perseverance for long-term goals while maintaining a high stamina. Grit involves vigorous work, continually overcoming challenges, maintaining effort and interest over the years despite errors, adversity, and "lows" along the way. *Makes it happen:* itis essential to create internal and external contexts that allow humans to pursue their dreams and make them come true.

#7 Reflect: is the aptitude to stop and think about the world. *Learn to learn:* is synonymous with meta-learning and gaining knowledge about how humans gain or acquire a skill through study and/or experience. *Mind and body control:* being able to control events mentally and physically. *Spiritual IQ:* is a superior way of thinking about our way of being and about others. It is a need to connect with something greater than ourselves, whether in sacred or divine logic, or in relation to other humanbeings or the environment around us.

DISCUSSION

The aim of the paper is to present a model for future competences. The choice of constructivism as the basis for "Superhumans" model is framed by the strong link between the

Citation Information: Cayolla, R., & Marques, P. (2021). The competences that humans need in a new era. *Journal of Management Information and Decision Sciences, 24*(S6), 1-8.

education that human beings acquire and the time to improve it - throughout their lives. Curiosity is something innate to human beings. Learning is an active social process, where the construction of new ideas or concepts is based on the knowledge that each human being has (Fannon, 2014).

Thinking about the future distinguishes humans from all other species. Having access to the network represents for the future what having access to capital has so far represented. Human influence means to put the focus on the other, their needs, and then simplifying the story to be told. Design philosophy is the talent to look at the world and see opportunities, trying to constantly find solutions to problems. Intersection is to connect and create unlikely worlds. Training mentality can be characterized as achieving success with intense, focused training, having constant feedback, with a tremendous desire to improve, every day. Reflect is a search for answers to deep human questions, the basis of human evolution. The creation of knowledge is mostly done in a social way, with communication having an essential role. Through this social integration, learning takes place in a holistic way. Elements such as responsibility for learning and motivation for learning (Glaserfeld, 1995; Vygotsky, 1978) are examples of the approach we present. Although the active knowledge construction carried out by the individual is derived by an internal drive, the social component, as a reward logic, is always present (Vygotsky, 1978). In an eminently emotional being, it is in this coordination of efforts that, in an increasingly digitalized world, the human being has to know how to act, and have the courage to do it. It is in the development and improvement of these inherently human skills that super humans emerge.

The skills defined by the Institute for the Future (2011) have implications at the individual (people) and global (companies and governments) levels. Knowing how to respond and anticipate increasingly volatile scenarios is a fundamental condition for achieving success. Defining the necessary skills, developing and updating them is essential, making the worker of the future a student for life. The changes ahead are well listed in the World Economic Forum (2016). However, regardless of the "skills stability" (p. v), the qualification and requalification of workers will be critical. It is not possible to expect that the next generation will be better prepared in the face of the technological revolution we are experiencing. Therefore, not only should governments create an enabling environment to help companies' efforts in teaching and training new skills on the part of individuals, but each individual must take amore proactive approach to lifelong learning. Analysing and anticipating future trends is difficult and risky. In a context of rapid change, future competences require continuous rethinking, properly framed in the current context. Having the ability to forecast and anticipate are thus fundamental characteristics in the elaboration of this task of the International Bureau of Education (2017). All three reports refer to the importance of active demand and the inherent meaning of the task as elements ofperformance improvement (Fannon, 2014; Foulkes & Robb, 2019).

CONCLUSION

The purpose of this article was to present a list of skills for the future, defining which skills to develop. This list has structural bases in the theory of constructivism, where the active search for knowledge, the lived experiences and the meanings of these are essential in the construction of development and knowledge. This is an initial conceptual work. For future research, these are aspects to take into account a deeper reflection of the skills to be developed as well as the way to develop them.

ACKNOWLEDGEMENT

The corresponding author for this article entitled "The Competences that Humans Need in a New Era" Ricardo Cayolla, Head of REMIT, Universidade Portucalense, Department of Economics and Management, Porto, Portugal, Email: rcayolla@upt.pt

Citation Information: Cayolla, R., & Marques, P. (2021). The competences that humans need in a new era. *Journal of Management Information and Decision Sciences, 24*(S6), 1-8.

REFERENCES

Bereiter, C. (1994). Constructivism, Socioculturalism, and Popper's World 3. *Educational Researcher*, *23*(7), 21–23.

Bruner, J. (1961). The act of discovery. *Harvard Educational Review*, *31*, 21–32.

Bruner, J. (1990). *Acts of meaning*. Cambridge, MA: Harvard University Press.

Cunningham, D.J. (1991). Assessing constructions and constructing assessments. *Educational Technology*, *31*(5), 13–17.

Fannon, K. (2014). 'Needle Stick' – a role-play simulation: transformative learning in complex dynamic social systems. *International Journal of Training Research*, *2*(1), 100–116.

Foulkes, T., & Robb, V.S.J. (2019). Transforming practice in long day care: an action research project. *International Journal of Training Research*, *17*(1), 80–91.

Ganann, R., Ciliska, D., & Thomas, H. (2010). Expediting systematic reviews: methods and implications of rapid reviews. *Implementation Science*, *5*(1), 1–10.

Glaserfeld, E. (1995). A Constructivist Approach to Teaching. In *In: Steffe L. P.& Gale J. (eds.) Constructivism in education.* (p. Erlbaum, Hillsdale: 3–15).

Goldberg, K. (2018). How AI Can Amplify Human Competencies. *MIT Sloan Management Review*, *60*(Fall), 14–15.

Harris, R., & Clayton, B. (2018). Editorial: the importance of skills–but which skills? *International Journal of Training Research*, *16*(3), 195–199.

Institute for the future (IFTF). (2011). *Future Work Skills 2020*.

Khangura, S., Konnyu, K., Cushman, R., Grimshaw, J., & Moher, D. (2012). Evidence summaries: The evolution of a rapid review approach. *SystematicReviews*, (1), 10.

International Bureau of Education (IBE). (2017). *Future competences and the future of curriculum. A global reference for curricula transformation*.

Mercer. (2019). *Global Talent Trends 2019*. The Online Knowledge Library. www.b-on.pt

Peralta-Alva, A., & Roitman, A. (2018). *Technology and the Future of Work*.Philips, D. C. (1995). The Good, the Bad, and the Ugly: the Many Faces of Cosntructivism. *Educational Researcher*, *24*(7), 5–12.

Piaget, J. (1972). *The psychology of the child*. New York: Basic Books.

Piaget, J. (1980). The psychogenesis of knowledge and its epistemological significance. In *In M.Piatelli-Palmarini (Ed.), Language and learning, 23-34).* (p. Cambridge, MA: Harvard University Press).

Singer, T., Seymour, B., O'Doherty, J., Kaube, H., Dolan, R.J., & Frith, C.D. (2004). Empathy for pain involves the affective but not sensory components of pain. *Science*, *303*(February), 1157–1161.

Tam, M. (2000). Constructivism, instructional design, and technology: Implications for transforming distance learning. *Educational Technology & Society*, *3*(2),50–60.

van Dam, N.H.M. (2017). *The 4th Industrial Revolution & the Future of Jobs*.Vygotsky, L. S. (1962). *Thought and language*. Cambridge, MA: MIT Press.

Vygotsky, L.S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.

Wilson, H.J., & Daugherty, P.R. (2018). Collaborative intelligence: Humans and AI are joining forces. *Harvard Business Review*, (July-August), 1114–1123.

World Economic Forum (WEF). (2016). *The Future of Jobs.*

Citation Information: Cayolla, R., & Marques, P. (2021). The competences that humans need in a new era. *Journal of Management Information and Decision Sciences, 24*(S6), 1-8.