

# 4 Fit Future

## Teacher Guidelines



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## 1. Introduction

Companies are under constant pressure to innovate for remaining competitive on the market. The complex environment makes a pure reliance on trend analysis no longer enough to understand future development in their industry. Particularly, the high-tech sector is vulnerable to combinations of long-term technological, societal and cultural change, comprising several dimensions of uncertainty related to technological change, especially the difficulty of identifying use cases for new technology and dependence on complementary inventions. Yet, HE offerings focus predominantly on educating (future) strategists in developing short and middle term (2-7 years) strategies.

Far-future strategic decisions, however, need to be built on a sound long-term technology future scenario (LTFS) development methodology that is different in so far as it needs to consider not just trend forecasts, but also tacit visionary knowledge. Developing multiple LTFSs for a future more than 10-20 years ahead supports companies in anticipating and making sense of possible shifts in their industry due to emergent technologies, wildcards like the recent COVID19 pandemic, and sociocultural change, and in validating business innovation ideas. High-tech sector companies would greatly benefit from an HE curriculum which provides a valid framework and a reliable methodology to develop LTFS enabling conscious choices in long-term strategy making.

FIT4Future stands for “Far-Future Strategy Development for STEM Higher Education Teachers”, provides an answer to these challenges, by offering a space for Higher Education Engineering teachers, who want to upskill for introducing so-called Long-Term Future Scenarios (and its topics) into their regular teaching portfolios and activities. Long-Term Future Scenarios build the bridge between the results of future research and traditional strategy development and offer a concrete, company-specific outlook for the next 10-20 years. The methodology is different in so far as it not only considers trend forecasts, but also tacit visionary knowledge.

FIT4Future aims at an innovative curriculum at European Higher Education Institutions (HEIs) in STEM by adding the lacking long-term perspective to strategic management teaching and fostering future employability of students with developed skills in high-tech companies. Students are targeted as the final beneficiaries. Students in STEM-related fields are currently being trained in traditional strategy making, but relying on pure trend analysis alone is not enough, and companies, especially from the high-tech sector, need professionals, who can develop Long-Term Future Scenarios. FIT4Future allows HEIs to provide their students (either in bachelor, master or specialization courses) with training in a new field and methodology important for developing sustainable long-term strategies, which enables the students to make sense of long-term trends, which they can use to engage in a meaningful way for and with their company.

## 2. Why a FIT4FUTURE Teacher Guidelines?

The pioneer and future-oriented science, technology, engineering, and mathematics (STEM) curriculum and updated strategy-making related study courses reflecting the needs of the high-tech industry, and the related strong collaboration network, make higher education institutions more attractive to students and STEM higher education (HE) teachers. FIT4Future aims that the STEM HE teachers will have updated skills and knowledge, increasing scientific research and publications. HEs can apply the long-term technology future scenario (LTFS) method to develop (or adapt) curricula to long-term trends ensuring these are

future-oriented. To enable this in an efficient way, FIT4Future will be developed based on a large-scale mapping of the current curricula, the needs of HE STEM teachers, and available educational contents.

Teacher Guidelines aim to motivate HE STEM teachers to use the FIT4FUTURE program and increase their knowledge and skills in the field of creativity LTFS teaching. This guide explains what FIT4FUTURE is and introduces them to the concept and topic of LTFS in STEM education, while at the same time emphasizing the benefits of the results for them. It aims to provide a step by step approach on how to use the FIT4FUTURE in the best way.

The testimonials from peers that have used the programme during the project lifetime will provide examples and inspiration.

### **3. FIT4FUTURE in a nutshell**

The FIT4FUTURE project is founded in the identified learning needs of the target group. Its contents are available, together with other materials such as videos, audios or links to further reading, in the specially designed online learning space, where teachers (and other interested parties) can access the training course and the LTFS methods and materials developed to innovate in their teaching approaches. The usefulness and appropriateness of these materials has been tested by numerous teachers participating in the FIT4FUTURE pilot, and some of the LTFS methods have also been tested in activities with students.

In this chapter we provide a quick insight into the main results from the project, for more detail and access to each of the described results, please visit: <https://benefit4future.eu/>

#### **3.1. FIT4FUTURE Curriculum**

The FIT4FUTURE Curriculum was developed based on a large scale mapping exercise of current curricula, the needs of HE STEM teachers and available educational contents. Its objectives are to increase learners' knowledge on long-term future forecasting and to meet the training needs of the HE STEM teachers for teaching long-term future forecasting.

The curriculum outlines the training modules that address the gaps and focus on providing HE teachers with the adequate knowledge to better teach long-term future forecasting in their curriculum. The curriculum is set up with different modules that are practical and easy for HE teachers to use.

The Curriculum formed the basis for the development for the FIT4FUTURE training programme. As such it provides the HEIs (and more concretely the members of the management and governing bodies, as well HR departments) with the context and background insights into the training programme. The Curriculum is accessible through the FIT4FUTURE website.



### **3.2. FIT4FUTURE Training**

The FIT4FUTURE Training brings together a suite of learning materials, which together provide a full programme for the introduction of LTFS in the courses of an HEI. The materials have been developed to allow for customisation and adaptation to the different courses and curricula of each institution.

The training consists of the following components:

#### **3.2.1. Basics**

This module introduces the topic of long term future scenarios, and focuses on the understanding of scenarios in decision making at organisation level and the methods used for LTFS.

#### **3.2.2. LTFS Methods**

This module provides details about the methods used in LTFS developed, such as fuzzy cognitive maps, analysis of science fiction novels and films, science fiction prototyping, flash fiction stories, trend extrapolation/trend impact analysis , Delphi study and cross impact analysis.

#### **3.2.3. LTFS Experiences**

This module is complementary to the module on LTFS methods, and provides real life examples from companies and research that incorporate LTFS methods.

### **3.3. Data and additional sources**

These additional components of the training provide access to data and additional sources, which can be used in providing LTFS training and/or to drill deeper into the topic. These can be used to extract additional learning materials for both teachers and students.

The data sources provide access to 39 data sources which can be used in the development of LTFS. They represent data sources from different countries and different sectors.

The additional resources have been selected for their connection or relevance for teaching LTFS. The resources could be used to enhance the quality of instruction that target LTFS incorporation.

All of this content is adapted and selected to provide the best possible library of information on LTFS and to make it easy for teachers to use in the classroom.

### **3.4. FIT4FUTURE HEI guidelines**

The HEI Guidelines aim to introduce HEIs, specifically the members of management, governing bodies, and HR departments, to the FIT4FUTURE concept and learning approach, highlighting the benefits of integrating LTFS into teaching. To facilitate adoption, the guidelines include examples of HEIs that have successfully implemented and promoted LTFS in their teaching, as well as those that have utilized the FIT4FUTURE concept and results.

## **4. Testimonials, and use cases**

The implementation of the FIT4FUTURE pilots utilized a comprehensive blended learning approach, combining independent navigation of the e-learning platform with interactive workshops and courses designed by the consortium. HE STEM teachers were introduced to the project's objectives and the platform's features through demonstrations, simulated workflows, and competitive learning sessions. These activities enabled teachers to explore and incorporate long-term future scenarios (LTFS) methods into their curricula. Throughout the process, teachers were engaged through workshops, brainstorming sessions, and in-class activities that included direct student participation. Feedback was gathered via online surveys and face-to-face interactions, providing valuable insights for continuous improvement of the platform.

Moreover, the pilot sessions were tailored to address specific teaching challenges, facilitating hands-on experiences with LTFS methods such as Flash Fiction Stories and Fuzzy Cognitive Mapping. This engagement fostered a collaborative environment where teachers could exchange ideas and refine their teaching strategies. In addition to enhancing subject-specific knowledge, the pilots emphasized the development of essential soft skills among both teachers and students, such as creative thinking and problem-solving. This iterative approach, backed by continuous feedback and real-world application, ensured that the FIT4FUTURE project not only met the educational needs of its users but also promoted innovative teaching practices that prepare students for future technological advancements.

Here are some tips and feedback from STEM HE teachers:

About the e-learning platform and the contents:

*“(into the e-learning platform) The section on how to approach the method in teaching helped me build up the lesson. What impressed me the most was how the Science Fiction Analysis exercise encouraged my students to think critically and creatively about the intersection of science, technology, and society. It made them excited to start exploring the subject of product development and gave them many ideas of potential products that could be made.”*

*“Utilizing the Scenario Building exercise from the Fit4Future platform has greatly enriched my teaching approach in environmental technology.”*

*“One particular method that caught my attention was the Flash Fiction method. The idea of using storytelling to access students' visionary knowledge about the far future resonated with me. Climate change, being one of the most pressing issues of our time, seemed like the perfect topic to explore through this creative lens.”*

About the change in their skills, competencies and attitudes towards their teaching approach:

*“As an educator, there's nothing more rewarding than seeing my students inspired to think boldly and creatively about the future of technology and its impact on society. In the future, I will look into more of the methods on the Fit4Future platform and adapt them to my classroom.”*

*“I was so glad that I found the F4F platform when I was in need of methods that I could use in my teaching to engage my students in envisioning the far future. As a teacher, I constantly seek innovative approaches to engage my students' creativity and critical thinking skills. When I stumbled upon this platform, it was like discovering a goldmine of resources.”*

*“Prompting my students to envision how AI could revolutionize the healthcare sector in the future provided valuable discussions about the intersection of technology and healthcare. It made the student think critically, creatively, and ethically about this subject. The results were beyond my expectations. The students learned a lot and it was a great starting point for my course on innovation in the healthcare sector. ”*

*“I introduced the Flash Fiction exercise to my class, prompting them to imagine a future where climate change had been solved. The response was remarkable. Students delved into the exercise and came up with many wonderful narratives. Some about sustainable cities powered by renewable energy, others about thriving ecosystems restored to their former glory. Throughout the stories, innovative technologies were used to change the way humanity interacted with the environment. I used the scenarios created by my students as springboards for further discussion and exploration in the classroom.”*

*“As an educator in urban planning, integrating the Fit4Future tools into my lectures has revolutionized the way my students perceive urban development. We used the LIFS methods to project urban environments*





*into the next century. This not only sparked creativity among the students but also allowed them to use critical thinking to address future urban challenges.”*

*“Teaching social sciences often involves discussing theoretical concepts that can seem distant to students. By integrating the Fit4Future platform into my classroom, I found the multiple methods especially effective.”*

*“(about the trend analysis methods) It allowed students to visualize and discuss social changes over time and predict future societal shifts. This method not only engaged the students but also helped them to connect historical events with potential future outcomes, making abstract concepts much more tangible and understandable. Their presentations showed improved depth and analysis, and they expressed a newfound appreciation for the dynamics of social change. This tool has enhanced the way we explore and discuss social sciences in our classroom, making learning both interactive and impactful.”*

About their approach on applying on a regular basis what they have learned in teaching/training activities:

*“Before discovering the Fit4Future project, using LTFS methods in teaching never crossed my mind. But now they have transformed how I approach teaching. I tried using the Science Fiction Prototyping method in one of my classes.”*

*“I teach a course on product development. A crucial part of it is looking into the future and thinking about how the product we develop today can fit into it. I was immediately interested when I heard about the Fit4Future platform. I thought it could be a valuable platform to learn new methods and ways of teaching.”*

*“(about the scenario building) I implemented this method in my classes, encouraging students to design scenarios where technology plays a key role in sustainability. The students' engagement was exceptional, as they eagerly debated the feasibility and ethical dimensions of their innovative technologies. Their projects not only showed a deep understanding but also a strong passion for contributing to a sustainable future. This exercise has become a fundamental part of my curriculum, fostering innovative thinking and practical application in environmental studies.”*

*“After a session using the Scenario Exploration System, students were able to articulate complex concepts such as smart cities and public space redesign with greater confidence. The feedback was incredibly positive, with many students expressing how these exercises helped them understand the practical implications of their studies in real-world scenarios.”*

## **5. Concluding Remarks**

The FIT4FUTURE project has successfully demonstrated the value of integrating Long-Term Future Scenarios (LTFS) into higher education curricula, particularly within STEM fields. By implementing a comprehensive blended learning approach, the project provided HE STEM teachers with the tools and methodologies



needed to incorporate LTFS into their teaching practices. This initiative not only enhanced teachers' ability to engage students with future-oriented thinking but also fostered an environment of creativity and innovation.

Through hands-on workshops, interactive courses, and real-world application scenarios, teachers were able to explore various LTFS methods such as Fuzzy Cognitive Mapping and Flash Fiction Stories. The iterative feedback loop, facilitated by online surveys and face-to-face interactions, ensured continuous improvement of the platform and its content. This approach has proven effective in developing essential soft skills among students, such as critical thinking and problem-solving, which are crucial for addressing future technological and societal challenges.

Overall, the FIT4FUTURE project has made significant strides in preparing both educators and students for the complexities of future strategic planning and technological advancements. The positive feedback from participants highlights the project's success in promoting innovative teaching practices and enhancing the educational experience. As the project moves forward, the insights and methodologies developed through FIT4FUTURE will continue to benefit the broader educational community, ensuring that HEIs remain at the forefront of strategic and forward-thinking education.