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# Future Skills Journey

## Making Digital Learning Offers Available in the digital networked infrastructure for education

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**Zusammenfassung**

In Kooperation mit NEOCOSMO entwickelt der Stifterverband einen neuen digitalen Lernort: die Future Skills Journey. Ziel der Future Skills Journey ist es, digitale Lernformate zu Zukunftskompetenzen einfach und kostenlos verfügbar zu machen und gleichzeitig ein vitales Lernökosystem einer cross-sektoralen Future Skills Community zu schaffen.

Technisch baut die Future Skills Journey auf den bestehenden KI-Campus des Stifterverbandes auf und ist mit der vom Bundesministerium für Bildung und Forschung (BMBF) geplanten Nationalen Infrastruktur für digitale Bildung verknüpft. Für die inhaltliche Gestaltung kuratiert der Stifterverband herausragende, bestehende Bildungsangebote und stellt sie zu zielgruppenorientierten Learning Journeys zusammen. Diese thematisch fokussierten Lernpfade zeichnen sich durch den vielfältigen Einsatz unterschiedlicher digitaler Lernformate aus. Dazu gehören Online-Kurse, Lernvideos, Podcasts, Lernspiele und Microcontent, wie zum Beispiel anschauliche Infografiken.

Die digitalen Lernangebote finden sich nicht nur in den Lernreisen wieder, sondern werden auch in einem rechtefreien Medienarchiv zur Verfügung gestellt. So unterstützt die Future Skills Journey zudem Lehrende dabei, die eigene Lehre oder den eigenen Unterricht, um Lernangebote zu Future Skills anzureichern und zeit- und ortsunabhängige Lernerfahrungen zu ermöglichen. Sowohl über die Lernreisen als auch über das Medienarchiv möchte es die Future Skills Journey ihren Nutzerinnen und Nutzern so ermöglichen, sich schnell und einfach mit Zukunftskompetenzen vertraut zu machen.

**Stichwörter:** e-learning; digital education; network

**Abstract**

In cooperation with NEOCOSMO, Stifterverband is developing a new digital learning hub: the Future Skills Journey. The aim of the Future Skills Journey is to make digital learning formats for future skills easily available free of charge and, at the same time, to create a vital learning ecosystem in the interest of a cross-sectional Future Skills Community for inspiring exchanges.

In technical terms, the Future Skills Journey builds upon Stifterverband's existing KI Campus, a learning platform for AI content, and is linked to the Federal Ministry for Education and Research's (BMBF) planned digital networked infrastructure for education. To design the content, Stifterverband curates outstanding, existing education content and puts it together into target group-oriented learning journeys. These thematically focussed learning paths are characterised by the versatile use of different digital learning formats. This includes online courses, explainer videos, podcasts, educational quizzes and microcontent, such as infographics.

The digital learning content is not just to be found in the learning journeys but are also made available in a copyright-free media archive. In this way, the Future Skills Journey also supports teaching staff in enriching their own learning and teaching with online learning on future skills and disconnecting learning experiences from time and location. Future Skills Journey wants to enable its users, both via learning journeys and the media archive, to become familiar with future skills quickly and easily.

**Keywords:** e-learning; digital education; network

## 1. Executive Summary

In cooperation with NEOCOSMO, Stifterverband is developing a new digital learning hub: the Future Skills Journey. The aim of the Future Skills Journey is to make digital learning formats for future skills easily available free of charge and, at the same time, to create a vital learning ecosystem in the interest of a cross-sectional Future Skills Community for inspiring exchanges.

In technical terms, the Future Skills Journey builds upon Stifterverband's existing KI Campus, a learning platform for AI content, and is linked to the Federal Ministry for Education and Research's (BMBF) planned (digital) networked infrastructure for education. To design the content, Stifterverband curates outstanding, existing education content and puts it together into target group-oriented learning journeys. These thematically focussed learning paths are characterised by the versatile use of different digital learning formats. This includes online courses, explainer videos, podcasts, educational quizzes and microcontent, such as infographics.

The digital learning content is not just to be found in the learning journeys but are also made available in a copyrightfree media archive. In this way, the Future Skills Journey also supports teaching staff in enriching their own learning and teaching with online learning on

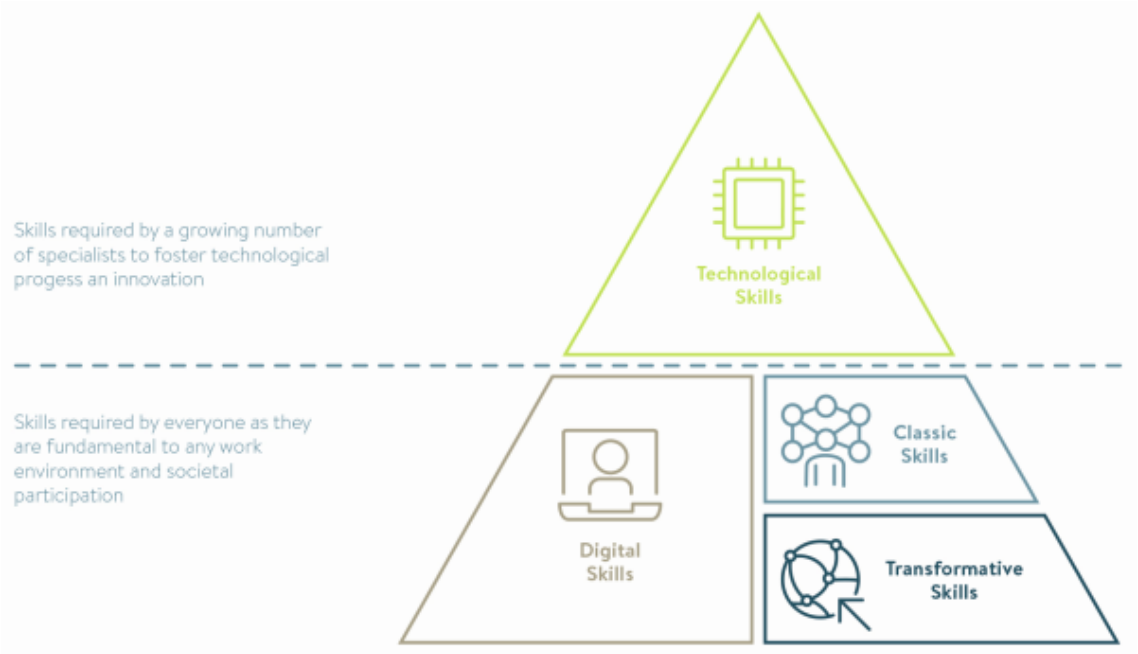
future skills and disconnecting learning experiences from time and location. Future Skills Journey wants to enable its users, both via learning journeys and the media archive, to become familiar with future skills quickly and easily.

After completing a course or learning journey, it will be possible for proof of gained competence in future skills to be sent on to the National Infrastructure for Digital Education and stored in its planned personalised Data Wallet. This is a contribution to trialling how proof of digital skills can be taken into account in the transition between educational segments. The Future Skills Journey is thus playing a major part in innovatively and practically responding to the educational and labour market requirements in the field of future skills.

## 2. Why Future Skills

The German educational landscape has not yet adapted to the continuous and rapid transformation processes and is lagging behind with appropriate digital learning. This means that future skills are not yet given sufficient consideration in the current German educational landscape and there is a shortage of freely accessible and qualityassured educational content. However, in future, a successful working life and participation in society can only be achieved if people have knowledge, skills, abilities and values from the field of future skills – which is why as many people as possible should acquire future skills. The Future Skills Journey contributes to delivering these required skills and needs for innovation.

So how are future skills defined in the context of the Future Skills Journey? In 2021, Stifterverband published a new version of a previously developed Future Skills Framework which forms the basis for the project work (Suessenbach, F. et al., 2021; Lehmann-Brauns, C. et al., 2018). According to this framework, future skills are skills which are required to be able to cope with the digitalised world of quick transformation and uncertainty, and even more so: to become a literate and an empowered individual in professional as well as every-day life. Figure 1 shows a pyramid which indicates the classifications of future skills into technological, digital, classic and transformative competences according to the framework. The shape of the pyramid indicates that primarily tech-specialists will need technological skills, while everyone in society will need a good understanding and the ability to apply digital, classic and transformative skills. Thus, the envisaged learning journeys described subsequently in this article pay into the latter three set of skills which are further described in the Future Skills Framework 2021. In addition, where appropriate, the learning journeys refer to a third framework by the Stifterverband, the Future Skills Framework for Openness, published in 2021 which additionally sets a focus on future ‘mindset’ (Hoffmann, W. et al., 2018)




As an interoperable subject portal, the Future Skills Journey creates access to user-oriented, digital learning journeys that facilitate the acquisition of future skills across countries, institutions and educational sectors, prepares for changed worlds of work and enables participation in society.

## 3. Shaping the Future Skills Journey

### 3.1. Design of the Learning Paths

Work in the preparation phase of the project has indicated that it is possible to group together already existing learning content on future skills for different target groups and thus create attractive and even new learning journeys. The aim of the Future Skills Journey is therefore to research and integrate existing and quality-assured course formats, but also to take account learning nuggets, such as podcasts and videos.

For designing the learning paths, the first step was to identify which topics would widely cover different future skills and are, at the same time, suitable for an introductory learning path for the target groups. Based on the Future Skills Framework published by Stifterverband in 2021, the topics were narrowed down six learning journeys:

*A learning journey on self-competencies*
This journey aims to foster self-reflection of the learners: What mindsets exist – and what makes me as a person tick? What type of learner am I? What motivates me when acquiring new competencies and knowledge? And how do I best organise myself in everyday digital life?

*A learning journey on digital literacy*
The journey on digital literacy will give a broad introduction into who am I in the digital world. It will cover topics such as: How do I act literate/consciously in the digital space, how do I protect my personal data? Which agile methods and tools of digital collaboration exist?

*A learning journey on data literacy*
This journey will deliver knowledge and awareness on data: What is data and what distinguishes it from information and knowledge? What is data literacy? How is data processed – and how do I make decisions based on data?

*A learning journey on entrepreneurial skills*
Creating visions, designing strategies, planning processes, gaining an understanding of markets, leadership and combining innovative methods with sustainability will be content of this learning journey.

*A learning journey on transformative skills*
The learning journey on transformative skills will deliver knowledge on how to gain the capacity of classifying and judging content and information, how to promote innovation, how to deliver missions and convince others in order to master the societal, ecological and democratic challenges we face today.

*A learning journey on digital, self-directed learning*
The journey on digital learning will focus on delivering a mindset on life-long learning and skills to initiate self-directed learning as a key success factor for the learners' career as well as for participating in society. It will introduce types of learners, learning theories and an overview of current digital learning, following a self-reflection and tools of how to navigate through digital learning.

In preparation for designing the learning paths, quality standards were set at an early stage of the project, such as ensuring clear and comprehensible structures of the learning journeys as well as the learning content and formats; keeping content short and to the point; including different formats for different types of learners; fostering an inclusive approach; addressing learners directly and personally; making use of OER.

The learning journeys will be compiled with content and formats which are consistent and complement each other. Feedback and user experience from regular testings will help to optimise the flow through the journeys and will unveil where extra elements that interlink the content are necessary. These testings will occur as an ongoing iterative process from an early stage on. They will be undertaken by potential users and their outcomes will be considered in the ongoing development process.

At an early stage of the project, it became clear that designing learning journeys specifically for the three differ ent target groups does not lead to satisfying results as all three groups are defined too broad: An employee may be more of an expert in one topic than a student – and vice versa in another. Therefore, it was decided, once the journeys are compiled, to produce extra handouts with suggestions on how to integrate the learning journeys into school or university teaching in cooperation with experts of the future skills community which is being established alongside the digital learning hub.

An additional part of the digital learning hub will be a 'catalogue of media', the mentioned media archive: In addition to the courses and learning nuggets compiled in the learning journeys, a wide range of relevant courses and learning nuggets will be made available so

that content for individual interests can be found and teaching staff can identify further learning content to enrich their own learning and teaching by disconnecting learning experience from time and location.

A current challenge is identifying learning content on partner platforms without knowing yet the technical pre-conditions: In what way will the partner platforms, on which relevant content was identified, be connected to the (digital) networked infrastructure for education, so that progress information can be delivered? Therefore, whilst already shaping the learning journeys, alternative content on other platforms is also being collected in order to be capable of exchanging single learning content in a journey if eventually necessary.

### 3.2. Developing a Learning Ecosystem

In addition to the design of the learning paths, the development of a vital learning ecosystem is also a key project element. Future Skills Learning Hubs are being set up for this purpose which are designed to foster the networking of a vital learning ecosystem for future skills. Future skills experts and practitioners from academia, schools and business come together in a community and have the opportunity to exchange ideas sectionally and cross-sectionally on future skills and to contribute to designing the learning hub. Stifterverband supports the regular online and offline meetings over the course of the project, bundles together needs and collects recommendations for the continuous design of the future skills journey. A particular focus lies on the transitional areas from school to university and to work. Skills that are important for a subsequent career, for example, can thus be taught at an early stage at school or during studies. Feedback and an exchange of experience are central contents of the meetings, which will mainly deal with:

- defining relevant future skills for their own area of application and identifying further needs,
- starting a cross-sectoral exchange,
- creating learning opportunities for learners in the transitions between school, university and work,
- testing selected learning paths in their own area of application and participating in the further design of the learning platforms by means of feedback loops.

## 4. The First Technical Results and Findings

In addition to implementation of the content, the project has a number of technical prerequisites. In the design phase, the prototype of the subject portal of the Future Skills Journey had already been set up and the technological foundation had been created to curate learning paths for various target groups and to establish technical interoperability with the National Infrastructure for Digital Education. On the basis of existing open source technologies, a prototype journey on the subject of data literacy was curated in which learning content from various technologies was linked to each other technically, in terms of subject matter and concept. This answered the research question as to which interfaces between the subject portal of the Future Skills Journey, the meta platform and integrated

third-party applications (university platforms, learning portals such as the KI Campus) can be implemented quickly and reliably, which functionalities a curating “intermediate” platform along the lines of a subject portal needs and which should be on the meta platform. For technical reasons, in the concept phase an area was realised within the KI Campus that was reserved for certain users for evaluation.

From a technical point of view, three interfaces to the meta education platform “BIRD / National Education Platform” were developed:

- a “meta data interface”, that shall allow to exchange course and learning path meta data between the future skills learning hub and the National Infrastructure for Digital Education,
- a “SSO Single Sign On” functionality on the basis of SAML 2.0 (and expanded by Shibboleth), that shall allow an easy authorisation and user provisioning on the future skills learning hub with the same credentials that learners use in their university and that are used for the National Infrastructure for Digital Edu-cation as well as other connected platforms, and
- a “Data Wallet Connector” that shall make it easy for users to transfer their learning results between the future skills learning hub and the National Infrastructure for Digital Education as well as other connected platforms.

All thesNational Infrastructure for Digital Education. It must be mentioned that the (digital) networked infrastructure for educatione three interfaces have been identified by the project and the (digital) networked infrastructure for education to be a key component in the interoperability infrastructure and shall be delivered by each platform that is connected to the is not only seen as a portal to all education platforms but also as an infrastructure services platform that defines standards to connect any kind of education platform with important education software services.

In order to develop the transfer of learning paths from the future skills portal to the BIRD platform, a concept of meta data exchange was developed. The technical solution that was created, transfers course and learning path descriptions to the meta education platform so that users can search and view courses in a general catalogue of national course offers. The data were made available as xml files by means of an API that exchanges the course data using a general course ID as key identifier which is unique for all course offers on the meta platform – a so called “UUID”. Furthermore, the interface offers the option to carry out booking processes for courses in third-party systems. Users can view the predefined learning path in the Future Skills Journey, book the course and start and gain controlled access to the course in the respected learning management system. For this, course meta data, especially course UUIDs and descriptions, are synchronised between the Future Skills Journey learning hub and a connected learning platform. During a course booking or booking query, user data (email, user ID and profile data, where voluntarily recorded) are exchanged between the platforms at the moment of successful booking, and possibly a user is newly registered in the connected learning platform for this purpose. Depending on the configuration, the Future Skills Journey then acts as an SSO provider for the learning platform, i.e., a user logs into the connected learning platform via the Future Skills Journey learning hub using Single Sign On. In the prototype case, this was realised during the design phase by connecting the HPI platform. As soon as the learning hub is connected to the education platform via SSO, the user can use alternative Single Sign Ons – in other

words, federated SSO mechanisms are supported – according to the user's preference. By using the connection of the meta education platform via the Data Wallet, it was shown that it is possible to incorporate the technology to offer the learners the prospect of using their learning results as proof of various digital skills in all further connected learning environments.

## 5. Different Transfer Options of Project Results

### 5.1. Technical Transfer Options

The technical developments implemented in the project are created under the guiding principle of openness and are made available as an open source framework. The API Service Framework/Interoperability Framework is published and is therefore potentially available to other technology platforms, developers and service providers. This enables the use of interfaces for connecting more open source platforms, for example LMS systems such as Moodle, Stud.IP, open HPI, ILIAS etc., which are used in higher education, schools or companies. The provision of the interfaces as open source also offers the option of using the findings in standardisation activities on the interfaces.

There are thus technical usage opportunities for educational content providers as well as technology and service providers in the educational sector and for related organisations. At the same time, the open framework should be incorporated in the standard technology of other portals, for example, eGov Campus, to give these portals the opportunity to connect to the meta education platform.

All of the developments implemented in the project, in particular the interfaces of the subject portal and the curated learning content for the meta education platform are conducted according to the principle of openness and made available as open source. An open API Service Framework/Interoperability Framework is implemented for this. The provision of developments as open source contributes to standardising the interfaces and promotes the development of a community around the planned project. There are thus usage opportunities both for educational portal providers as well as technology and service providers in the educational sector and related organisations. At the same time, the open framework should be incorporated in the NEOCOSMO standard technology to benefit other portals that are already using this technology.

### 5.2. Knowledge Transfer Opportunities

In the preliminary work for the development and design of the Future Skills Journey, in particular the design of the content, the experiences from existing networks and the needs from different perspectives were included. The current demand for skills for Future Skills in education, business and society formed the basis. In addition, special attention was paid to the individual and institutional user perspective in the design.

All of the design and academic findings of the Future Skills Journey acquired in the course of the project (design and implementation phase) will be shared with the networks and will flow directly into the further development of learning content at universities, schools and companies. Participating universities, schools and institutions will be provided with learning content as OER under an open Creative Commons Licence (CC BY-SA 4.0). This is also the case for learning formats, whose interfaces, proof of skills and learning environments are to be connected as a prototype to the (digital) networked infrastructure for education. All development steps are correspondingly replicable.

Another aspect for further usage results from the conceptual approach of the Future Skills Journey in terms of didactics and the quality of the learning content: whereas existing platforms mostly provide a very broad range, which often leads to a perceived surplus of opportunities from the learner's point of view, the Future Skills Journey with the focus on future skills aims to cover a sufficiently broad portfolio of subjects without losing its focus. Thanks to the planned integration of a customisable sequence of the Future Skills Journey, a modern, learning-objective oriented learning journey will be created that is low-threshold in comparison to previous learning opportunities and should result in low drop-out rates. The guiding principle of the Future Skills Journey is a high-quality digital learning offer tailored to the needs of the users, with continuous further development. The overarching aim of the learning journey is for as many users as possible to be reached so that they can be supported in enhancing their skills profiles and improving their career prospects by means of cooperation with the Stifterverband network.

### 5.3. Transfer Opportunities in Business and Society

In view of the continuing digitisation, previous job profiles are changing, new forms of working are developing and thus new profiles and skills for employees are required. A study conducted by Stifterverband together with the consultants McKinsey predicts a qualification demand of 700,000 technology specialists by 2023 and more than 2 million people in the field of interdisciplinary qualification, comprising digital and non-digital skills. Skilled workers in companies and students from all specialist disciplines will have to have continuous training throughout their working lives. Since the Future Skills Journey addresses the great need for education and skills development, this leads to many varied economic usage and application potentials (Lehmann-Brauns, C. et al., 2018).

In the medium term, the platform is to be continuously further developed with content from the Stifterverband programme and project work and, by adding more partners, is to develop into a learning ecosystem of educational services. Another usage opportunity comes from the transfer of the project findings to other skills requirements, e.g., in the field of further vocational training. Overall, Stifterverband sees a great potential for linking the Future Skills Journey to existing and future projects.

## 6. Impact der Future Skills Journey und Evaluation

Stifterverband focuses on impact-oriented, systematic and sustainable change in its two areas of activity: Education & Skills and Collaborative Research & Innovation. It strives for long-term social change that empowers people to shape the transformation (impact goal).

By using different resources (input), Stifterverband engages in different activities (output, e. g. Future Skills Journey) to achieve changes in the target groups (outcomes) that contribute to the desired social change.

Following this structure, the Future Skills Journey was designed and outcome goals were set to contribute to the impact goal (social change):

- Awareness of the need for and importance of Future Skills has been raised among decision-makers in science and among those responsible at schools and universities.
- Teachers enrich their own teaching with the rights-free media archive from the Future Skills Journey.
- Pupils have developed a positive relationship with the demands of the labour market.
- Students, as well as graduates about to start their first jobs, have learned skills that will prepare them successfully for working life.
- Working people have an awareness of future skills in lifelong learning.

A number of activities (output) have been planned to achieve these outcome goals. These activities are:

- Developing and operating the Future Skills Journey learning hub including online learning paths.
- Developing a knowledge hub about Future Skills.
- Building a community of practice.
- Developing and implementing digital certificates of competence.

The use of survey methods (e.g. evaluation, interviews) and data sources (views, downloads, social media impressions etc.) will help to determine, how particular activities contribute to the achievement of an associated outcome goal.

The Future Skills Journey is successful when all the outputs of the Future Skills Journey (the activities) have been realised and surveys or data evaluations allow positive conclusions to be drawn from this work.

## 7. Summary

The overarching aim of the Future Skills Journey lies in using digitisation and testing out new ways to improve access to and participation in high-quality education for everyone. To us, Future Skills seem particularly suitable in terms of content because they are of interest to a broad target group, both for professional life and for participation in society. The learning content incorporated in the Future Skills Journey should comply with a quality-assured academic level and, in line with the Future Skills Framework 2018, Future Skills 2021 and the Future Skills Framework for Openness 2021, comprise thematic learning content on key digital qualifications, key non-digital qualifications, technological skills and transformative skills. In implementing the Future Skills Journey, we are relying on a strong,

nationwide network. This is made up of players from universities, schools and companies. By establishing a vital learning ecosystem, the sectors involved should also be motivated to contribute to a diverse and freely accessible offer for future skills for their target groups.

## Call to Action

Interested students, teachers from universities and schools, employees in companies who are involved in Future Skills or intend to work with this subject in more depth in the future, are therefore warmly invited to contact Henning Koch or Claudia Schneider: futureskillsjourney@stifterverband.de.

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