

EUcare4.0 Trainer Guidelines

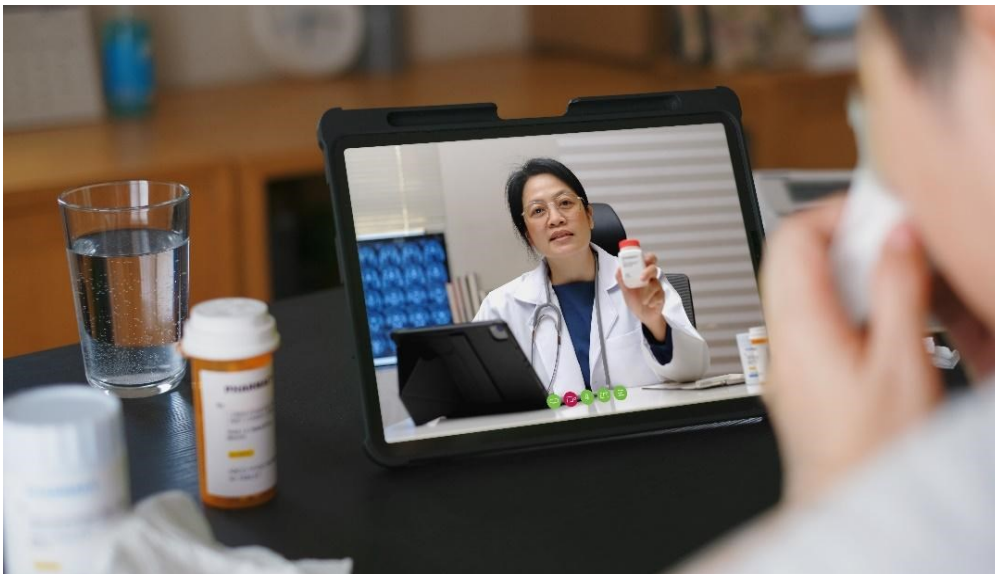
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Author: Weedeznign_photo, source: <https://elements.envato.com/telehealth-concept-asian-woman-video-call-with-her-VD4J65F>

Introduction

Industry 4.0 is revolutionizing the way healthcare is delivered, including the diagnosis, the treatment, monitoring the patients and their health status, the patient-medical professional relationship but also the management and organization of the health systems. The new challenges in the medical field, brought by 4.0 Industry development, especially in the psychiatric field, create new needs of training for the mental health professionals like raising awareness about Health 4.0 benefits of digitalisation, gaining knowledge about digital technologies applications in the specific sector of mental healthcare, be able to identify which of these technologies can be included in official education paths and designing strategies to do it, as mentioned in the Course Curriculum.

The handbook contains guidelines for trainers about the use of the materials created in the Eucare 4.0 project, during the training sessions, according to the course curriculum, which can be found on the project site. What a trainer should have in focus when preparing for the course is: how to use the online-learning methods and better make use of its advantages for learners, what to underlie when conceiving the training, how to increase learning experiences efficiency by using informal and non-formal methods (for example, assessments while having the course and quizzes).

Developed in order to support the VET trainers, teachers, and mentors to produce a high impact on the final target group regarding the use of Industry 4.0 in caring for patients with mental health needs, materials created in Eucare 4.0 are available at <https://extension.uc3m.es/>

Information is organized in a modular and flexible way. Each module was developed by one of the project partners. There are 10 modules, as follows:

- 1. Introduction to Industry 4.0; (EFCC)
- 2. Introduction to Health 4.0; (LUDOR)
- 3. Application of Health 4.0 to the mental health sector;) (ECAM-EPMI)
- 4. Introduction to mHealth and eHealth; (OAMGMAMR)
- 5. Mental health apps; (LUDOR)
- 6. Telepsychiatry; (ECAM-EPMI)
- 7. IoT for mental healthcare. (UC3M)
- 8. Big data for mental healthcare. (UC3M)
- 9. Artificial intelligence for mental healthcare. Inference Models, Clustering/Classification, Pattern Recognition, Prediction; (EFCC)
- 10. Mixed reality (AR/VR) for mental healthcare. Milgram's continuum AR, VR, Multimodal interfaces. (SESCAM)

1. Why is needed

The purpose of this guideline is to help VET instructors (educators) VET teachers/trainers/mentors, senior managers, mid-managers, and not only to understand the use of 4.0 in mental healthcare, and to be able to provide the knowledge according to the content of the Eucare 4.0 curriculum. They should be able to build a flexible online context for learning which enables the trainer to make adjustments depending on the learner's needs and abilities. Using these guidelines, trainers will acquire expert knowledge in planning and conducting Eucare 4.0 training efficiently, based on the methods provided and, on the other hand, on the specific needs of the learners.

2. Future aims

This guideline aims to support and educate senior managers, mid-managers, and **VET teachers/trainers/mentors** and make the introduction of Industry 4.0 to mental healthcare professionals a simple process. Industry 4.0 will play a key part in the career development of the next generation. Describing the conversion and development of industrial manufacturing through the digitization of new technologies, Industry 4.0 has added a new dimension where, with the help of new technologies, the industrial market has hit a new level, which was not seen before, including the mental healthcare sector.

Learners become familiar with the concept of Industry 4.0 and its technologies, so it is essential for trainers to be able to transmit the knowledge they acquire to their trainees and also for being able to find innovative ways of using the new technologies in their practice from the decision makers to the ones who work directly with patients with mental disorders. One of the main objectives of the Eucare 4.0 project is to create an online course that will allow trainers to learn all the basics of how to put into practice the technology provided by Industry 4.0 in mental healthcare and to disseminate their advanced knowledge and competencies with the professionals in this area.

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- In the following section of this guideline, we present different practices and the steps that trainers should follow to teach the trainees. It may be a good chance for the trainers to practice their skills in using Industry 4.0 tools in mental healthcare and create good learning contexts by carrying them out before teaching them to students. This way, they may also get to know the difficulties and challenges that may arise during their learning and find more creative tools for teaching those matters.

3. Learning context (how can you deliver the content) – general guidelines

3.1. Teaching and learning online

Online learning gives the trainee full responsibility for his learning, provides more personalized learning, and gives more flexibility to the learner, considering the structure of the course organized by modules and the possibility to follow the modules by choice. The trainees can learn at their own pace and receive individual feedback on their performance. They can also choose learning content tailored to their level, learning style, and interests, making learning more engaging and productive. Online learning allows access to a much wider range of specialists and learning content. It creates the potential for a higher level of involvement without requiring them to be present in the physical environment of the educational setting.

Online learning also has the potential to improve productivity and reduce the costs of transportation in terms of money and time etc. Online learning can foster creativity in trainees by providing them with options to experiment, collaborate with peers to solve a problem, research topics, and develop their projects. It inspires trainers to innovate and develop new learning tools and solutions, improving trainer-trainee interaction and learning opportunities.

Teaching online includes case studies where students will be encouraged to use work-based experiences in mental healthcare and consider the patient/client perspective in using Industry 4.0 tools. As was previously mentioned, the online materials are organized into 10 modules, distributed depending on the target group in three blocks.

To encourage learners to reflect on their learning, it is recommended to use interactive methods of learning like video courses with quizzes and reflection moments about case studies but also to encourage them to develop strategies of using the knowledge and competencies, and skills gained at each module in their workplace in the mental healthcare, in our case. The trainees can also be encouraged to share their understanding of the content, discuss it with their peers and then write a short paragraph that summarizes their learning. A case Study is used to discuss their opinions about the use of different Industry 4.0. tools in mental healthcare and share them with their peers and trainers. The learning platform offers trainers and trainees a simple way to collaborate on projects and coursework. For trainees, the platform offers a variety of collaborative opportunities through video, messaging, and discussions. The use of technology in health education improves trainee performance, making lessons more attractive, prompting interest in learning in trainees, increasing their enthusiasm, and improving the quality of the lesson.

3.2. Resources

Considering the course is online, the trainers should make sure they will have a device with internet access, a multimedia-enabled browser and to be registered in the extension platform,

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- movies, headsets, laptops, online hand-outs available for the participants, etc. (depending on the content and the objectives of the module).

3.3. What the trainer must focus on:

- Must have in mind clear lessons goals
- Must use challenging materials, considering the course is online, to keep the interest and the focus of the trainees (games, videos, quizzes, facilitate interaction with peers, etc.)
- Use dynamic video courses so the trainees can check the information they learned.
- Use formal and non-formal methods in teaching.
- Use person-centered learning methods, like virtual space facilitates "comparing, copying, discussing, and most of all cooperating and revising" (Motschnig-Pitrik, 2005) using online platforms.
- Use teamwork (games, tasks that can involve more online participants in exercises like Kahoot, Quizziz, etc.)
- Spilt the module training into meaningful parts.
- Use self-reflection to deepen the learning process (using H5P).
- Ensure access to the activities for all the participants.
- Ensure adjusting the learning methods depending on the group, if needed (have a plan B method).

In the next part of the guideline, there will be a description of all the steps a trainer must take in order to facilitate the course delivery. It needs to be underlined that even if the course is an online course, being an open source, it can be used by the trainers as it is, but also, the materials can be used in hybrid or on-site learning.

In order to efficiently provide the course, a trainer might follow the steps suggested below. Because some aspects are commune and some are specific for each module, the trainer will find, for the last case, a specific example or suggestion for each module.

4. Steps on delivering the modules' content

4.1. Set the target group per module according to the curriculum

In order to be more efficient and have a more practical touch in organizing and providing care in the mental healthcare sector, the course Eucare 4.0 targets different profiles according to the needs of applying the knowledge in the practice of mental healthcare but also implementing them in the institutional level.

So, the **primary target group** is **VET instructors** like trainers, teachers, and mentors specializing in mental healthcare, having an essential role in developing the abilities and skills needed to apply I4.0 technology. Teachers/trainers/mentors will follow up on the course as a whole (10 modules, 50h). They should be aware of how to use various teaching methods to ensure an understanding in detail of the concepts and procedures of each technology.

The secondary target group (Mid managers) only needs to complete the first six modules related to strategic information and success stories without going into the technical details described in the last modules. Middle management people like healthcare and trainer providers or educational institutions are part of this group. They constitute the interface between the primary target group and the tertiary.

- **The tertiary target group (Senior manager)** will only need strategic information (modules 1-3) to make informed decisions and is linked to policymakers and officials responsible for education.

Target group	Who is involved	Modules to follow	Blocks
Primary	VET instructors, trainers, teachers	M1 to M10	I, II, III
Secondary	Mid-managers (health care and trainer providers/educational institutions)	M1 to M6	I, II
Tertiary	Senior managers	M1 to M3	I

4.2. Module learning objectives

- The trainer has to use measurable and concrete **learning objectives**.

Module number	The name of the module	Learning objectives	Observations
1.	Introduction to Industry 4.0	<p>The trainees will be able to:</p> <ul style="list-style-type: none"> • define Industry 4.0 and the relevant main technologies • Identify the 4 Industrial Revolutions • identify the Industry 4.0 stakeholders and their roles • identify the opportunities of innovation offered by Industry 4.0 • relate at least 2 relevant case studies on Industry 4.0 implementations. 	
2.	Introduction to Health 4.0	<p>The trainees will be able to:</p> <ul style="list-style-type: none"> • define Health 4.0 • identify the Health 4.0 stakeholders and their roles • identify the Strengths, Weaknesses, Opportunities, and Threats of Health 4.0 • relate at least 2 relevant case studies on Health 4.0 implementation in Mental Health. 	
3.	Application of Health 4.0 to the mental health sector;	<p>The trainees will be able to:</p> <ul style="list-style-type: none"> • define the concept of the mental health sector. • explain the evolution of technological innovations in the field of health. • explain the brain structure • relate the basic principles of medical imaging and electrophysiology 	



		<ul style="list-style-type: none"> • define the technology of eye tracking and its usefulness in the field of mental health • define the Snoezelen room and its usefulness in the mental sector. • explain the role of robotics in the mental sector. 	
4.	Introduction to mHealth and eHealth	<p>The trainees will be able to:</p> <ul style="list-style-type: none"> • define eHealth and mHealth • relate at least 5 pros for using eHealth and mHealth • relate at least 5 cons for using eHealth and mHealth • identify at least one impact of eHealth and mHealth on people • identify at least one impact of eHealth and mHealth on the home environment • identify at least one impact of eHealth and mHealth on the work environment • identify at least one impact of eHealth and mHealth on society • propose one case study for using eHealth and mHealth in their work 	
5.	Mental health apps	<p>The trainees will be able to:</p> <ul style="list-style-type: none"> • define mental health apps (MHA) • identify the basic concepts of MHA • relate at least 5 benefits of MHA • relate at least 5 drawbacks of MHA • explain how to select a suitable MHA • identify the MHA categories • give examples of MHA relevant to different categories • relate at least 5 applications of MHA to Health • relate at least 2 relevant case studies on MHA use in Mental Health. 	
6.	Telepsychiatry	<p>The trainees will be able to:</p> <ul style="list-style-type: none"> • define telepsychiatry • explain the link with telemedicine • explain the regulations related to telepsychiatry. • relate the basics of computer networking, data, and network security. 	



7.	IoT for mental healthcare.	<p>The trainees will be able to:</p> <ul style="list-style-type: none"> • define what is IoT • identify the basic concepts of IoT • define the main components of an IoT system <ul style="list-style-type: none"> • differentiate the two main types of computing applied to IoT systems • relate the main benefits of IoT • put some examples of the IoT applications • relate some applications of IoT in healthcare <ul style="list-style-type: none"> • identify the main benefits of IoT in the healthcare sector • enumerate some of the possible IoT applications in mental healthcare • relate at least 2 relevant use cases of IoT on mental health care 	
8.	Big data for mental healthcare.	<p>The trainees will be able to:</p> <ul style="list-style-type: none"> • define what is Big Data • identify the basic concepts of Data • define the Vs of Big Data • define the main steps of a Big Data process • relate the main benefits of Big Data • put some examples of the Big Data applications <ul style="list-style-type: none"> • relate some applications of Big Data in healthcare <ul style="list-style-type: none"> • identify the main benefits of Big Data in the healthcare sector • enumerate some of the possible Big Data applications in mental healthcare • relate at least 2 relevant use cases of Big Data on mental health care 	
9.	Artificial intelligence for mental healthcare. Inference Models, Clustering/Classification, Pattern Recognition, Prediction	<p>The trainees will be able to:</p> <ul style="list-style-type: none"> • define what is Artificial Intelligence (AI) • identify the basic concepts of AI • define the main components of an AI system <ul style="list-style-type: none"> • relate the main benefits of AI • put some examples of AI applications • relate some applications of AI in healthcare 	

		<ul style="list-style-type: none"> • identify the main benefits of AI in the healthcare sector • enumerate some of the possible AI applications in mental healthcare • relate at least 2 relevant use cases of AI on mental health care 	
10.	Mixed reality (AR/VR) for mental healthcare. Milgram's continuum AR, VR, Multimodal interfaces	<p>The trainees will be able to:</p> <ul style="list-style-type: none"> • define mental health cases using Mixed Reality (MR) • identify the basic concepts of MR • explain Milgram's continuum of MR • identify the MR variants • explain how MR works • explain how to select a suitable Multimodal interface • relate at least 3 applications of MR to health • relate at least 2 relevant case studies on MR use in Mental Health 	

4.3. Training plan

- The trainer must know exactly how much time dedicates to each module and the activities.

Presentations	Formative assessment	Extra work for students	Recommendation	Forum discussions	Summative assessment
12 videos/module	12 questions/module	elaborate a study case	access supplementary resources	discussions	final evaluation
60 minutes	60 minutes		60 minutes	60 minutes	60 minutes

The time for the formative assessment and the study case can vary from one module to another, depending on the type of assessment the trainer chooses considering the module but also the target group.

The trainer needs to know the resources needed for the training (the trainer is free to find any other entertaining resources in order to make the course more entertaining):

- laptop,
- internet connection,
- e-learning platform,
- paper form - if necessary, in case it is on-site training or hybrid
- Online forms if the training is organized only online

- *Links with the video courses*
- *links with extra resources which will be presented in the Core content subchapter.*

4.4. Where we start from

- *All the participants have to access the EUCARE e-learning platform <https://extension.uc3m.es> by enrollment on the platform with personal e-mail as username and password.*

4.5. Motivation

- The motivation of each module will make clear in what way each module can contribute to enriching the knowledge on the use of Industry 4.0 in healthcare.

Module number	The name of the module	What is the contribution of the module to understanding the use of Industry 4.0 in healthcare?	Observations
1.	Introduction to Industry 4.0	<ul style="list-style-type: none"> - helping the workers in the medical area, managers, and VET trainers to be familiarized with Industry 4.0 and its possible applications in healthcare - helping the trainees to understand the Strengths, Weaknesses, Opportunities, and Threats related to the implementation of Industry 4.0 - helping the trainees to understand better the next chapters, which will describe in more detail the role of Industry 4.0 and relevant technologies in mental health 	
2.	Introduction to Health 4.0	<ul style="list-style-type: none"> - helping the workers in the medical area, managers, and VET trainers to be familiarized with Health 4.0, which is the application of Industry 4.0 technologies and concepts in healthcare - helping the trainees to understand the Strengths, Weaknesses, Opportunities, and Threats related to the implementation of Health 4.0 - helping the trainees to understand better the next chapters, which will describe in more detail the role of Health 4.0 in mental health 	
3.	Application of Health 4.0 to the mental health sector;	<ul style="list-style-type: none"> - assisting specialized educators and teachers in the mental health field to improve the non-verbal and verbal communication of individuals with 	

		<p>intellectual disabilities. Also, helping them in their academic learning as a key to social and professional inclusion.</p> <p>- assisting mental health professionals in the early diagnosis of intellectual disabilities and the assessment of the extent of impairment caused by such disabilities, as well as monitoring the progress made through interventions. In fact, public authorities and European states aim to reduce healthcare expenses through early interventions, particularly for very young children.</p>	
4.	Introduction to mHealth and eHealth	<p>- helping the workers in the medical area, managers, and VET trainers to be familiarized with these concepts and to understand how the work in the healthcare sector can be improved by using eHealth and mHealth</p> <p>- helping the trainees to understand better the next chapters, which will describe in more detail what 4.0 Industry means for the people, especially for people with mental health issues and their families.</p>	
5.	Mental health apps	<p>- helping the workers in the medical area, managers, and VET trainers to be familiarized with the Mental health apps as one of the applications of Industry 4.0 in healthcare</p>	
6.	Telepsychiatry	<p>- telepsychiatry is a valuable tool that enables mental health practitioners to provide remote services to patients who may face difficulties in physically accessing healthcare facilities. By leveraging telecommunication technologies such as video conferencing and secure digital platforms, mental health professionals can conduct virtual consultations and therapy sessions, allowing them to stay connected with their patients regardless of</p>	

		<p>geographical distance or mobility constraints.</p> <ul style="list-style-type: none"> - this approach proves especially beneficial for individuals with mobility limitations, those residing in remote areas, or patients facing other challenges that prevent them from attending in-person appointments. The convenience of telepsychiatry not only ensures continuous care but also reduces potential disruptions in the treatment process, leading to improved patient outcomes. 	
7.	IoT for mental healthcare.	<ul style="list-style-type: none"> - helping medical workers, managers, and VET trainers become familiar with IoT device applications in the area of Mental Health as one of the applications of Industry 4.0 in healthcare. 	
8.	Big data for mental healthcare.	<ul style="list-style-type: none"> - helping the trainees to gain knowledge about what Big Data is in mental health as one of the applications of Industry 4.0 in mental health. 	
9.	Artificial intelligence for mental healthcare. Inference Models, Clustering/Classification, Pattern Recognition, Prediction	<ul style="list-style-type: none"> - helping the trainees to gain knowledge about what Artificial Intelligence is in mental health as one of the applications of Industry 4.0 in mental health. 	
10.	Mixed reality (AR/VR) for mental healthcare. Milgram's continuum AR, VR, Multimodal interfaces	<ul style="list-style-type: none"> - the main contribution of this module is to introduce mental health professionals to mixed reality technologies, how these technologies work, and the possibilities for their use. 	

4.6. Core content (technical content divided into units according to the curriculum)

Most of the steps of the training are the same for all ten modules, but there are some subchapters that ask for specific mentions so those will be described in detail for each module.

Describe here all the steps of the training as follows:

a. Pre-test

Before the effective start of the training, the trainees will complete a pre-test which would be an online form with ten questions regarding the impact of eHealth and mHealth on people and society. The purpose of the pre-test is to know the trainees' level on this topic.

b. Collecting the expectations from the participants:

- What are your personal expectations for this module?
- What are your professional expectations for this module?

For online courses, use an online form to collect the expectancies of the trainees to adjust the information if you, as a trainer, can contact the trainees to check their progress. For blended or face-to-face training, a paper form can also be used to collect the expectancies of the participants.

c. The Start of training

- To get the best out of the learning activity presented, use a **wide variety of formats** such as lectures, graphics, videos, interactive activities (like Genially, H5P), and surveys, according to the content of each module.

Module number	The name of the module	Suggestions for how to catch the interest of the trainees for each module	Observations
1.	Introduction to Industry 4.0	Can start with an icebreaker – like a discussion on how Industry 4.0 is going to revolutionise all the industries (from manufacturing, to entertainment, to healthcare, etc.), the implications of Industry 4.0 technologies on various stakeholders (patients, healthcare professionals, healthcare providers, etc.) – in order to make the trainees curious about the 4 th Industrial Revolution.	
2.	Introduction to Health 4.0	Can start with an icebreaker – like a discussion on how the Health 4.0 is going to revolutionise all the aspects of healthcare, the implications of Health 4.0 implementation on various stakeholders (patients, healthcare	

		<p>professionals, healthcare providers, etc.) – in order to make the trainees curious about what they are going to learn.</p> <p>To start, the trainer can also use a video to introduce some ideas about Health 4.0 and ask them to complete a short quiz or a brainstorming for face-to-face courses or blended courses.</p>	
3.	Application of Health 4.0 to the mental health sector;	<p>Can start with an icebreaker – like a discussion on how the healthcare changed in the last decades, how the technology revolutionized the health sector – in order to make the trainees curious about what they are going to learn.</p> <p>To start, the trainer can also use a video to introduce some ideas about what people know about Health 4.0 and ask them to complete a short quiz or a brainstorming for face-to-face courses or blended courses.</p>	
4.	Introduction to mHealth and eHealth	<p>Can start with an icebreaker for the beginning of the module – like a discussion on how it was for people to get medical health before the eHealth and mHealth if we think about people living in difficult-to-reach areas, so you can make the trainees curious about what they are going to learn.</p> <p>To start, the trainer can also use a video to introduce some ideas about what people know about eHealth and mHealth and ask them to complete a short quiz or a brainstorming for face-to-face courses or blended courses.</p>	
5.	Mental health apps	<p>Can start with an icebreaker – like a discussion on how the smartphones affect our lives, the variety of apps, including those for health, and how these may possible be useful for mental health – in order to make the trainees curious about what they are going to learn.</p>	



		<p>To start, the trainer can also use a video to introduce some ideas about what people know about mental health apps and ask them to complete a short quiz or a brainstorming for face-to-face courses or blended courses.</p>	
6.	Telepsychiatry	<p>Highlight the Growing Relevance: Introduce telepsychiatry as a rapidly evolving and in-demand field within mental health care, emphasizing the increasing need for skilled professionals in this area.</p> <p>Showcase the Benefits: Demonstrate the numerous advantages of telepsychiatry, such as increased accessibility to patients, flexibility in practice, and the ability to reach underserved populations.</p>	
7.	IoT for mental healthcare.	<p>Can start with an icebreaker – like a discussion on how the IoT devices, like smart fridges affect our lives, and including some examples on IoT devices for health, and how these may possible be useful for mental health – in order to make the trainees curious about what they are going to learn.</p> <p>To start, the trainer can also use a video to introduce some ideas about what people know about IoT and ask them to complete a short quiz or a brainstorming for face-to-face courses or blended courses.</p>	
8.	Big data for mental healthcare.	<p>Can start with an icebreaker – like a discussion on how the Big Data has changed our lives, and including some examples of Big Data on the health sector, and how these may possible be useful for mental health – in order to make the trainees curious about what they are going to learn.</p>	

		To start, the trainer can also use a video to introduce some ideas about what people know about Big Data and ask them to complete a short quiz or a brainstorming for face-to-face courses or blended courses.	
9.	Artificial intelligence for mental healthcare. Inference Models, Clustering/Classification, Pattern Recognition, Prediction	<p>Can start with an icebreaker – like a discussion on how the Artificial Intelligence is changing our lives, and including some examples of AI in the health sector, and how these may possible be useful for mental health – in order to make the trainees curious about what they are going to learn.</p> <p>To start, the trainer can also use a video to introduce some ideas about what people know about AI and ask them to complete a short quiz or a brainstorming for face-to-face courses or blended courses.</p>	
10.	Mixed reality (AR/VR) for mental healthcare. Milgram’s continuum AR, VR, Multimodal interfaces	<p>Can start with an icebreaker – like a discussion on how the healthcare changed in the last decades, how this technology could be useful in the health sector – in order to make the trainees curious about what they are going to learn.</p> <p>To start, the trainer can also use a video to introduce some ideas about what people know about Mixed Reality and ask them to complete a short quiz or a brainstorming for face-to-face courses or blended courses.</p>	

d. Training materials:

Presentations of the 12 videos of five minutes each, which reflect the topics of this module and end with a formative assessment (a question for each video), assigned on [EUCARE e-learning platform](#).

- *Some of the videos will be followed by supplementary resources which are meant to clarify the topics from the video courses and can be used after each video or can be used at the end of the module as a recap.*

e. Supplementary formative assessment – a case study elaborated by the trainees

The participants should receive clear instructions to elaborate on the case study by themselves, which should contribute to the improvement of their daily work in health care. They can submit the study case in electronic form or on paper (for blended or face-to-face courses).

f. Forum discussions on related subjects.

The forum discussions are meant to facilitate sharing of the learning experiences of the trainees and would also take place on the platform.

But also, the topics for the forum can be to reflect on materials for study or for the extra work (videos the trainees are watching or articles they read).

Module number	The name of the module	Examples of topics for the forum discussions for each module	Observations
1.	Introduction to Industry 4.0	The trainees can discuss the practical aspects related to Industry 4.0 implementation in their work: the benefits for staff, patients and families; the difficulties; the need for training on the innovative technologies of Industry 4.0	There can be topics related to the videos' content in order to have clearer ideas and for better learning but also for sharing good practices.
2.	Introduction to Health 4.0	The trainees can discuss the practical aspects related to Health 4.0 implementation in their work: the benefits for staff, patients and families; the difficulties; the need for training.	
3.	Application of Health 4.0 to the mental health sector;	Reflection on robotics and its utility in fostering interaction, communication, and learning among children with mental disabilities.	

4.	Introduction to mHealth and eHealth	The trainees can discuss the practical aspects of using eHealth and mHealth in their work and what the benefits would be for the patients and also for them as the medical staff.
5.	Mental health apps	The trainees can discuss the practical aspects related to the use mental health apps: the benefits for patients and families; the difficulties related to selection of a suitable app; examples of good mental health apps.
6.	Telepsychiatry	Trainees can address topics on using computer networking and its significance in monitoring individuals with mental disorders or mental disabilities in their work or in general.
7.	IoT for mental healthcare.	The trainees can discuss the practical aspects related to the use of IoT devices: the benefits for patients and families; the difficulties related to the selection of a suitable IoT device; examples of the benefits of IoT devices.
8.	Big data for mental healthcare.	The trainees can discuss the practical aspects related to the use of Big Data in the healthcare sector: the benefits for patients and families; the difficulties related to the selection of suitable Big Data applications; examples of the benefits of Big Data.
9.	Artificial intelligence for mental healthcare. Inference Models, Clustering/Classification, Pattern Recognition, Prediction	The trainees can discuss the practical aspects related to the use of Artificial Intelligence in the healthcare sector: the benefits for patients and families; the difficulties related to the selection of suitable AI applications; examples of the benefits of AI.
10.	Mixed reality (AR/VR) for mental healthcare.	The trainees can discuss the practical aspects related to the use

	Milgram's continuum AR, VR, Multimodal interfaces	of mixed realities: the benefits for patients, clinicians, and families; the difficulties related to implementation; examples of devices by technology.	
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g. Summative assessment - final evaluation - see 5.1.7

The summative assessment would be an online form with 60 questions with multiple responses from all twelve video courses in the module.

The trainer can add any other assessment work appropriate to the content of the module.

Methods suggestions for delivering the content of the course:

- Start with a problem adjusted to your topic to awaken the curiosity and motivation of the participants (similar to an **icebreaker for on-site learning**).
- Online course methods might include displaying visual content with the **lecture's voiceover** but also videos and **reading material** to complete the coursework. Videos are always accessible and can be followed by the trainees whenever they want; they are affordable to produce; allows trainers to explain complex subjects using graphics, motion, and voiceovers; and they also offer dynamic delivery of the training materials. What is also important is that the content of a video training course can be easily modified to its specific needs.
- Use person-centered learning methods based on a participatory mode (active online courses) and links to concrete examples of the technologies in the medical field (can be **videos, tutorials, articles**, etc.).
- Use teamwork (**games, tasks** that can involve more online participants in exercises like Kahoot, Quizziz, etc.).
- You need to be sure you offer **equal access to the learning process for all the participants**, adjusting the learning methods if the case.
- The trainer will use the case study already done in the video but also can construct new ones according to the trainee's expectations and needs (which are identified at the beginning).

4.7. Recap. Conclusions and future trends

- Collect the **gains of the trainees: self-perception** of the learners on their learnings, what they can **apply in their work** with people who seek medical help.
- **For example**, if the training takes place online, there can be online forms where the participants can answer some questions, like:
 - What is the most valuable thing you've learned during the training?
 - What would you use on your first day at work from what you have learned?
 - What are the things you can count on in trying to implement the use of eHealth and mHealth in your workplace?

- What are the things you expect to create difficulties in accepting the implementation of eHealth and mHealth in your workplace?
 - For blended or face-to-face training, you can also use a paper form to collect the gains.

4.8. Exams and quality control

- At the end of the module, the trainee must answer the same survey as at the beginning of the module (5 minutes for the post-test form).
- The formative assessment of the module consists of 1(one) question for each video, which needs to be answered by the participants during the course. The participants also receive the indication to elaborate on a case study by themselves, **as a supplementary formative assessment**.
- The summative assessment of the module consists of a 60 questions final quiz, which must be adjusted to the learning objectives (see Eucare Course Curriculum on the project site for details).
- The formal condition for participants to receive the certificate of achievement is the necessity to have a minimum **75% of good answers on the summative assessment**. The Certificate of achievement will be automatically generated from the e-learning spaces in English for each module.
- For all the quizzes can be used online forms on EUcare4.0 e-learning platform.

4.9. Recommendations

Here, the trainer can be more specific on some aspects of the module that can facilitate the information delivery and the effectiveness of the methods used to have the maximum impact on people working with psychiatric diagnoses.

Module number	The name of the module	Recommendations for the trainers for each module	Observations
1.	Introduction to Industry 4.0	<p>The trainer must adapt to their audience. For a less technical audience, they should focus on the practical application aspect. However, for a more technical audience, they can delve deeper into technical details, especially regarding the IoT, Bid Data and Artificial Intelligence parts.</p> <p>In training sessions or presentations, it is essential for the trainer to be flexible and cater to the specific needs and knowledge levels of the audience.</p>	For those who may not have a strong technical background, the trainer should emphasize the practical and real-world applications of the subject matter.



2.	Introduction to Health 4.0	<p>The trainers must be aware of the group target when choosing the exercises and the additional materials for the trainees; for the 2nd module, the target group involves senior managers, which asks for additional resources and topics of the forums related to stakeholders and their roles, Strengths, Weaknesses, Opportunities, and Threats of Health 4.0 and relevant case studies.</p> <p>The trainer should explain how a SWOT analysis can be useful for the trainees to assess Health 4.0, especially how it can help them understand the potential of Health 4.0 technologies for improving their work.</p>	<p>Demonstrating that Health 4.0 has the ability to revolutionize mental health care by enhancing its personalization, accessibility, and effectiveness, thereby playing a crucial role in tackling the increasing global mental health crisis, can contribute to a greater interest for using 4.0. Industry facilities for the stakeholders but also for the people who work in the medical field, by making their work easier.</p>
3.	Application of Health 4.0 to the mental health sector;	<p>The trainer must adapt to their audience. For a less technical audience, they should focus on the practical application aspect. However, for a more technical audience, they can delve deeper into technical details, especially regarding the robotics part.</p> <p>In training sessions or presentations, it is essential for the trainer to be flexible and cater to the specific needs and knowledge levels of the audience.</p>	<p>For those who may not have a strong technical background, the trainer should emphasize the practical and real-world applications of the subject matter.</p>
4.	Introduction to mHealth and eHealth	<p>The trainers must be aware of the group target when choosing the exercises and the additional materials for the trainees; for the 4th module, the target group involves mostly, mid-managers and senior managers, which also asks for additional resources and topics of the forums related to stakeholders and all that involves taking the decisions like costs, benefits or disadvantages of using 4.0. Industry in Healthcare, in terms of pros and cons, to make them understand the need to invest in the training of the medical staff and also to be aware of the barriers they can encounter in trying to implement the use of 4.0 Industry gains in their daily work.</p>	<p>Describing what eHealth and mHealth mean for the people, community, work community or family community, and society can help trainees to understand better the utility of eHealth and mHealth in their daily work and the importance of their personal involvement in developing a more person-centred approach to the patient considering the both-way benefits of the 4.0 Industry impact on the patient's wellness but also on making the work of the medical staff easier through</p>



			access to information and a more and more developed technology.
5.	Mental health apps	<p>The trainers must be aware of the group target when choosing the exercises and the additional materials for the trainees; for the 5th module, the target group involves mostly mid-managers, which also asks for additional resources and topics of the forums related to the basic concepts of MHA, their benefits and limitations, the categories and relevant case studies.</p> <p>It is, also important for the trainers to focus on how to provide the information to help the trainees to better understand what mental health apps are, their basic concepts, benefits and limitations, the MHA (Mental Health Apps) categories, what are the best methods for selecting a suitable MHA, etc.</p> <p>The trainer should explain how a MHA can help various stakeholders, from patients and families to healthcare providers.</p>	<p>The learning is further enhanced by the presentation of some of the most relevant mental health apps currently available on the market, in addition to 2 relevant case studies on using these apps. And also, the trainees must have in mind the large number of videos and online resources in order to open the pathway for the trainees to look for and to use these apps in their daily work in mental health care.</p>
6.	Telepsychiatry	<p>Telepsychiatry is focused on assisting healthcare professionals in comprehending the invaluable advantages of utilizing computer networks for patient care and follow-up.</p> <p>The trainer must adapt to their audience and to be flexible and cater to the specific needs and knowledge levels of the audience: for a more technical audience, they can delve deeper into technical details, especially regarding the Computer Network part and for those who may not have a strong technical background, the trainer should emphasize the practical and real-world applications of the subject matter. Healthcare professionals will learn how to effectively conduct remote consultations, assessments, and ongoing support for patients, utilizing internet-based technologies and video conferencing software.</p>	<p>There is also important to underly the potential benefits of telepsychiatry, such as overcoming geographical barriers, improving access to mental health services, and increasing the reach of care to underserved populations.</p> <p>The comprehensive information in various network techniques and computer security protocols the participants will receive is focused on computer security and is of utmost importance, given that telepsychiatry involves the exchange of sensitive medical data and deals with</p>



			particularly vulnerable individuals, such as those with mental health conditions.
7.	IoT for mental healthcare.	<p>The trainers must be aware of the group target when choosing the exercises and the additional materials for the trainees; for the 7th module, the target group involves mostly trainers, teachers, and mentors in health care, which asks for additional resources and topics of the forums related to the basic concepts of IoT devices, their benefits and limitations, the categories and relevant case studies.</p> <p>The trainer must provide a comprehensive overview of IoT, starting with a clear definition of the basic concepts and highlighting the main components of an IoT system and distinguishes between the two primary types of computing used in IoT systems. The trainer should explain how an IoT device can help various stakeholders, from patients and families to healthcare providers in the mental healthcare sector.</p>	<p>Specifically, it delves into the applications of IoT in the healthcare sector and the benefits of IoT in healthcare and explains further the potential IoT applications in mental healthcare.</p> <p>The benefits of IoT, with some examples of IoT applications are provided to showcase its potential.</p> <p>Three relevant use cases of IoT in mental healthcare must be explained at this module.</p>
8.	Big data for mental healthcare.	<p>The trainers must be aware of the group target when choosing the exercises and the additional materials for the trainees; for the 8th module, the target group involves mostly trainers, teachers, and mentors in health care, which asks for additional resources, and topics of the forums related to the basic concepts of IoT devices, their benefits and limitations, the categories and relevant case studies.</p> <p>The trainer must emphasize fundamental concepts such as the Vs of Big Data, the main steps involved in a Big Data process, the significant benefits associated with it and to highlight various examples of Big Data applications, specifically focused on the healthcare sector.</p> <p>The trainer should explain how an IoT device can help various stakeholders, from</p>	<p>It is important to emphasize on the benefits of Big Data in the healthcare sector especially in mental healthcare and the numerous potential applications of Big Data in this field.</p> <p>There is also an invitation for the trainees in exploration of two use cases of Big Data in mental healthcare, for a better understanding of the process.</p>



		patients and families to healthcare providers in the mental healthcare sector.	
9.	Artificial intelligence for mental healthcare. Inference Models, Clustering/Classification, Pattern Recognition, Prediction	The trainers must be aware of the group target when choosing the exercises and the additional materials for the trainees; for the 9th module, the target group involves mostly trainers, teachers, and mentors in health care, which asks for additional resources, and topics of the forums related to the basic concepts of Artificial Intelligence technologies, their benefits and limitations, the categories and relevant case studies.	The trainer should explain how AI technologies can help various stakeholders, from patients, clinicians, and families to healthcare agents.
10.	Mixed reality (AR/VR) for mental healthcare. Milgram's continuum AR, VR, and Multimodal interfaces	<p>The trainers must be aware of the group target when choosing the exercises and the additional materials for the trainees; for the 10th module, the target group involves mostly trainers, teachers, and mentors in health care, which asks for additional resources, and topics of the forums related to the basic concepts of Mixed Reality technologies, their benefits and limitations, the categories and relevant case studies.</p> <p>The trainer should focus on what technology are involved in, their basic concepts, benefits and limitations, the MR devices, what are the best approaches for selecting a suitable device, etc.</p> <p>The trainer should explain how Mixed Reality technologies can help various stakeholders, from patients, clinicians, and families to healthcare agents.</p>	It is important to focus on the presentation of some of the most relevant devices currently available on the market, in addition to relevant case studies on using these technologies.

Conclusions

This guideline was conceived, based on the curriculum of the course and based on the target groups involved in each module, to help trainers deliver the best content to the trainees, considering the significant impact of 4.0. Industry in health care and specially in psychiatric care.

It is important to remember that the examples and the case studies given in this training but also constructed by the trainees are very relevant because, in this way, the information and the tasks accomplished by the participants will help them to link the theory with their professional experience and put it into the practice.

Considering the complexity and the amount of information of Health 4.0 in mental health, this guideline provides some general direction in the information delivery for the trainers, adjusted to the level of competencies of the trainees and to their cultural background.

Starting from this, the guideline recommends a step-by-step approach, integrating the theory with practical aspects like finding ways to apply ideas at the workplace and understanding the use of 4.0. Industry technology in health care, from prevention to cure, in order to improve the health professionals' work but also the life of the people in society who need their assistance.

Moreover, the training emphasizes the significance of safeguarding patient privacy and maintaining the confidentiality of medical information while using 4.0 technology in providing care, which is of great importance from the patients' rights point of view, considering the standards and ethical guidelines a base for any health care intervention. The trainer must emphasize that the use of 4.0 technology aims to empower mental health professionals with the expertise to integrate IT solutions seamlessly into their practices, leading to improved patient outcomes and a more efficient and accessible mental healthcare system.

Being built following consultations with numerous professionals working in the mental health sector, including special educators, specialized teachers, speech therapists, psychomotor therapists, occupational therapists, psychologists, child psychiatrists but also in IT technologies from four European countries, the course gives the trainers who wants to access the materials the freedom to organize the content according to their needs. The content of some modules provides condensed representation of these professionals' requests. A valuable idea a trainer must have in mind is that each time, the demand is the same: there's a need for simple and readily available solutions to help young people, and young adults progress, but also elderly people who need mental health care assistance, to enhance essential and important functions such as communication, social interaction to maintain a higher level of independency. Advancement in these areas leads to increased autonomy for the individual and ensures their integration into society. The positive outcome is a reduction in healthcare expenses for the state and a decrease in the mental burden for parents.

All the materials have been made within the EuCare 4.0 project, financed through Erasmus + and can be consulted and free downloaded from the e-learning [platform](#) and from the project [website](#).

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