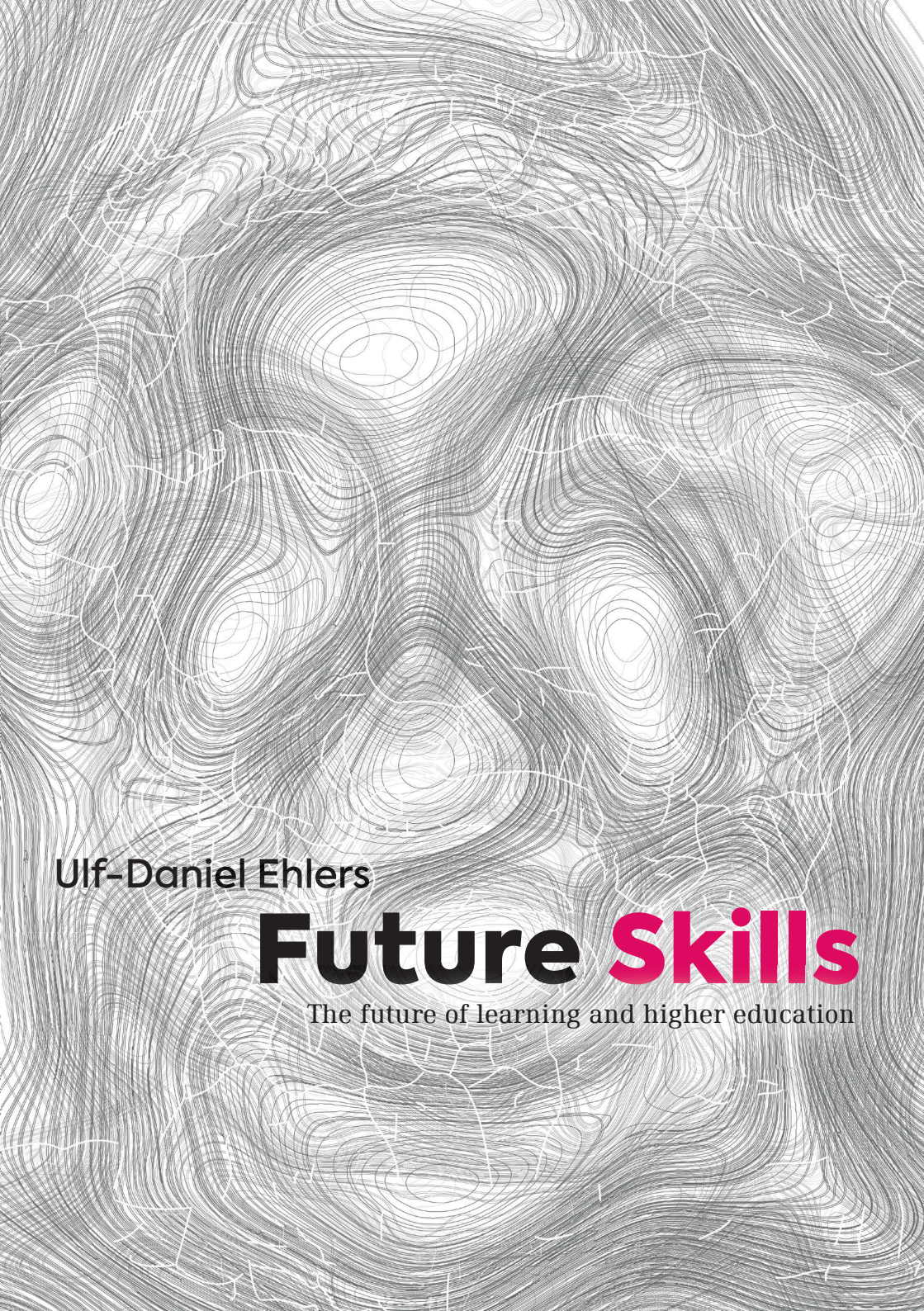
Ulf-Daniel Ehlers
Future Skills
The future of learning and higher education

Ulf-Daniel Ehlers

Future Skills – Future Learning and Future Higher Education

To all who walked along with me,
and who continue to do so,
with profound gratitude for challenges and inspirations!
And to Joshua and his future…

This book is part of the international Springer Book Series "Future Higher Education – Zukunft der Hochschulbildung", edited by Prof. Dr. Ulf-Daniel Ehlers (Book Series: ISSN 2662-5768).

About the book series: The book series is focussing on higher education's dramatic change worldwide. Student enrolment rates of over 70 percent within the next 15 years in industrialized countries and a drastic increase in demand in developing and emerging countries mark a new status and a changed function of higher education in postmodern societies. At the same time, the demands on universities are increasing to prepare their graduates to shape a global and digitalised world of tomorrow. The role that higher education plays in the implementation of the Sustainable Development Goals speaks for itself: without a university of the future that is renewed in terms of content and organisation, it will not be possible to solve social problems such as those associated with climate change, the challenges of migration, which will increase in the future, conflicts that arise as a result of populist social and political concepts and the associated question of the future of democracy. The development of a renewed social consensus on the role of higher education in the future requires the creation of forums and channels in which the question of higher education in the future can be discussed. The "Future of Higher Education" series aims to take up contributions from the whole range of scientific and socio-political topics and thus support the development of viable concepts for the future of higher education.

The topics of the series range from indepth analyses of society, the significance of the science system and higher education system in the society of the future to questions of future higher education management. Empirical studies but also basic approaches to higher education innovation topics are focused on, including detailed topics such as alternative forms of study, micro certificates, digital transformation, block chain for higher education and other topics.

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Our deepest fear is not that we are inadequate.
Our deepest fear is that we are powerful beyond measure.
It is our light, not our darkness
That most frightens us.

We ask ourselves
Who am I to be brilliant, gorgeous, talented, fabulous?
Actually, who are you *not* to be?
You are a child of God.

Your playing small
Does not serve the world.
There's nothing enlightened about shrinking
So that other people won't feel insecure around you.

We are all meant to shine,
As children do.
We were born to make manifest
The glory of God that is within us.

It's not just in some of us;
It's in everyone.
And as we let our own light shine,
We unconsciously give other people permission to do the same.
As we're liberated from our own fear,
Our presence automatically liberates others.

(Marianne Williamson)

Preface

Also, each effect demands an equally strong counter-effect, begetting demands equally active receiving. The present must therefore be prepared already for the future.
(Wilhelm von Humboldt, *Ideen über Staatsverfassung*)

I wrote this book to open up a conversation about how the new world of skill demands in a post knowledge era, will look like. And to stimulate an exchange about how higher education might evolve their institutions to better align teaching and learning in the light of these new demands. Writing this book was both easy and hard. Easy, because I have the privilege to be fully immersed into the global community of learning innovators in higher education and also businesses in our own institution and across the entire field of higher education. Hard, because the ideas I am presenting here – that we are entering a post-knowledge era with *Future Skills* on the rise and that higher education institutions will change its shape and appearance – are both nascent and contestable. In the book I try to say some new things – and hopefully some true things – about how higher education is changing.

The book is meant to look ahead, to provoke and to inspire. That is why I chose such a title: *Future Skills* – sounds strange, at least at first sight it does! The title is creating doubts and it annoys. At least from an educational science point of view it is fair to say that dealing with the subject of *Future Skills* is a paradox in itself already. Why? Skills, i.e. abilities and competences, are per se aimed at mastering future challenges. So why impregnate such a future concept again with the addition "Future"? If you, however, take time and deal with the subject of *Future Skills* more in-depth it quickly becomes clear that there is more at stake. More than just finding a new terminology for the concept of competence.

Future Skills initiatives are currently being developed all over the world in various shapes and forms, many of whom are discussed in detail in this book. Some are sectoral, for schools or universities, others national, e.g. the initiative *Future Skills*

Canada or also international, e.g. from the OECD, the EU or the World Economic Forum. All approaches have one thing in common – they all reflect the changed social conditions for work, education and life and analyse important *Future Skills*. Many of these concepts focus on skills for employees in a digitised world. In particular those are focussing on digital data-related skills which originated already in the 1990s and 2000s and were discussed there as digital or information literacy. These approaches are now often enriched with important intercultural communication and cooperation skills.

In other *Future Skills* approaches, the topic appears as a continuation of the concept of lifelong learning, in order to ensure a fit between constantly changing requirements on the one hand side and the capabilities of the individual to cope with them on the other hand side. Often this comes along with a strong focus on an economic impetus of participation of the individual in the labour market, sometimes also coloured differently as Skills for Life. And in fact, it is hard to find approaches that attempt to establish a more holistic educational reference frame within a widened understanding. This brief analysis already shows that there is obviously more at stake than just a renaissance of the concept of competence in a new shape and form. Apparently, there is a need to charge the concept of competence and give it direction. The underlying reason is a societal change of the magnitude of a tectonic shift alongside with huge pressures on organisations to change their mode of operation, their way of working, and in consequence also asks for a profound change in the higher education sector. It asks the question how *the university* as an institution can master the future and the question as to what the future of higher education looks like.

How difficult the task is to understand this future is expressed in the fact that under conditions of emergent social developments the understanding of the future results less and less from knowing the past; and also in the recognition that our social, political and economic realities more and more are the result of emergent processes – meaning, they develop self-organised cannot be determined in advance and often appear seemingly without a clear trigger. Emergence comes along as a more and more influential phenomenon in all spheres of life. The ability to deal with these ever faster accelerating contexts in the future is following less and less the known and widely practiced paradigm of knowledge acquisition based on ready-made curricula in higher education but requires a radical situative change. The concept of lifelong learning with its various implementations' varieties, the idea of a post knowledge society, competence orientation in education institutions, and the digitally ubiquitous and constantly available information and knowledge are the ingredients which will form the basis to compose new, flexible and connected learning pathways.

The very concept of *Future Skills* asks for fundamental change. It asks for more than a simple list of skills that schools or higher education institutions can use and base their curricula on in order to be able to guarantee their learners a future-proof and secure preparation for all eventualities. *Future Skills* still goes deeper and reaches wider. It calls for change which is so profound that it touches on the foundations of our educational and labour system. In highly developed organisations in which *Future Skills* play a major role already, work processes are often subject to drastic changes, responsibility structures and patterns of action shift. In higher education the notion of *Future Skills* questions the preparatory proposition according to which students can be prepared through knowledge acquisition for the futures to come.

It is true that the concept of key competences over the last two decades, at least in higher education institutions, has given rise to the idea that, in addition to knowledge transfer, other aspects, precisely those key competences play an important role in preparing for the labour market. In addition, capacity to shape the world we live in, citizenship and competences for life have gained importance. However, the complete integration of a deep competence orientation in the sense of the ability to deal with highly emergent systems, emergent organisations and unknown situations of the future, has so far only been introduced to a limited extent. The emerging discussion about *Future Skills* deals with the question of how this emerging can be done. Adding to this debate is the currently emerging movement of occupationalisation of academic education in an emerging educational society. It is raising the issue how both aspects can be combined – in this this book we argue that both concepts support each other as two sides of the same coin.

This book deals with three topics: Topic 1 is the analysis of the background, the change in organisational structures and the drivers against which the *Future Skills* concept is currently rising. Theme 2 is the appraisal of skills based on various empirical studies, and theme 3 is an elaboration of drivers and scenarios for the university of the future. All three topics are dealt with on basis of empirically validated concepts and follow on from the international discussion that exists in this area and which are being scientifically investigated within this book. This book is therefore not aiming to contribute a finite and finalised list of *Future Skills* to the current discussion in the field – even though a huge further step has been taken through the work, compared with many existing concepts. Its specific and unique contribution consists of working out the underlying structures of *Future Skills* for higher education.

The book develops a model that describes the underlying structures and processes of change which form the base for the development of *Future Skills* and with its *Triple Helix Model* identifies three basic components that constitute *Future Skills*, as the ability of individuals to act in future highly emerging contexts. The

Triple Helix-Model of *Future Skills* is able to map the areas that are important for *Future Skills* and has a greater explanatory depth than the simple lists presented so far on this topic in other contexts. "*Future Skills* – Future of Learning – Future of Universities" is the first book on the subject of *Future Skills* and is at the same time the first empirical work on the theme, rooted in educational science. It covers not only the question of *Future Skills* for future work, but also *Future Skills* as a fundamental capacity to act in a changing world.

This is a book about the future. It is inspired through the present and informed by the past. It lives out of the concerns voiced in moments of reflection and all the same out of the hopes that higher education can contribute to a culturally rich, personally rewarding, sustainable, prosperous and happy future for all. For us all but especially for our children.

I would like to thank all those involved who have contributed to making this book a reality. This book benefits from conversations with colleagues from near and far and all over the world. From interviews, discussions and contributions from students, friends, colleagues, scholars and business leaders. My wonderful team which supported the important studies which we implemented, and the translation of the German version. A very special thanks to Patricia Bonaudo, Laura Eigbrecht and Silke Huber and to Manfred Daniel. Thanks to all the experts involved in the various *NextSkills* Studies, the Baden-Wuerttemberg Cooperative State University and the many participating organisations, who were ready for interviews, as well the international experts who supported the Delphi Studies.

The book represents an important milestone in the question of how we will further develop our higher education institutions in the future. The project goes beyond digitisation, takes up competence orientation in great depth and presents models and profiles for higher education development over the next 15 years.

Karlsruhe, March 2020
Ulf-Daniel Ehlers

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Future Skills – The Key to Changing Higher Education

#lead-in

Future Skills has contributed to a decisive change of the public discussion about higher education, which we refer to as the *Future Skills Turn*. To examine this *turn* and its implications for the future of higher education is the purpose of this book. As a concept, *Future Skills* has gained an importance similar to that which emerged in the seventies of the last century from ideas such as *equal opportunities* or *science orientation* in European education. Such guiding principles usually do not appear as precisely tailored and empirically operationalized concepts, but rather as conceptual condensations of broadly diversified bundles of arguments and objectives – equally in the public, the political and the scientific discourse.

The starting point for the enormous career of the *Future Skills* concept is the insight that current concepts of higher education do not meet the urgent needs of our societies with convincing future concepts. Neither they are fit to help sustain our environment nor associated social or economic challenges. While social challenges are exacerbated by an accelerating process of globalization and digital advancement, at the same time these are the very forces that enable a multitude of new options for human development. In this situation of digital acceleration, the characteristic feature is that of uncertainty and the inevitable necessity is that of creative responsibility. It is a platitude that the future is unpredictable, however we must be prepared to shape it.

In ten to twelve years' time, children who attend primary school next year will be entering vocational training or higher education, and in fifteen years' time they will be the new professionals who as young citizens take over the responsibility in our society. We know little about this future. In the year 2060-2065 they are likely to retire, end their employment and/ or cease working. About this future we do not know anything. Our schools must prepare them for jobs that do not yet exist, for technologies and applications that have not yet been invented, for living in a society

whose social structures we cannot foresee today, and for dealing with challenges that are not yet discernible. It is our shared responsibility to make the most of the opportunities and find ways to deal with this uncertain future. It is about nothing more and nothing less than the preservation of our planet and our livelihoods.

Solving social problems, such as those associated with climate change, the challenges of migration, which will continue to increase in the future, the conflicts arising from populist social and political drafts and the associated question of the future of our democracies – all this requires the ability to develop new and so far unknown approaches, to tread new paths and to relate the hitherto unconnected to one another in a new way. In education and science, this will only succeed if we work inter- and transdisciplinarily in the best sense of the word, to compile solutions and contributions of each of the disciplines and sciences, to reflect critically on them and to relate them to one another. This, however, is a big challenge. Higher education Institutions are struggling with it because they all share a common handicap: The history of science, research and thus also of higher education is a history of "silo-ism", specialisation and differentiation of disciplines – the almost 18,000 degree programmes offered at German higher education institutions alone are proof of this. The old institution of higher education is faced with the challenge of having to reinvent itself – in a time when academic education is experiencing an enormous growth process and is projected to reach 70 percent plus of an age cohort worldwide by 2050. It's like having to replace the pilot in a car race, right in the middle of a steep turn and during a risky overtaking manoeuvre.

#futureskills

The research project *NextSkills* aims at finding models and descriptions for future relevant skills, so-called *Future Skills*, within the framework of a multi-methodological research design and through international consultations.[1] *Future Skills* should be the skills that enable university graduates to master the challenges of the future in the best possible way. The results show that to deal with future challenges, students must develop curiosity, imagination, vision, resilience and self-confidence, as well as the ability to act in a self-organised way. They must be able to understand and respect the ideas, perspectives and values of others, and they must be able to

1 More and up to date information about the *NextSkills* project can be found here: http://www.NextSkills.org

deal with mistakes and regressions, while at the same time progressing with care, even against difficulties.

In numerous conversations, interviews and analyses, it became clear to us *that Future Skills* must also strive to raise awareness for local and global challenges; to raise awareness and become mindful of how climate change impacts on nature and the environment – and to focus with greatest attention on how students can acquire skills to participate in societal contexts in order reduce or reverse these impacts. It is also about shaping social issues such as demographic- or migration challenges.

Promoting *Future Skills* also means to strive for creating an educational system that enables future citizens to deal with the challenges involved and to care for greater coherence in society, to value openness, tolerance and an awareness of differences and diversity, and not to succumb to populist explanations. It became clear to us that the question of how young people can be empowered to participate in social systems and processes, and how we can strengthen justice, peace and the integrity of creation and community as values in a future society, will determine the relevance of our higher education Institutions in the future.

At the same time, today's specialist and expert knowledge will only represent a small part of what future generations will be able to draw on in their search for solutions to complex problems. Next generations will be driven by more than career prospects, a good job and a high income. They will also strive for the well-being of their friends and families, their communities and the planet as a whole. Empathy, mindfulness and passion will become explicit educational objectives of the higher education institutions of the future. It will be about realising educational concepts that equip learners with strength, energy and conviction and with the ability to communicate them in an appreciative and effective way. The skills they need must enable them to shape their own lives and contribute to the well-being of others.

Higher education institutions would do well to turn away from the goal of imparting knowledge that is primarily concerned with self-contained and easily verifiable relations for which there are right and wrong answers. In the future it will be important to study on the basis of questions for which there are no immediate correct answers, but in which it is a matter of weighing, plausibly arguing and representing value attitudes and orientations. The *NextSkills* project was launched to find out what these skills are and how they can best be developed. The aim of this project is to provide universities, their management and their teachers with answers on the direction in which educational goals, structures and processes need to be shaped. The focus is on three questions:

1. What skills will people need in the future to shape their world and environment as citizens in an increasing globalised context? What skills do employees need

in order to cope with the constant development and constant adaptation to new situations in organisations and working life? We call these skills *Future Skills*.
2. How can organisations help their staff to acquire these skills and what organisational forms and structures are needed to develop the optimal organisational cultures for this?
3. What can higher education institutions do to promote these skills among students? How should studies and teaching be structured, and which forms of higher education didactics and learning designs are suitable?

In this book we describe the results of this work. The concepts presented are backed up by in-depth interviews, expert assessments and international Delphi Studies.

If *Future Skills* are placed at the centre of considerations for higher education, then the need to rethink higher education as a place of research, teaching and learning becomes apparent at many points. And the following applies: Everything that is easy to teach and easy to assess is also easy to digitise – and thus also to automate. *Future Skills* such as creativity, self-organisation-abilities, self- and reflection competence or Design Thinking Competence, however, require ingenious forms of learning, teaching and development. It is therefore a question of how the promotion of *Future Skills* can be anchored in higher education curricula. This involves concentrating on active, creative forms of teaching and learning and educational objectives that require complex assessment scenarios, and that go beyond the mere transfer of knowledge and focuses on the development of specific competences.[2]

#stateofplay

The *NextSkills* studies does not take place in a vacuum. The question which skills should form the basis of learning concepts is highly relevant in any higher education system for current and future generations – and one that has already been discussed in many different ways and places. After research on graduate attributes was in the foreground in the eighties and nineties of the last century, there is currently a veritable renaissance of scientific work on this topic. These are, firstly, labour

2 The terms competence, skill as well as agency need a careful consideration since they are the conceptual core of the *Future Skills* concept. We have therefore devoted several entire sections to describe, define and deliminate the concept of competence which we understand as ability to act in unknown complex contexts, an understanding which is based on works of Erpenbeck (e.g. Erpenbeck 2012). See chapter A2 (and following) for a comprehensive elaboration.

market studies that raise the question of what the future of increasingly digitised workplaces will look like. Secondly, these are studies of societal scope which pose the question what society will look like in 2030 or 2050. These are questions like: Will work continue to be the sense giving element in our common lives? What are the risks that individuals in a society have to cope with and what are the best strategies to cope with them? Here, too, the digital penetration of the entire private sphere plays a major role. And thirdly, the question which educational concepts are suited best to prepare students for unpredictable futures. And finally, there are numerous approaches emerging in the field of international organisations starting with the famous report by Jacques Delors in 1996 to the European Union (EU) stressing "living together" as a central educational objective, the Organisation for Economic Co-operation and Development (OECD) or the United Nations Educational, Scientific and Cultural Organisation (UNESCO), all raising the question how societies can learn and live together in such a way that global challenges can be adequately and effectively addressed. All these different perspectives, which have been increasingly discussed since the 1990s, are moving into focus through international cooperation, global networking and digitisation. The discussions are reflected in concepts such as the seventeen Sustainable Development Goals (SDG) and further international, cross-border education and society future scenarios.

The question which skills young people of generations to come will need to cope with the challenges described above is therefore a highly topical one. It is much discussed and is currently one of the hot topics, not only in educational science, but also in economics, organisation- and labour market studies. Most of the approaches are empirically analytical and attempt to predict the future by analysing existing developments, projecting them into the future, for example by taking the development of new occupations and occupational fields as a basis or by (linearly) updating the speed of technology development and its application to automation in work processes, thus creating new professional profiles. From these, requirements are derived, which are then developed into competence profiles in schools and universities. This approach has limits that are now becoming increasingly foreseeable.

#emergence

It is clear that the debate on the future capabilities needed to meet the societal challenges of present and future generations must take into account one thing in particular: An ever faster and non-linearly changing context of action. This characteristic is finding its way into more and more educational concepts – initially

on a purely descriptive level. The question is how higher education can deal with situations in which the very nature of knowledge is changing, and knowledge is becoming one amongst many different ingredients of meaningful higher education – and not the most important one. When unpredictability and uncertainty in future professional and private contexts become the rule of the day. Future-ready students need to exercise agency, in their own education and throughout life. Agency implies a sense of responsibility to participate in the world and, in so doing, to influence people, events and circumstances for the better. Agency requires the ability to frame a guiding purpose and identify actions to achieve a goal. Recently, more systematic and scientific-theoretical concepts have been elaborated, in which the question of unpredictability is put into the centre. At present, these include drafts from ecosystem theory, physics in the field of research on emergent systems and self-organisation, and cybernetics in behavioural research and biology. They are based on the realization that developments in systems often lead to new states that cannot be derived from the previous states. The so-called emergent development has the distinct characteristics: irreducibility, i.e. the impossibility of linearly extrapolating a development into a future development, since the future development, as a new status, can no longer be reduced to the previous one; secondly the characteristic of unpredictability, i.e. the impossibility of predicting the next, subsequent state. Applied to social, political and economic processes, as well as communication processes, this means that individuals will have to deal with situations in the future that can neither be predicted nor calculated in advance.

More and more a sense of urgency within the higher education governance community is developing. The question is clear: how to deal with the unforeseen? Contributions to *Future Skills* must provide answers to this question. At present, there are only a few competing approaches that really address this question systematically and go beyond the pure and already known concept of competence. With this book we aim to close this gap. In the present work a model for *Future Skills* is designed. It combines theoretical aspects of education with competence concepts and concepts of self-organisation.

#triplehelix

This is a book about the future. Our current university education concepts are still strongly oriented towards knowledge transfer. Building up and accumulating knowledge in order to then call it up in future professional action contexts is – to put it pointedly – the current game of higher education, studies and the labour market.

However, it seems that we have reached the limits of this way of working. Our study shows that especially in those fields of work that can be regarded both as highly agile and at the same time knowledge-intensive, simple retrievable knowledge is less and less the currency of future labour market success, but *Future Skills* are. In the context of the *NextSkills* Studies, the *Triple Helix-Model* of the capacity to act[3] in emergent contexts will be developed and presented in Chapter A 1 Objektives & Methodology of the *NextSkills* Studies.

We see the higher education system worldwide in the midst of a transformation process. In structural terms, all industrialized societies are on the verge of becoming a "Bildungsgesellschaft" (an *educational society)* in which the pressure on individuals to obtain academic education is constantly increasing. This goes hand in hand with an ever-stronger networking demand due to the availability of communication media and the rising competition in globally available information and knowledge. The resulting acceleration of the development and decreasing half-life of knowledge resources necessitates a constant lifelong updating of the knowledge of the individual. However, knowledge is not enough, it merely forms a basis for *Future Skills*. While not all skills are new, the extent to which performance in *future organisations* depends on them gives them a completely new relevance.

Future Skills is a dazzling term that is based on a variety of understandings. The existing approaches are often exhausted in bare listings of future-laden concepts and terms that carry importance for *Future Skills.* List follows list. Beyond this fresh but purely additive view, there are currently only the older and already familiar but barely really implemented *competence-oriented* learning scenarios. It is often emphasised that educational science has always been concerned with *Future Skills*. After all, what, if not *future* capacity to act should educational concepts actually contain? Admittedly, *Future Skills* is therefore a dazzling and (today) popular term which, from an educational science point of view, certainly already contains construction challenges.

If these challenges are left aside, it also offers opportunities. It stands out from the already somewhat entrenched debate about the introduction of competences as constructs of knowledge, skills and attitudes, does not at first glance immediately refer to the discussion about key qualifications and competences and is internationally connectable. The term is therefore attractive but requires a good deal of conceptual sharpening and delimitation.

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3 English "Agency": "Future-ready students need to exercise agency, in their own education and throughout life. Agency implies a sense of responsibility to participate in the world and, in so doing, to influence people, events and circumstances for the better. Agency requires the ability to frame a guiding purpose and identify actions to achieve a goal."

#agenda

With this book we pursue two main objectives: On the one hand, we want to report in detail on the results of the three-year *NextSkills* project and its content for German and English research on *Future Skills*. On the other hand, our aim is to use the book to establish a theoretical frame of reference for *Future Skills* in higher education and to classify existing research related to the topic within it. The following infographics (Figure 1) illustrate the structure of the book conceived for this purpose.

The book is divided into three large parts, preceded by a foundational chapter on the *Future Skills* Turn (Chapter II. The Future Skills Turn). The *Future Skills* Turn is described by means of various real-life organisational examples, which show the increasing importance of *Future Skills* as a future guiding orientation for higher education. In this chapter it becomes clear that *Future Skills* is not so much about a new concept of education or competence, but about the description of those competence profiles that gain importance as *Future Skills* under the conditions of highly emergent contexts in advanced future organisations.

Part A is then dedicated to the very nature, definition and elaboration of *Future Skills*. Chapter A 1 Objectives & Methodology of the NextSkills Studies first describes the study design of the *NextSkills* Studies. Chapter A 2 The *Future Skills Triple Helix-Model* develops a basic theoretical framework for *Future Skills* as an educational concept. The so-called *Triple Helix-Model* of capacity to act in highly emergent contexts is developed. The model is based on the recognition of three shifts taking place, three major changes in the basic structure of the world of work, to which the *Future Skill* concept responds. Within the research on *Future Skills* and the *Triple Helix-Model* for *Future Skills*, the *NextSkills* project offers as the first study ever a theoretical frame of reference for *Future Skills*. In Chapter A 3 *Future Skills* for the World of Tomorrow, the seventeen *Future Skills* Profiles are worked out, defined and described. Chapter analyses the results of the international *NextSkills* Delphi Study in terms of the maturity of current higher education and its ability to support the development of *Future Skills* among students.

Part B of the book is dedicated to the task of reviewing the state of the art in *Future Skills* research. There are currently no comprehensive literature reviews on this subject in either German-speaking or English-speaking countries. Chapter B 1 State of Research – Old Bottle, New Wine? presents the state of research, starting with related research on graduate attributes. Chapter B 2 Foundations of the *Future Skills* Revolution: The Theory of *Future Skills* constructs and describes the essential theoretical frame of reference for *Future Skills* research. The so-called "drift to self-organisation" plays a decisive role connecting different theoretical contributions.

Part C of the book is devoted to the question of what the university of the future will look like. First, Chapter C 1 Ten Seconds of the Future of Higher Education describes ten main drivers of the future of universities. Chapter C 2 Rethinking Learning, Teaching and Research: An Agenda for Higher Education of the Future then describes how higher education Institutions will develop on the basis of these drivers from both a pedagogical and an organisational perspective. Chapter C 3 Four Scenarios for the University of the Future concludes by formulating four possible scenarios for the university of the future.

In the glossary, the book develops an important system of cross-references for the partially terminologically complex work. A comprehensive bibliography of German and English literature on the subject is also documented.

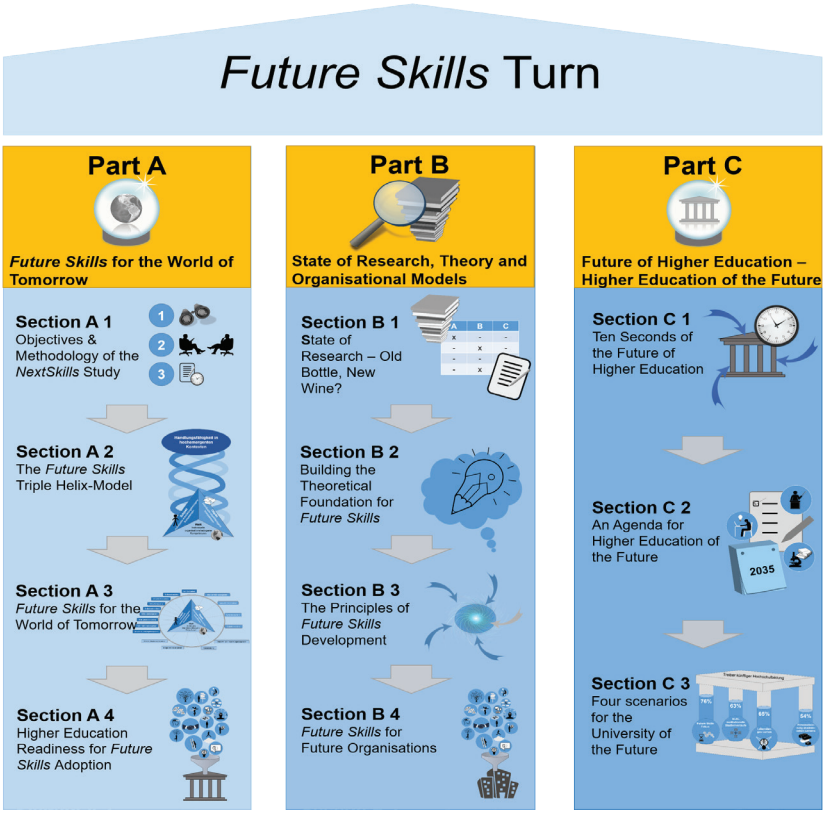

Fig. 1 Agenda – the bigger picture

The *Future Skills* Turn

II

William Ross Ashby was born on 6 September 1903 in London, England, and died on 15 November 1972. He was a British psychiatrist and pioneer in cybernetics, the study of complex systems, and is regarded as one of the most influential persons in systems science (Klir 1978). His works Introduction to Cybernetics (1956) and Design for a Brain (1952) have been influential in the sciences of complex systems since their appearance in the 1950s, when they were known as cybernetics. Although he was so important in the science of complex systems, today he is far less well known than Norbert Wiener or Herbert A. Simon. Ashby's law bears his name and provided the scientific basis for the homeostatic principle and the principles of self-organisation. *The Law of Requisite Variety* is one of the central insights of cybernetics (Ashby 1956).

The law states that a system that controls another can compensate the more for disturbances in the control process the greater the variety of its action: the greater the variety of a system, the more it can reduce the variety of its environment by controlling. It follows from this that the variety of the control system must be at least as great as the variety of the malfunctions that occur in order to be able to control it. Following this idea, this means that whenever it is a question of dealing successfully with highly complex and dynamic situations, the acting system must have at least the same complexity and dynamics as the system in which action takes place. If you transfer this thought to today, it means: As the market continues to network, it becomes more and more important to allow and promote free networking within one's own company. Otherwise, one is in danger of getting lost.

How can companies react concretely to complex system requirements? Peter Kruse, professor and founder of the management consultancy *nextpractice*, points out that although hierarchy ensures an orderly and calculable approach, it is not a recommendable answer to the complex dynamics of networks (Kruse 2015). Leadership then no longer means thinking ahead or steering the activities of employees but ensuring that the people in the company can develop the necessary *Future Skills*

in order to recognise interrelationships and thus be able to organise themselves in line with market requirements.

Networking is thus both the problem and the solution.

Adaptation to a new organisational reality through learning becomes a key element. A study by Peter Kruse (2009) shows: 77 percent of the surveyed managers are convinced that a fundamental change in the system of leadership is needed. There is broad consensus among the managers surveyed that it is becoming increasingly important to engage in open-ended processes. There is a consensual call for more courage for *iterative-testing agility* (Kruse 2015). Thus, instead of traditional management between target and actual, there is an invitation to move forward step by step, trying out and learning. Goals are not set or negotiated but are constantly adapted and developed together. Kruse's studies allow the corresponding ideal of leadership to be broken down into three central demands: network organisation instead of line hierarchy, self-organisation instead of control and cooperation instead of competition (ibid.).

Overall, it can be observed that the individual has an increasingly greater responsibility within the organisation. Less responsibility can be transferred to *central* management structures. And thirdly, that the question of which *Future Skills* are actually important and needed in order to successfully work on the respective tasks in the "network organisation" can only be answered in a very personalised way and in the respective context – and that the learning of these skills must also be done by the individual itself.

Examining today's institutions, this connection becomes immediately apparent. Those interviewed for the *Future Skills* Study are aware that the development of the necessary skills is so volatile and constantly changing that 80 percent of the necessary learning takes place "on the job". The externally organised, formal and explicit training plays an ever less important role. According to estimates, 90 percent of the reflection on what employees actually need and where they can learn the necessary skills takes place on their own initiative. The general assessment is that it plays an increasingly subordinate role to have codified knowledge readily available. It is much more important to search for and discriminate against data, information and knowledge, to be able to make distinctions, as well as to be able to carry out the validity and objectivity of the information found in each case. The ability of one's own individual information management is not only a question of subjective knowledge management, i.e. how one organises one's own knowledge area. It is also about having the ability to validate data and information. The widespread view that information validates itself through the reproduction of many people is not always true, contrary to the popular understanding of the *Wisdom of the Crowds*.

The French philosopher and mathematician Marquis de Condorcet already pointed out an important additional condition in the 18th century. The Condorcet jury theorem states: "If the amount of knowledge distributed in the minds of the set of decision-makers involved in an estimation task is a little below chance, then the hit rate of the overall decision is extremely low.[4] If, on the other hand, the individual's knowledge is only a little above chance, then the group will rock itself to a surprisingly high marksmanship. Peter Kruse, futurologist, once described this connection as follows:

> "If you sit with Günther Jauch (German TV Show Master) and are asked a question about a celebrity's holiday preferences, you can assume, because "celebrities" become public figures through the media, that the knowledge of the individual studio guests is above chance. Here you should draw the public joker. But if you have a question in the field of nuclear physics, then the probability is quite low that the knowledge is above chance. Then you better roll the dice."

With regard to organisations, this means that the distributed knowledge is limited in principle by information monopolies, relationship networks or hierarchical thresholds. It is therefore an important task to ensure that this does not happen, and that knowledge is freely available and without the typical knowledge restrictions (e.g. information monopolies) in the organisation. In addition, it is important to carefully consider how to deal with the validity of information on the Internet, no matter how many others cite and multiply it (Kruse in Personalwirtschaft 2015).

II.1 Towards a Post-Knowledge Era: The Relativity of Knowledge

In our studies we are suggesting that society is moving towards a new era which we describe as the post-knowledge era. This has to do with what we can call the new relativity of knowledge. During a short period, and following the industrial age, knowledge has first advanced to the prime factor of differentiation in many societies – today resulting also in more academic enrolment rates than ever before – and is currently under pressure from a new regime of evidence-based experience which we describe in our work as competence. A clear sign of this is the rise of alternative credentialing systems, as well as professional online platforms where

4 Also known as *social election theory*, which was invented in the mid-20th century by Kenneth Arrow (Arrow 1963).

individuals can document and present their achievements for application and recruitment purposes (Ehlers 2018). *Future Skills* can be understood as a special profile of such competences.

Thus, we are differentiating between the role knowledge played within three different periods:

a. the industrial age in which technology was at the forefront and individuals had to succumb to industrial production machinery,
b. the knowledge age, enabled through massive educational system development leading to knowledge becoming the prime factor for societal mobility and
c. today's post knowledge era in which a more comprehensive concept of individual and self-organised capacity to act, creativity, innovation and competence form a new vision of individuals, capable to act under new, unknown unprepared circumstances and can perform problem solving complex challenges – with knowledge playing an enabling role but transformed through volition, ability, values and experiences.

During the last century, there were big changes in knowledge – in how people *see* knowledge and how they *use* it. It has been suggested to label this period as the beginning of the *knowledge age* and to distinguish it from the *industrial age*. The knowledge age is an age in which knowledge and ideas are the main source of differentiation for individuals in society as well as for economic growth and became more important than kinship, land, labour, money, or other tangible resources. Bourdieu is writing about it at length when he sharply suggests widening the concept of capital from economic to social and cultural. It is important to understand how our *meaning of knowledge* is changing. Knowledge is no longer being thought of as something that is developed and stored in the minds of students, experts, represented in books, and classified into disciplines. Instead, it becomes more and more apparent that knowledge is now seen more as a fluent, *energy-like* system of networks and flows. Knowledge age knowledge is defined – and valued – not for what it *is*, but for what it can help to *do*.[5] It is produced, not by individual experts, but by "collective intelligence" – that is, groups of people with complementary expertise who collaborate for specific purposes. These changes have major implications for our higher education system (and for the education system at large).

5 Some of this forefront thinking about the post-knowledge era is taken from the "Shifting thinking community" from New Zealand Research Council, http://www.shiftingthinking.org/

In the post-knowledge era, the meaning of knowledge is changing. Knowledge is not viewed as the most important ingredient for action (to do something with it). Its importance for agency and competence in the sense of capacity to act is decreasing, becoming relativized against other factors which come into the picture, like values, personal traits, and the development of a disposition to act – also in unprepared complex challenging contexts. Knowledge in the post-knowledge era is just one factor amongst others. The post-knowledge era is characterised through a new paradigm – the paradigm of self-organisation, in a situation in which emergence and networks become a main organisational paradigm (Castells) of society, business and private life. The term "post-knowledge era" introduces a new distinction, and is an attempt to characterise these new organisational paradigms in our current times, differentiating it from the industrial era and the knowledge era. It is clear that this distinction is not a clear cut one or that societies evolve in a sharp sequential way but rather is expressed in a bundle of beliefs, values, societal developments which show as patches and slowly develop into a majority guiding belief.

In the industrial age mass education began, and in schools trained professionals package "know what" knowledge into a logical, controlled, cumulative sequence. Students are organised into age-related cohorts who receive this knowledge all together, in the same order, at the same pace. Industrial age schools also teach social and citizenship skills. Students are disciplined to follow the rules and respect the authority of certain bodies of knowledge, and to follow the rules and respect authority in the society they live in. The schooling system is managed by a bureaucracy, set up to ensure the efficient and standardized functioning of all parts of the system. The efficiency of the system takes precedence over the needs of individual students. This one-size-fits-all system works reasonably well as a way of sorting people into the different kinds of worker-citizens needed by industrial age societies: however, it produces a great deal of 'wastage' – which we call drop-outs (see also the shiftingthinking.org collective, 2019).

In post-knowledge era things are changing. Knowledge is still important, but not an end in itself anymore. It is just one step on the ladder to competence and professionalism. People need more than this. They need to be able to *do things with* this knowledge, to use it to create *new* knowledge. Knowledge is changing its meaning. It is becoming a resource, something to *learn* (or think) *with*. In the knowledge age already, and in the post knowledge era even more so, change, not stability, is a given. The *NextSkills* Studies revealed exactly this shift in views on knowledge. They show that post knowledge age workers and citizens need to be able to locate, assess, and represent new information quickly. They need to be able to communicate this to others, and to be able to work productively in collaborations with others. They need to be adaptable, creative and innovative, and to be able to

understand things at a 'systems' or *big picture* level. Most importantly, they need to be able to think and learn for themselves, sometimes with the help of external authorities and/or systems of rules, but more often, without this help.

Because 'know what' and 'know how' kinds of knowledge have only a short shelf life, it is no longer viable to ask schools to 'fill up' students with all the knowledge they need beyond school (ibid.). Nor is it viable to teach students any particular 'one best way' of knowing – or doing – things. Instead they need to teach students how to work out *for themselves* what to do. Today's schools are organised to produce industrial age worker-citizens. If schools are to prepare young people for successful lives in the 21st century, they need to do things differently. 21st century schools need to develop different skills and dispositions from those that were required in the 20th century. This can't be done simply by adding these 'new' skills and dispositions to the existing curriculum.

The *Future Skills* Study shows that the ability to take the initiative, and the self-competence to follow through play an equally important, if not perhaps even more important role than specialist knowledge. However, the polarization of *knowledge* on the one hand and agency, capacity and *competence* – terms which will need to be clarified and defined in the course if this book (see section A2 for this) – on the other is only seemingly a contradiction. Because *knowledge* is not independent of *competence,* but an integral element of competence. Competence, however, goes far beyond knowledge (see also Chapter B 1.2.2 *Future Skills* as Competence). Self-competence, for example, can be described as the

> "Willingness and ability as an individual personality to clarify, think through and assess the development opportunities, demands and restrictions in family, career and public life, to develop one's own talents and to draw up and further develop life plans. It includes qualities such as independence, critical ability, self-confidence, reliability, sense of responsibility and duty. This includes in particular the development of well-thought-out moral concepts and the self-determined attachment to values." (KMK 2011)

This insight is often the subject of a seeming contradiction, which repeatedly emerges in the recent debate about knowledge/expertise vs. action competence and skills and requires fundamental reflection. It is expressed in statements by large Tech-Companies (Times higher education 2015) about the relativisation of formal certificates as well as in controversial debates among teachers on the question of whether competencies are a realistic goal for learning processes at all, when there is so much knowledge to learn at first.

Overall, there is often a misconception about the connection between competence and knowledge. We have therefore devoted a separate chapter to this topic in

order to show that today we are actually dealing with a *change in competence* (see also Chapter B 1.2.3 Self-Organisation).

In the organisations surveyed, personnel development instruments were increasingly geared towards supporting individual competence development and in particular the development of subject competences (see Chapter A 2 The *Future Skills Triple Helix-Model*). In doing so, coaching oriented methods are largely being used. This in turn places increased demands on managers and in many cases makes it necessary to rethink the existing governance structures of the organisations.

The interviews show that there is an increasing trend away from mediation towards self-organised learning. The development of self-organised learning as *the* future competence par excellence in turn requires new and special models of training, support and development for employees. These are of great importance for personnel development in organisations at all levels, both in programme design, i.e. also in the individual support of employees, and at the didactic level of a single training event.

In almost all organisations surveyed, there are instruments and methods for recording competencies, both at the beginning of measures and later on, which aim to support employees in reflecting on their own development. Managers increasingly see themselves as coaches, learning companions and decreasingly as persons who pre-structure work processes. Personal dominance and strong personality are therefore passé. Efficient achievement of objectives and control via key figures are considered insufficient. Against the background of growing dynamics and complexity, managers intuitively evaluate yesterday's success concepts as tomorrow's risk.

II.2 The *Future Skills* Turn

A strong turn towards *Future Skills* can be observed. This is also expressed in the instruments that are increasingly being used in personnel development. For example, a medium-sized company in the medical devices sector reports that it uses feedback forms for its employees, which are based on nine competencies, only one of which is actually technical. In personnel development, more and more importance is attached to how cooperation and networking can be promoted. For example, personality models and tests are used in order to help to understand the preferences of employees for cooperation and how mutual understanding and willingness to cooperate can be improved (medium-sized bank).

The new focus on *Future Skills* is also reflected in the range of continuing training opportunities and measures. Further training courses are less *catalogue-oriented*

but increasingly aimed at networking – and thus at self-organisation (see also Chapter B 2 Foundations of the *Future Skills* Revolution: The Theory of *Future Skills*). This is expressed quite practically, for example, in the fact that a human resources manager reports that today there are about 200 offers of personnel development per year, and 80-85 percent of these are organised as *colleague trains colleague* (medium-sized medical device manufacturer). In some organisations there are also explicit departments that emphasise the importance of learning for work and interlink both issues, for example a *learning and work* team in one of the participating organisations (large drugstore chain).

The shift in *Future Skills* – away from specialist knowledge towards *Future Skills – is* also reflected in the fact that coaching, consulting and mentoring are playing an increasingly important role alongside traditional personnel development tools. Coaching stands for open-ended and solution-focused support of personal contexts, consulting for a format in which the main focus is on targeted support for a given problem, while mentoring can also take place between colleagues with different expertise. The dissolution of the boundaries between the private and the professional is a trend-setting development. In one of the organisations surveyed, employees can include topics from their private environment in a coaching session. This makes sense in so far as, especially in coaching as an open-ended format, questions from the private, personal sphere always play a role and the professional context cannot always be clearly defined. The prerequisite for this is the creation of a context in which clear information barriers are defined and a constellation of trust is established.

One of the organisations, building on the mentoring format, has introduced an additional approach: *reverse mentoring*. This does not define a mentoring offer but formulates a mentoring need which can then be served by colleagues – above all from other departments or hierarchical contexts. An apprentice or a trainee may be training the Members of the Board of Managing Directors in a specific software topic or employees from Sales are mentors for the experts from the Development Department (medium-sized bank).

II.3 Conversations with Practitioners: Gaining Insights into the Practice of Supporting *Future Skills* Development

The following examples show how organisational structure, values, leadership and communication structures must interact in order to build an organisational culture for *Future Skills*. We were able to gather them in many conversations – official once

as well as informally – from practitioners of changing learning environments in many organisations.

II.3.1 Building a Networked Organisation

Employees of all departments can register in a one-year competence workshop. The aim of the competence workshop is to tackle a personal learning or development task. For this purpose, training courses, trainings or collegial consulting/training can be used. Important: Topics that are important for the professional work context as well as topics that appear relevant for private interest can be selected. The central element of the competence workshop is the regular Reflection and Sharing Workshop. This is about all participants telling each other what they have learned so far, how it has taken place and what is next. Difficulties, progress, surprising and unexpected aspects are the focus of the competence workshop. The events take place outside the actual day-to-day business and are moderated. The participants regularly reflect on their progress in learning and development and cultivate a language for their own learning.

This format also serves to support networking of employees within the organisation. A new network of employees is created, which runs through the entire organisation and connects employees who have not previously had any contact or connection with each other. The highest premise here is: It may explicitly be about private as well as professional things. In this way, the conditions for a stronger self-organisation are created and improved. Each competence workshop concludes with a one-day event in which the personal learning journeys are told and shared. The organisation's Board of Directors will also participate in this special event.

II.3.2 The End of Instruction: Learners as Experts

In a large drugstore chain, apprentices and (dual) students are not referred to as apprentices or students but with a new creative word creation: "Lernlinge". Behind this is the view that learning does not function through instructing or teaching but is a self-active and self-controlled process. The concept of all related functions has been adapted accordingly: Trainers are learning facilitators, certificates or examinations are documented in a personal learning passport, learning facilitators receive special training as learning facilitators, which is intended in particular to support learning as a self-organised process. There are learning events and learning workshops instead of courses. The format of the learning workshops aims in partic-

ular at supporting the ability to self-organised learning (see also Chapter B 2.1 The "Drift to Self-Organisation"); thematic content is initially of secondary importance.

A world market leader in the IT service sector is turning the tide – it is no longer trainees and students who need to be trained and further educated, but the company wants to benefit from the perspectives of young people and their unbiased view. Individual departments can apply to students with project ideas. Studies, further education and training do not therefore take place as a process defined by the curriculum right from the start, at the beginning of which it is already clear which contents can be learned in which constellation at which point in time but are a situationally compiled portfolio of experiences. These are reflected, documented and also supervised by coaches and mentors. The central feature here is that the projects in which students are deployed represent authentic problem contexts, i.e. real problems that are relevant for the company. In special cases this goes so far that students develop their own business ideas as *intrapreneurs* in teams, which they then further develop for the company and which, carried to business maturity, can then form the company's own new or further developed products. Students are also involved in the development of future topics by analysing and developing business strategies from their perspective, developing cases on how the company can deal with new topics on the market. An example of this is a student project group that thinks about the topic of blockchain as a business area.

II.3.3 Creativity in Distributed Teams

In the interviews with a globally leading technology group, the experts point out that it is important for an organisation to develop expertise on how complementary competencies of individuals can be put together in teams as "shared expertise", e.g. in departments or project teams – sometimes even worldwide. The approach is based on the fact that the *Future Skills,* increasingly important in the future, cannot be equally well-developed with all employees, but that from the point of view of the organisation it is important to have a complete spectrum of competencies distributed within a team as far as possible. The focus is not only on the ability to implement projects or expertise to overcome defined challenges, but also on the compilation of employee profiles that lead to a maximum degree of *shared creativity* as joint creativity within the team. In many cases, the teams are distributed all over the world and only work together for a short time. From the point of view of the organisation, the point is that the existing competences and experiences must be known and documented. Establishing such talent management is a comprehensive task of human capital management (Ehlers et al. 2003) and only possible for organ-

isations that have implemented a particularly high level of maturity in personnel management. This also includes a high degree of formalisation of competences and competence requirements. In addition, the support of creativity is located exactly in the field of tension between formalization and informality, which it as an organisation explicitly has to build up – and which is rather over-structured by rules and categories of HCM systems and thereby hindered.

II.3.4 Flexibilisation and Self-Organisation

In all surveyed organisations, learning and working take place in contexts that allow flexibility in workflows, roles, function descriptions and definitions. Examples include the organisation of working time on the shop floor or the abolition of working time regulations (for a large pharmaceutics company). In a participating organisation of the *Future Skills* Study, the principle of self-organisation in working time regulations was introduced in all branches throughout Germany. Employees can design their duty rosters in consultation with each other without having to obtain approval from superiors. What sounds so simple here is an enormous challenge for very heterogeneous contexts and employees, which requires precisely those *Future Skills* that are regarded as keys to the future working world, namely self-organisation and meta-competencies.

II.3.5 Creating Space, Changing Perspective, Enabling Innovation and Creativity

How do you get the members of an organisation to think outside the box and develop suggestions for new products, new business ideas or production processes? How to build on the intelligence, experience and perspective of all members of the organisation to reflect the position of a company/organisation and to consider starting points for a positioning in ten years?

The case of a world market leader in the medical devices sector shows how this could work. The organisation has initiated an internal competition for this purpose. All members of the company were invited to submit suggestions to the management on what a new corporate strategy could look like; products, market placement, future strengths, USPs for the coming decade were in demand. The special: Each submission could also be explained in a short oral session. Everyone's been heard. From all the proposals, some were selected that were particularly far-reaching and diverse. Those who had brought them in were then sent into a

seven-week retreat as a team. In seven weeks, they were given the task of developing the best future strategy possible for them in a working environment for which the management had rented extra offices. The highlight was that they should all work together on this future task: people from very different areas of the company, with very different perspectives and ideas, who were all able to work together on this major project. The latest research on the topic of innovation and creativity clearly shows one thing: Detaching oneself from work contexts and coming together in new social constellations promotes divergent thinking and thus contributes to creativity (Bezmen et al. 2015).

II.3.6 Self-Regulated Learning

A large pharmaceutical company has developed its own innovative approach to strengthening learning skills. Traditionally, new employees and managers in the organisation were offered various standard training courses, some of which were compulsory and some voluntary. The question then was, how to get from this receptive mode into to an active learning situation? How does one get from the reception mentality into a self-responsible learning process? The organisation recognised that it would not make sense to pretend to provide an all-inclusive learning offer for every single employee, as learning has become the key to future organisational design. The contexts in which employees want, should and are able to learn have become too individual and diverse. Therefore, a new concept was developed. In cooperation with a University of Education, the company discussed concepts for self-organised learning and how these could be introduced and strengthened in the organisation. A radical change has been initiated, away from the structured presence in continuing education towards self-responsible learning via e-learning in virtual worlds. Employees were offered rich learning worlds rather than defined requirements. Initially, twelve modules were developed and made available to the employees. They were able to choose from them according to their needs, what was right and appropriate for them – measured against their respective context. More and more modules were developed, and a rich learning world was created, which is now available to the different target groups. The future lies in the fact that it is no longer centrally determined and controlled who learns what and when, but in the fact that employees themselves are increasingly becoming the managers and designers of their own learning experiences. Only they know what they need to strengthen their professionalism and what knowledge and skills they need to develop their own are of responsibility. Managers take on a new role, creating freedom and structures for self-responsibility and self-organisation. Experience has shown that

managers must be encouraged to coach employees on their way to more personal responsibility and to create flexible work situations in order to enable learning.

II.3.7 Empowering Personal Growth

Future Skills cannot (only) be learned cognitively but have to do with the development of personalities and strengthening professionalism. The fact that the future of competence orientation in organisations is relevant is also shown by the example of personnel and organisational development offers, in which the aim is to strengthen one's own personality. But how does that happen? How can employees strengthen their own self-confidence? In fact, targeted coaching measures are required that lead to more self-organisation ability, autonomy and the ability to act, especially in contexts in which employees have to deal more and more with uncertainty and ambiguity. In these contexts, they have to make decisions and take responsibility in situations of incomplete information availability – often a difficult undertaking. How do you strengthen their self-confidence?

For instance, an organisation participating in the *NextSkills* Studies conducts theatre workshops with employees for this purpose. The participants, who are on stage for the first time and master their part there, experience situations in which they not only experience themselves in a completely new and different way, but also their colleagues. If in everyday life it is perhaps a matter of hiding what is perceived as a personal weakness from colleagues, on stage it is a matter of showing oneself, even and especially in all incapacity. All are in the same boat for the time being. For probably most people the stage experience in the theatre workshop is a new, a reference experience. As a trainer and coach, the aim is to make it clear that it is not brilliance or absolute ability that counts but learning and development that enable you to get involved in the situation. If this is internalized, employees – so the idea – will be able to master all new challenges together in teams, disclosing their strengths and weaknesses.

Other organisations also rely on group experience and group dynamics. It is often a matter of bringing together exactly those in organisations that have nothing else to do with each other, i.e. acting across departments or business units, often in completely new and external environments. This ranges from weekends in the monastery to a visit to the climbing park. Self-confidence, self-competence and a strengthening of self-worth as well as autonomy and performance motivation are the *Future Skills* of which the development is at the forefront of these trainings.

II.3.8 Making Space to Learn

Development needs freedom, needs recognition and the knowledge that one's own commitment is well received and that design proposals can be implemented. One of the organisations participating in *NextSkills* lives this as a practical reality, taking their employee suggestion scheme seriously. Employees can contribute their ideas online and then gradually implement them through participatory selection processes. For example, suggestions are made as to what the factory site of the future might look like. It is then a question of whether the site can also be opened to a part of the public in order to bring the population closer to what is being researched and produced there, or simply to be more integrated into the community, the district, the cityscape. The identity of the individual employees with their actions within their organisation can thus be further strengthened. For example, can a restaurant be opened on the factory premises? Does it make sense to open a laundry for the factory employees directly on the factory premises? The Change Agents, whose larger and smaller proposals are selected for implementation, are given leave to put them into practice. The example shows that *Future Skills* are not stand-alone in order to be effective, but are ideally supported by an open, employee-oriented management concept. These must be tried out and implemented in order to design the organisational structures, processes and the entire organisation in such a way that the future of work, with a high level of identity and freedom for creative rethinking, becomes possible.

II.3.9 Participatory Strategy Development

A final example – this time from the academic world – shows what real participatory design of future organisational strategies can look like and why these are important. Dublin City University in Ireland was undergoing deep restructuring in 2017. In this situation, the president was tasked with developing a new five-year strategy. The university committees insisted that this should be done with the maximum involvement of all participants in order to increase acceptance and assertiveness – and not run the risk of creating a bureaucratic paper tiger. Ten strategy groups were set up to develop future drafts on ten different topics. The core of the strategy development, however, was named "FUSE". FUSE was a crowdsourcing initiative of Dublin City University to develop key ideas for the university's future five-year strategy – together with all stakeholders of the university. FUSE is conceived as a brainstorming event in which all 17,000 students, 80,000 alumni and 1,200 university members had the opportunity to contribute their ideas online – for 30

hours. The FUSE event was opened by Richard Bruton, TD, Minister for Education & Skills together with the university president. There were debating sessions for students, staff and lecturers, sleep-ins in the university library and live broadcasts of all university campuses, online TV interim summaries and online connections of university partners, local politicians and companies. Over 7,500 posts could be collected in this way. These have been clustered, duplications unified, paraphrased and merged into thematic clusters. Various teams worked out key messages so that the university management could be presented with a rich picture of clear thematic priorities for the future strategy. It is a hallmark of future organisations to allow participation in design processes. The main aim is to increase the identification of the organisation members with their organisations – not only in the world of work, but also in the world of education and schools.

In universities, this reverses the direction of development. Whereas students have so far been the instructed entities, learning at fixed times on the basis of fixed curricula, in future it will be a question of interviewing them and asking them to submit their suggestions for university development. Where do you want to go? What are the important issues of the future that need to be taken into account? What services are required? And how should studying be experienced? Participation and the organisations` members` involvement enable design processes. However, they also promote personal responsibility – as a prerequisite for self-organisation – and make employees aware of their responsibilities. Organisation will no longer be experienced as something externally given, structures that are in a sense inevitably present and into which everyone must insert his own creativity and imagination, but it is in fact the structure that can be influenced through participation – a structure one is also co-responsible for.

The design of shared responsibility structures is one of the greatest challenges in the future world of work. It is the most important link in the chain: participation – influence and identification – self-responsibility – self-organisation. It has an influence because members of an organisation want and need to develop. Freedom, personal responsibility, the ability to communicate, to participate, all these are at the same time characteristics and results of the new culture of working and learning.