Ready for the Future?
Future Skills in European Higher Education

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Abstract
Research on Future Skills is the current hot topic in education, management and organizational research. In times of global networked organizations and steadily accelerating product cycles, the model of qualification for future jobs seems debatable. Can graduates really be prepared for the future by the predominant model of knowledge acquisition? Do we already have adequate concepts for competence development in higher education? Or do we need something new, something radical? An international study led to the identification of 16 Future Skills Profiles within three areas that can be depicted in a Triple Helix Model of Future Skills. While the inividual skills were all rated as important for future graduates by experts, the maturity level of higher education institutions in promoting these skills was questioned. These results call for new strategies and concepts concerning structural, teaching and learning aspects and a new way of embracing lifelong learning concepts in higher education and indicate a new perception of knowledge and learning.

Keywords: *Future Skills, higher education, Learning, Competence, Delphi Survey, Education Research*

1. Introduction to the Field of Future Skill Research

Research on *Future Skills* is the current hot topic in management and organizational research (Ehlers 2020). In times of global networked organizations and steadily accelerating product cycles, the model of qualification for future jobs seems debatable. The vast majority of employers surveyed for the "Future of Jobs Report" of the World Economic Forum (WEF 2018), released in 2018, expects that by 2022, the skills required to perform most jobs will have shifted significantly.

Can graduates really be prepared for the future by predominantly acquiring knowledge? Do we already have adequate concepts for competence development in higher education? Or do we need something new, something radical? Research on *Future Skills* is becoming more prominent. Examples are lists of skills for living and working in 2030 (OECD, 2018) or the analysis of work area-related qualifications (Deming, 2017). However, the time has come to go a step further and conduct in-depth research.

Starting point for research on *Future Skills* presented in this paper is an analysis of factors which influence our lives, the way we work and live, learn and develop. Such descriptions, by dealing with the future, carry a certain degree of vagueness, while being as precise as possible in capturing aspects that can be seen as influencing factors for the future: future ways of living, future ways of work, future ways of learning, etc. (e.g. OECD 2019, 2018, 2017). Analyzing the currently existing papers on important skills and abilities for the future work life, at least two converging primary factors crystallize:

- Increasingly fast technological advancements and their effects on all spheres of our lives, work and societies lead to an excess of information and options.
- Increased global cooperation, exchange and communication are no longer an option but a necessary ingredient of every process of society, work and life.

Resulting from that, a number of connected changes can be observed:

- A new demand for (higher) education studies and innovation in learning pathways and qualification structures including certification and credentialing schemes will be needed due to the changes in work structures.
- By this, there will be higher demand for higher education, turning industrial societies into education societies where education is the means by which one can manage risks.
- The very essence of how learning and studying is organized is evolving into new concepts – from static to reflection in action in complex situations.

In order to find reference models which are capable of capturing the intertwined and networked nature of these developments, we base our studies in ecosystem theory and cybernetics. Combining these approaches with an educational science as well as with a

sociological point of view, our research is rooted in the assumption that there are ongoing changes within the structure, nature, and profile of competences and skills. These changing skill requirements can be described and analyzed.

Policy and research pay increasing attention to analyzing in-depth changes and trends for the future working world and future job markets (OECD 2018a, 2018b, WEF 2018, Playfoot & Hall 2009). However, most approaches fall short of two perspectives, which we call the 'iceberg phenomenon' and the 'future education gap': While the 'iceberg phenomenon' of *Future Skill* research refers to the fact that *Future Skill* research is often wrongly exclusively focusing on technological change (World Economic Forum 2018, Hirsch-Kreinsen 2016, Deloitte 2018, PwC 2018, McKinsey & Company 2018, Balliester & Adam 2018), the 'future education gap' describes a missing focus on rooting Future Skills approaches in education theory.

In order to overcome this shortfall and to be able to research the articulation, extent, nature and contexts of such *Future Skills*, we designed a threefold long-term research project, starting in 2015, called "Future Skills – Future Learning and Future Higher Education". The research focus is on identifying *Future Skills* in a broad and holistic sense, incorporating digital skills but going beyond them, and determining which changes in the working world are causing these new skill demands. Moreover, we asked how higher education institutions will have to reorganize their academic programmes in order to promote the development of such *Future Skills* for future graduates – and how far they have already progressed in this undertaking.

2. Methodological Design and Research Context of the Delphi Study

Our research aims at defining *Future Skills*, as well as asking how higher education can support their development. As has been demonstrated by other studies, research in this area is of vital importance as future graduates need to adapt to an increasingly changing and ever more complex environment that demands agility and innovation. In order to address this complex field systematically, we ask three questions within three different, but interrelated areas:

- Future Skills: Which skills are necessary for future employees? Which skills will be necessary to shape the future and society in a sustainable way?
- Future learning concepts: How can organizations and firms support the development of *Future Skills* (learning and management approaches)?
- Future higher education: How can we design higher education concepts in order to support the development of *Future Skills*?

Part 1 of the research initiative was about identifying innovative and future-oriented 'future organizations', this choice based on their advanced approaches of learning and competence

development. In part 2 of the research, we analyzed the nature of these competence concepts and the competence demands of the 'future organizations' through in-depth interviews and we were able to model a set of 17 competence profiles which we refer to as *Future Skills*, each containing a number of subcompetences and embedded in a three-dimensional competence frame. In part 3, in order to validate our findings and to determine the impact of the demand for *Future Skills* on higher education, we designed an international Delphi study, drawing on the assessments and opinions of almost 50 experts from all over the world. The experts were asked to reflect and evaluate within three areas which were identified as important for future higher education: (1) drivers of change shaping future higher education, (2) scenarios of future higher education, and (3) *Future Skills*. For each of the areas we were interested in the degree of relevance of the respective issues, as well as in the experts' opinion about when they would gain relevance.

3. Future Skills for Future Graduates

The term *Future Skills* is defined as the 'ability to act successfully on a complex problem in a future unknown context of action'. It refers to an individual's disposition to act in a self-organized way, visible to the outside as performance.

An actor can develop *Future Skills* in relation to her/himself, in relation to dealing with a task, a topic or an object s/he is working on, or in relation to an organisational environment, i.e. the social system. In the reconstruction of the data and with recourse to the epistemological position of the subject-object split and the distinction of the object-, material world into a representational and a social world, we attribute to it a subject-, object- and world (social/organizational) reference. The result is a tripartite division, a threefold relation, with each of its three parts (or dimensions) related to the other. Due to the close interrelated integration of all three dimensions, we refer to this concept as the *Triple Helix Model of Future Skills*, alluding to the biological concept of DNA and its helix structure. The concept allows the formal description of actions in highly emergent contexts. This means that performance in a *Future Skills* context results from an interplay of the described tripartite structure. This threefold distinction goes back to Meder (2007, also Roth 1971) who presents a constitutive structure for education as a threefold relation. It allows to differentiate skills as follows:

1. The first *Future Skill* dimension is the subjective dimension of *Future Skills* profiles. It is relating to an individual's subjective, personal abilities to learn, adapt and develop in order to improve its opportunities to productively participate in tomorrow's working world, actively shape it and get involved with designing societies to cope with future challenges. It contains seven *Future Skill* profiles.
2. The second *Future Skill* dimension is relating to an individual's ability to act in a self-organized way in relation to an object, a task or a certain subject-related issue.

It is emphasizing a new understanding of knowledge, going beyond pure expertise and towards connecting knowledge with motivation, values and the capacity to act in the concerned field of knowledge. It contains three *Future Skill* profiles.

3. The third *Future Skill* dimension is relating to an individual's ability to act self-organized in relation to its social and organizational environment. It is emphasizing the individual's dual role as the curator of its own social portfolio of membership in several organizational spheres of rethinking organizational spaces and recreating organizational structures for the future. It contains five *Future Skill* profiles.

Within the three dimensions, sixteen skill profiles have been defined (fig. 1). A skill profile is an array containing further subskills.

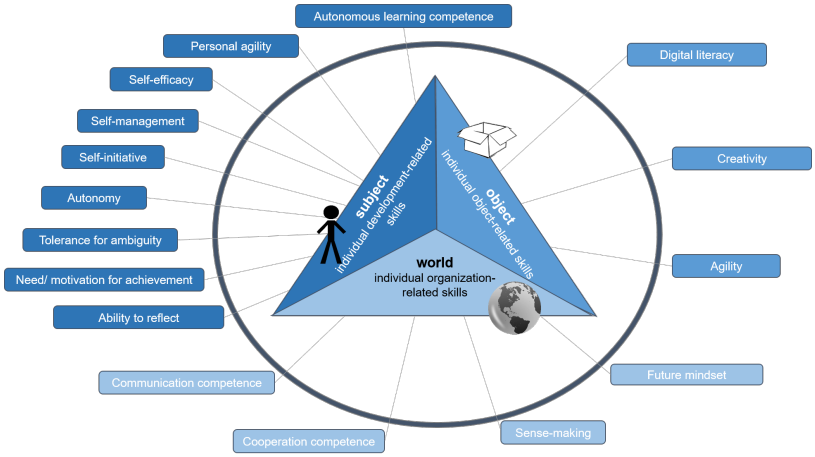

Figure 1. The 16 Future Skill profiles.

4. Future Skills Maturity Level of European Higher Education

How well do higher education institutions already manage today to support their students in the development of *Future Skills*? The Delphi respondents received a list of all *Future Skills* including their descriptions and were asked to assess their importance for future higher education. They should also indicate to what extent higher education institutions are currently able to promote these skills among their students. Both variables were each assessed on a 5-step Likert scale. In order to obtain an overview of the possible discrepancies between the importance of a skill and the degree of maturity of its current promotion by higher education institutions, the delta of the two mean values of these variables was calculated.

All individual development-related competences were rated as important by the respondents' sample, with autonomy (self-determination competence) and the ability to reflect (reflection competence) even being considered very important ($M_{Autonomy} = 4.53$, $SD_{Autonomy} = 0.62$;

$M_{\text{Ability to reflect}}$ = 4.50, $SD_{\text{Ability to reflect}}$ = 0.67). In addition, the data showed that reflection competence, together with self-efficacy and self-initiative – compared to the other individual development-related competences – currently represent the *Future Skills* best promoted by higher education institutions. The Future Skill Profile Autonomous Learning Competence (M = 4.48, SD = 0.69) and Decision Competence or self-management (M = 4.46, SD = 0.72) came second and third in the ranking of importance. However, the calculated delta shows that the highest discrepancy between importance and the current level of support emerges for learning competence (Δ = 1.83) and Autonomy or self-determination competence (Δ = 1.81) – two of the skills that were rated as among the most important.

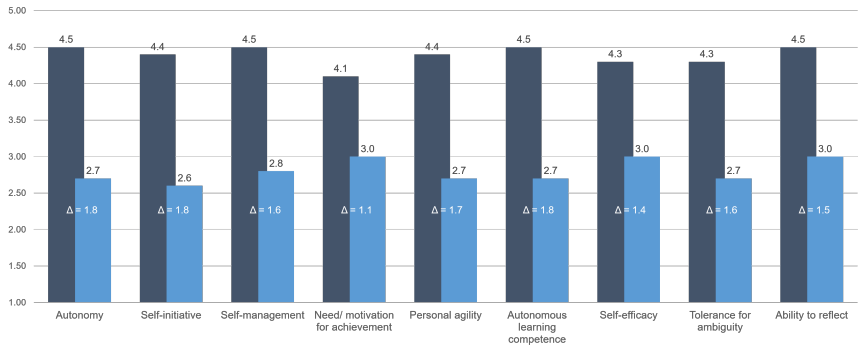

Figure 2. Individual development-related skills maturity.

Individual object-related skills are based on the individual's ability to act in unknown future contexts, in which the individual is not the point of reference, but a particular object to which the action relates. The expert ensample rated all skills in this category as important. As can be seen from Figure 3, the experts believe that agility (system competence) (M = 2.53, SD = 0.87) and creativity (innovation competence) (M = 2.52, SD = 0.85) are the least promoted by higher education institutions. The Delphi respondents rated digital literacy as being promoted to an acceptable degree (M = 2.93, SD = 1.03).

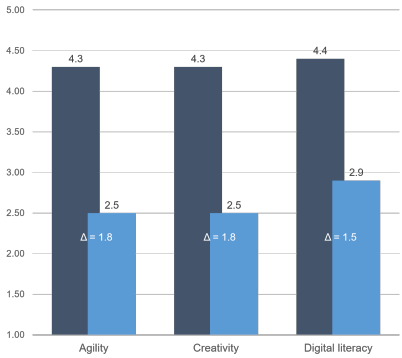

Figure 3. Individual object-related skills maturity.

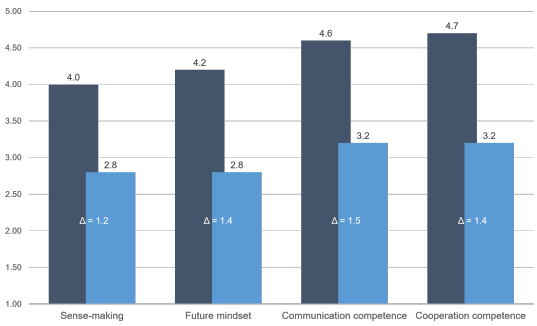

Figure 4. Individual organization-related skills maturity.

Organization-related skills comprise those skills that are needed to operate successfully in organisational and social environments. Here, too, the international expert sample rated all skills as important, with the cooperation competence with an average value of 4.59 (SD = 0.67) and the communication competence with an average value of 4.67 (SD = 0.67) even being rated as very important (see Figure 3). In addition, the experts assessed all the skills in this category as being supported to an acceptable degree by higher education institutions, with the two skills considered most important – cooperation and communication skills – also being regarded as the *Future Skills* best promoted by higher education institutions.

The experts emphasized that the degree to which *Future Skills* are promoted differs between higher education institutions, between different types of higher education and depends on study programmes and teaching styles. Furthermore, depending on age, personality and attitude, students are not equally well equipped to develop *Future Skills*. In a study commissioned by the Stifterverband on the subject of *Future Skills*, strategic potential for higher education institutions is highlighted with the aim of improving the deficits in the integration of *Future Skills* into higher education teaching (Meyer-Guckel et al. 2019):

- Higher education institutions face the challenge of preparing all their students for a digitised working environment. At present, there is a particular lack of educational opportunities that support development of *Future Skills*.
- Higher education institutions are becoming increasingly important for companies when it comes to supporting *Future Skills* development.
- Higher education institutions need innovative approaches and more resources in very different areas, including the conception of new study programmes, the enhancement of existing curricula, the teaching of *Future Skills*, the creation of new learning environments and agile innovation spaces as well as the positioning of higher education institutions as providers of lifelong learning opportunities.

Acknowledgements

All reports can be accessed in full length at the project web site www.nextskills.org as open access publications.

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