SAFETY

simulation for medical practice

SIMULATION APPROACH FOR EDUCATION AND TRAINING IN EMERGENCY

ACTION PLAN

for the e-learning course

V2

24 October 2023

SAFETY Work Package 4 – T 4.3

Lead partner: EICD, with all partners support

Co-funded by the Erasmus+ Programme of the European Union

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Introduction
In the second year of the project, the SAFETY team, both academic and industry partners, have added significant deliverables to the project. There are now 10 theoretical modules and 25 practical modules which have been peer-reviewed and sent for external evaluation to accomplished experts from the academic field and from the industry, as per the project assumed objectives.

General objectives
This action plan will consist of a detailed strategy and outline, with methodologies and procedures, for preparing and recording the videos which will comprise most of the final e-learning module, together with the virtual patient cases linked to each appropriate module. The first variant of the e-learning course will be addressed to an external group, for evaluation and testing. The tools for external evaluation will be described in this document, as well as a procedure to incorporate the recommended improvements. Each university partner will assign a responsible person for WP4, in order to assure good communication and fast decision making, as well as a seamless adaptation to potential unforeseen barriers in implementation. The technical implementation of the courses into an on-line platform, as well as technical support regarding the development of the recordings will be provided by InfoTech. Virtual patients to be integrated into the Moodle platform will be provided by TTW. All other non-university partners will support the development of the course.

Theoretical modules

There are now 10 theoretical modules which have been peer reviewed internally and externally and adapted to adequately fulfil the projected educational needs.
The theoretical modules and the university partners responsible are:
• UNIFG:
  ○ Thermal and Toxicological Emergencies
  ○ Aspects of CRM, Teamwork, Leadership, Communication
• HUBc
  ○ Traumatic Emergencies (Polytrauma, Traumatic Brain Injury, Thoracic Trauma, Abdominal Trauma, Musculoskeletal Trauma)
  ○ Shock (Hypovolemic shock, Distributive shock, Cardiogenic shock, Obstructive shock)
• EICD
  ○ Cardiovascular Emergencies (ACS, Hypo-/Hypertension, Arrhythmia)
  ○ Pulmonary Emergencies (Pulmonary Embolism, Pulmonary edema, COPD/Asthma)
• LMU
  ○ Neurological and Psychiatric Emergencies (Stroke, Epilepsy, ICP)
  ○ Infant emergencies and Obstetrics
• UiS
  ○ Systematic Approach to Emergency (xABCDE, SAMPLER, BLS/ALS Algorhythm, ISBAR Model)
  ○ Aspects of Simulation Training

Each university partner is mandated to prepare at least **2 hours of video recording** for the theoretical modules. As a general rule, given that each partner has prepared **2 sub-modules**, each sub-module should be divided into **at least 3 parts.** Each sub-division of the theoretical modules will be transcribed as a **PowerPoint** (or equivalent) presentation. The number and style of the slides will be at the discretion of each partner. However, each presentation will undergo an **internal peer-reviewing process**, in order to

maximise the output of the e-learning course and minimize correctable mistakes. The internal peer-reviewing will be done in the same pairs as the reviewing of the documents for WP 3.
Given that there is some variability as to the areas to be covered by each university partner, they will, however, have the option to further divide each section as they see fit and record as many videos as they need to cover the material agreed after the external reviewing of WP3. The final form of the cumulated video materials produced by each partner will be of **minimum 120 minutes, and of maximum 150 minutes.**

For a uniform look of the courses, a guideline for preparing the presentations will be provided in the following.

Recommendations for the PPT preparation:

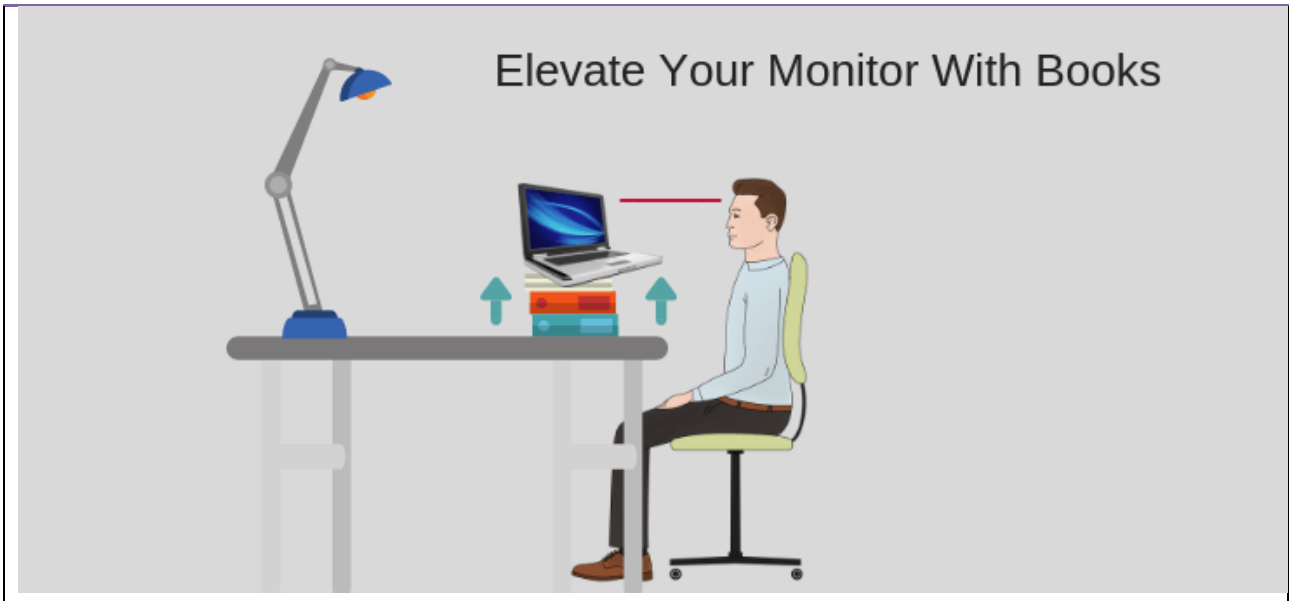
- Page orientation to **landscape**
- **16:9 as presentation format**
- **Minimum resolution of 1280 x 780**
- All presentations will use the European Commission logo and disclaimer (available in Google drive, in the SAFETY official folder) on the first slide
- A suggestion for how the first slide should look is available below
- All presentations will use the SAFETY logo and visual aids (available in Google drive, in the SAFETY official folder) on each slide
- Presenters should use the **"Sections" tool in PPT** in order to divide each presentation into **chapters**; the chapters will further serve as points where to mark the recordings, so as to facilitate the use of the materials to students of different backgrounds and level of knowledge

Recommendations for recording the presentations for the theoretical modules

Preparing for the recording

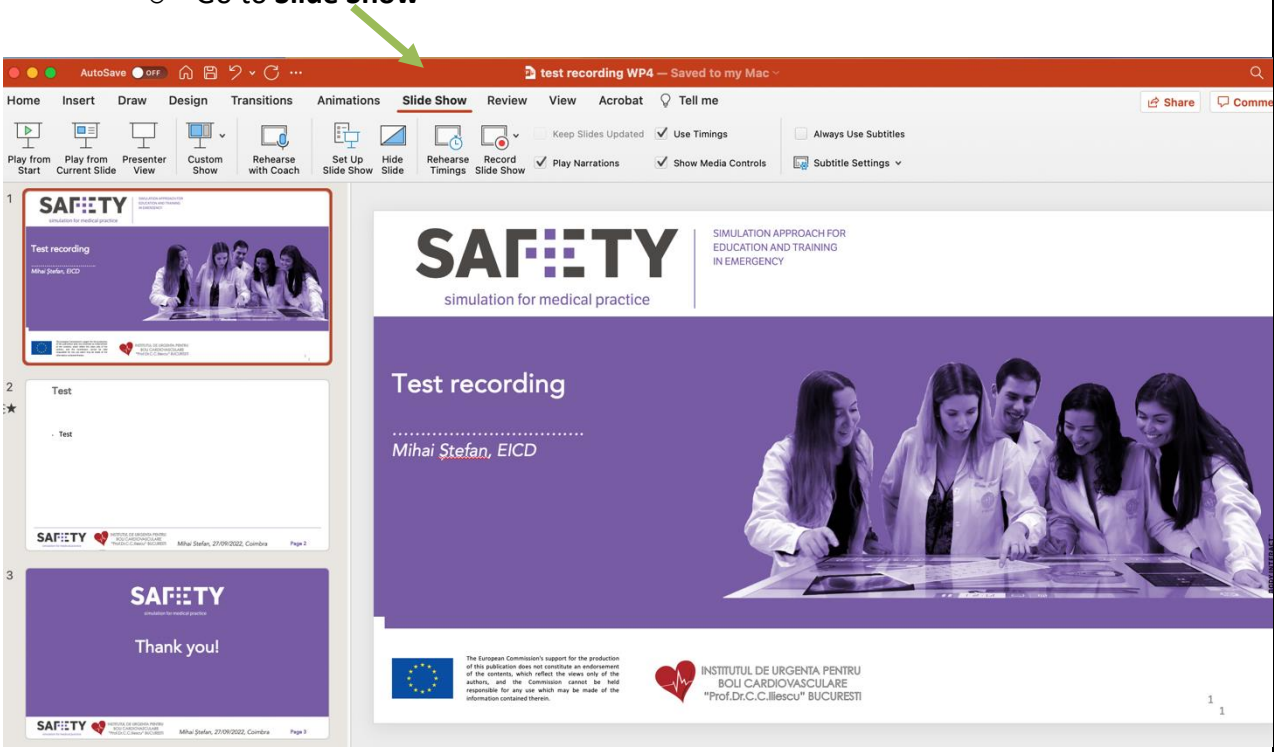
- Adjust your camera
- Make sure there is good lighting, and your face is visible
- Put your lens at eye level or slightly higher as it will mimic the in-person feeling of eye contact.

  Use a laptop stand or a stack of books to prop up your recording device.
- Make sure your microphone is working and is recording clearly
- If necessary, use external headphones and microphone for a good quality of the recording
- Try to work in a quiet environment, without external noise and without interruptions



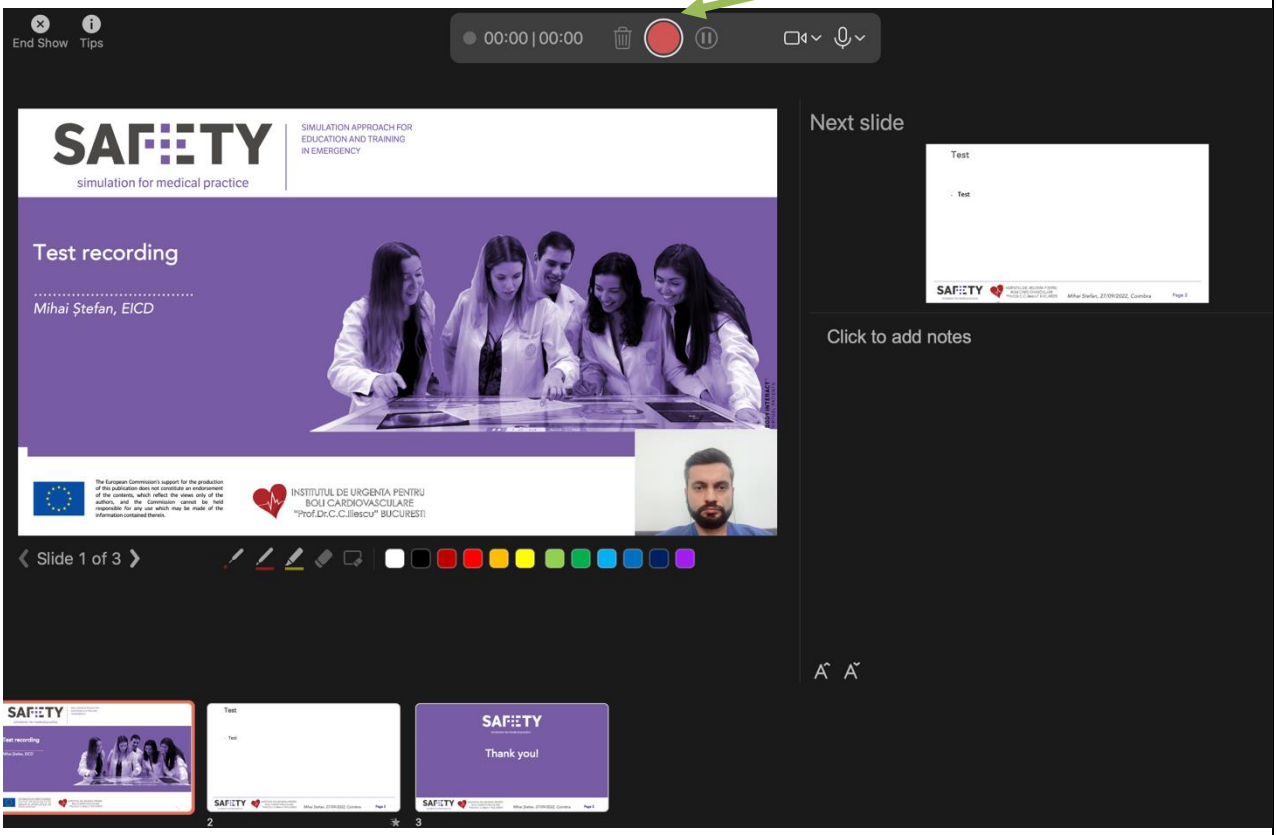
Recording the presentation:

- The format of the recordings should be “voice-over-slides”
- For this, PPT or equivalent software can be used
- To this end, the presenter should take the following steps:
  - Open the presentation
  - Go to **Slide Show**

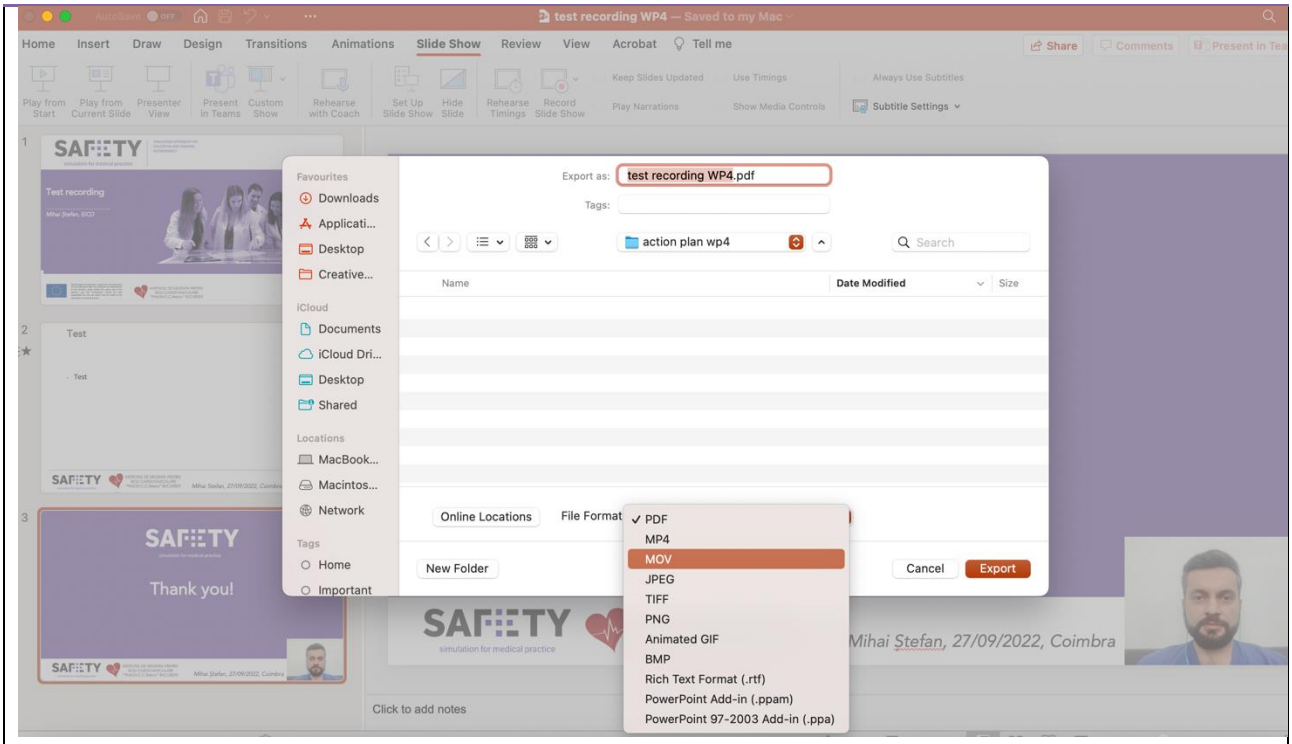


  - Press **Record Slide Show**

- This will open a presenter view, with the slides as a main window and the presenter window in the corner of the image
- When the presenter is ready to start, he/she must press the **Record** button



- A countdown will begin and then the recording is turned on
- When the presentation is over, the **Record** button must be pressed again
- The recording should then be saved and exported in a video format (MP4 or MOV)



A model MP4 short recording will be available as an appendix to this document.

All videos will be uploaded to the SAFETY YouTube channel and linked to the Moodle SAFETY platform, in dedicated sections corresponding to each course.

All partners will prepare the theoretical presentation in a manner to best suit the content they have been assigned. The consortium partners have enormous experience in theoretical courses, both off- and on-line, and will adapt each presentation to fit the educational objective of the course. As such, they can insert links to external videos (for example other YouTube material), mini-quizzes, small assignments for the learners, as they see proper.

For each presentation, after being uploaded to the platform and the YouTube channel, InfoTech will add automatic subtitles, in English, so as to avoid difficulties in understanding various accents of non-native English-speaking learners.

Multiple choice questions (MCQs) for student evaluation

As a part of the e-Learning course, the candidates will have to undergo evaluation.

It is proposed that this should happen at the end of each theoretical module, via a pop-up quiz, as well as after finalizing the SAFETY course.

All university partners should design 5 MCQs for each recorded video. Of these, 3 MCQs will appear in the Moodle platform after finishing the viewing of each course, as an auto-evaluation tool.

At the end, this should lead to a database of at least 150 MCQs.

After the full course is completed, each learner will have to undergo a test-quiz comprised of 30 randomly selected MCQs (automatically selected by the platform).

Recommendations for designing the MCQs and evaluating candidates:

- Each question should have 5 answers
- All answers can be either true or false
- This leads to a total of 150 points which will be the maximum score of the candidate
- In order to graduate the course and receive the diploma, each candidate should cumulatively meet 2 conditions
    - score a minimum of 105 points at the final evaluation test (70% of 150)
    - go through all theoretical modules, recorded practical simulation scenarios and virtual patients

For uniformity, all partners should design the MCQs according to this model:

The academic partners working together for the SAFETY e-learning course are:

A. *UNIFG*
B. *HUBc*
C. *EICD*
D. *LMU*
E. *UiS*

Practical modules
According to the project description, T 4.2, in connection with T 4.4 and T4.5 will consist of building the e-learning modules, of which an integral output are the practical modules. These practical modules, as already discussed in previous SAFETY consortium meetings, will consist of actual clinical scenarios, which will be enacted in full in the simulation centres of the academic partners participating in the project. As a result of the work performed by all partners under the coordination of LMU as leader of WP3, the SAFETY consortium has produced 25 clinical simulation scenarios, as follows: UNIFG • Respiratory failure and Airway Management • Abdominal Trauma • Psychosis • Toxicological emergencies • Multimorbidity and Palliative Care HUBc • Bradyarrythmia • Polytrauma • Epilepsy • Cardiogenic shock • Emergencies in pregnancy EICD • Tachyarrhythmia • Hypertension/ Hypertensive crisis • Musculoskeletal Trauma • Hypovolemic shock, e.g. Hemorrhagic shock • Distributive shock - Sepsis, Anaphylaxis LMU

- Traumatic brain injury
- Intracranial Hemorrhage
- Childbirth
- Infant Dyspnea
- Thermal injury -

UiS

- ACS
- Stroke
- Hypoglycemia
- Obstructive shock, e.g. Tension pneumothorax
- Resuscitation / CPR

All academic partners are tasked to pilot the courses with **at least 40 learners, for a total of 200 learners across the partners.** Learners are defined as:

- Medical students
- Residents
- Healthcare professionals
- Physicians who want to learn and revive emergency medical skills

Trainers will get the signature of the "consent form" from each student attending the course.
EICD will develop and deliver a standardized consent form to be signed in all centres.
The classes will follow the approved scripts.
The whole **performance (with simulation device and subsequent debriefing)** practical simulations will be recorded so that this second e-learning module will consist of a movie featuring the enacted scripts by students.

In order to have uniform development of the practical e-learning modules, we suggest the following approach:

- Each simulation will be recorded with a minimum of **8 learners**, to fulfil the minimum total of 200 learners across the consortium

- Depending on the scenario, each centre will have the freedom to choose how the learners are divided, but they can be used as:
    - Participants to the scenario
    - Actors required for the enactment
    - Audience members
- As for some scenarios it can be difficult to involve 8 learners and accomplish set educational goals, the partners have suggested to divide the group in smaller teams and repeat the simulation as needed; afterwards, the partner will choose the recording that is best for including in the on-line platform
- All learners should take part in the debriefing
- Each scenario should result in a video of 20-25 minutes, with the following structure
    - Briefing – it should be clear from the briefing who are the participants to the scenario (learners), who are the actors, and who are the educators – 3-5 mins
    - Play-out of the scenario – 5-10 mins
    - Debriefing – 15 mins

Technical environment

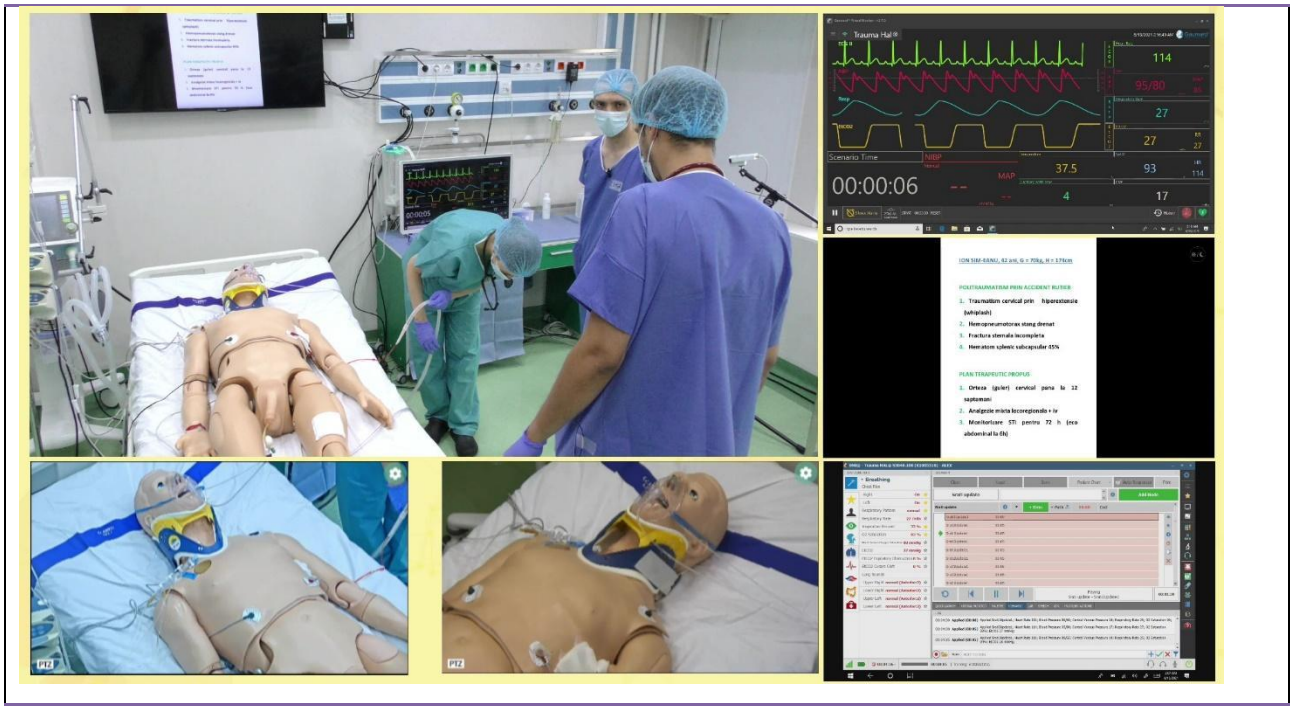
The scenarios will be recorded using the internal video recording software available to each centre.

At this time, UNIFG, LMU and EICD are using SimStation for real-time audio-video recording during simulation sessions.

Given that HUBc and UiS do not have an in-house solution for recording the scenarios, it has been discussed in previous partner meetings that Laerdal will support this by providing SimCapture.

Video editing will be done in-house by each partner and the recorded scenarios will be delivered to InfoTech for upload on the YouTube channel and inclusion in the Moodle platform in the assigned module.

Preferably, the partners will use split screen recordings when appropriate, for a better didactic effect for the final learners, which will use the platform exclusively online.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Integrating blocks of theoretical and practical modules with virtual simulated patients to achieve Blended Learning Objective
At the end of WP4 implementation, the partners will have produced at least 600 minutes of recorded sessions on theoretical modules and an estimated of 400-600 minutes of recorded practical modules. All the recorded material will be available to learners on the Moodle platform, available via a link from the SAFETY official website, to registered learners, who will only access it with a username and password. The platform will be organized into 10 modules, which will have a theoretical section (course), a recorded simulation scenario section and a virtual patient section. The only exception to this will be courses 1 and 2, which will deliver theoretical courses on medical simulation and CRM, Teamwork, Leadership and Communication. Each theoretical course will be sub-divided into lessons. For every lesson, there will be one 20 minutes recording (previously established). The titles of the lessons will be established by the partners after dividing and recording the theoretical material, and the action plan will be updated accordingly. The modules will be: **Module 1: An introduction to medical simulation** – Aspects of simulation training (UiS – Peter Dieckmann) **Course 1.1** Lesson 1.1.1 - Setting the scene. Lesson 1.1.2 - A practical example. Lesson 1.1.3 – Reflection. **Module 2: Cardiovascular Emergencies** **Course 2.1** – Theoretical section Lesson 2.1.1 – Acute coronary syndromes (Mihai Ștefan, Alexandru Dascălu – EICD) Lesson 2.1.2 – Hypertension (Mihai Ștefan – EICD) Lesson 2.1.3 – A systematic approach to hypotension (Cornelia Predoi - EICD)

Lesson 2.1.4 – Arrhythmias (Cornelia Predoi - EICD)

Course 2.2 – Practical scenarios

Lesson 2.2.1 – Acute coronary syndromes (Facilitator – Une Stømer – Uis)

Lesson 2.2.2 – Tachyarrhythmias (Facilitators – Mihai Ștefan, Cosmin Bălan – EICD)

Lesson 2.2.3 – Bradyarrhythmias (Facilitators – Cristina Ibáñez, Juan Perdomo – HUBC)

Lesson 2.2.4 – Hypertensive crisis (Facilitators – Mihai Ștefan, Cornelia Predoi – EICD)

Course 2.3 – Virtual patient

To be selected

Module 3: Shock

Course 3.1 – Theoretical lecture – Pathophysiology, diagnosis, and management of shock (Cristina Ibáñez, Juan Perdomo - HUBC)

Course 3.2 – Practical scenarios

Lesson 3.2.1 - Hypovolemic shock – (Facilitators – Cosmin Bălan, Mihai Ștefan - EICD)

Lesson 3.2.2 – Anaphylactic shock – (Facilitators – Liana Văleanu, Cosmin Bălan - EICD)

Lesson 3.2.3 - Cardiogenic shock – (Facilitators – Cristina Ibáñez, Juan Perdomo, Beatriz Tena, Lidia Gómez - HUBC)

Lesson 3.2.4 - Obstructive shock – (Facilitator – Camilla Normand - UiS)

Lesson 3.2.5 – Septic shock in a child (The SABES team)

Course 3.3 – Virtual patient

Module 4: Pulmonary Emergencies

Course 4.1 – Theoretical lectures

Lesson 4.1.1 – Pulmonary oedema (Cosmin Bălan – EICD)

Lesson 4.1.2 – COPD/ Asthma (Cornel Robu – EICD)

Lesson 4.1.3 – Pulmonary embolism (Liana Văleanu – EICD)

Course 4.2 – Practical scenarios

Lesson 4.2.1 - Respiratory failure and Airway Management (Facilitator, UniFg)

Lesson 4.2.2 – Respiratory insufficiency in a child (The SABES team)

Course 4.3 – Virtual patient

Module 5: Traumatic Emergencies

Course 5.1 – Theoretical lecture

Simulation for traumatic emergencies (Cristina Ibáñez, Juan Perdomo, Beatriz Tena, Lidia Gómez – HUBC)

Lesson 5.1.1 – Polytrauma, Part 1

Lesson 5.1.2 – Polytrauma, Part 2

Lesson 5.1.3 – Polytrauma, Part 3

Course 5.2 – Practical scenarios

Lesson 5.2.1 – Polytrauma (Facilitators - Cristina Ibáñez, Juan Perdomo, Beatriz Tena, Lidia Gómez - HUBC)

Lesson 5.2.2 - Traumatic brain injury (Facilitator – Marc Lazarovici, LMU)

Lesson 5.2.3 - Abdominal Trauma (Facilitators – UniFg)

Lesson 5.2.4 - Musculoskeletal Trauma (Facilitators – Thomas Bărbulescu, Andrei Dumitrache - EICD)

Course 5.3 – Virtual patient

Module 6: Neurological and Psychiatric Emergencies

Course 6.1 – Theoretical lectures

Lesson 6.1.1 – Neurological emergencies (Christopher Helmbrecht, LMU)

Lesson 6.1.2 – Psychiatric emergencies (Christopher Helmbrecht, LMU

Course 6.2 – Practical scenarios

Lesson 6.2.1 – Stroke (Facilitator – Une Stømer – Uis)

Lesson 6.2.2 – Intracranial haemorrhage (Facilitator – Marc Lazarovici - LMU)

Lesson 6.2.3 – Epilepsy (Facilitators - Cristina Ibáñez, Juan Perdomo, Beatriz Tena, Lidia Gómez - HUBC)

Lesson 6.2.4 – Psychosis (Facilitators – Lucia Mirabella, Lucia Di Staso – UniFg)

Course 6.3 – Virtual patient

Module 7: Thermal and Toxicological Emergencies

Course 7.1 - Theoretical lecture – Thermal and toxicological emergencies (Lucia Mirabella – UniFg)

Course 7.2 – Practical scenarios

Lesson 7.2.1 – Thermal injury (Facilitator – Marc Lazarovici, Christopher Helmbrecht, Philipp Fischer, LMU)

Lesson 7.2.2 – Toxicological emergencies (UNIFG)

Course 7.3 – Virtual patient

Module 8: Infant emergencies and Obstetrics

Course 8.1 – Theoretical lectures

Lesson 8.1.1 – Paediatric emergencies after birth (Christopher Helmbrecht, LMU)

Lesson 8.1.2 – Paediatric respiratory emergencies (Christopher Helmbrecht, LMU)

Lesson 8.1.3 – Paediatric accidents and injuries (Christopher Helmbrecht, LMU)

Course 8.2 – Practical scenarios

Lesson 8.2.1 – Childbirth (Facilitators – Marc Lazarovici, Cristopher Helmbrecht, Philipp Fischer - LMU)

Lesson 8.2.2 - Infant Dyspnoea (Facilitators – Marc Lazarovici, Philipp Fischer - LMU)

Lesson 8.2.3 - Emergencies in pregnancy (Facilitators - Cristina Ibáñez, Juan Perdomo, Beatriz Tena, Lidia Gómez - HUBC)

Lesson 8.2.4 – Stabilization of a preterm newborn (Facilitators – SABES team)

Lesson 8.2.5 -

Course 8.3 – Virtual patient

Module 9: Systematic Approach to Emergency (xABCDE, SAMPLER, BLS/ALS Algorithm, ISBAR Model)

Course 9.1 – Theoretical lectures

Lesson 9.1.1 - ISBAR (Camilla Normand, UiS)

Lesson 9.1.2 - XABCDE and SAMPLER (Camilla Normand, UiS)

Lesson 9.1.3 - Cardiovascular Resuscitation (Camilla Normand, UiS)

Course 9.2 – Practical scenarios

Lesson 9.2.1 - Resuscitation / CPR (Facilitator - Une Stømer – UiS)

Lesson 9.2.2 – Hypoglicemia (Une Stømer – UiS)

Lesson 9.2.3 - Multimorbidity and Palliative Care

Lesson 9.2.4 – Newborn resuscitation (The SABES team)

Lesson 9.2.5 – Ventricular tachycardia in a child (The SABES team)

Course 9.3 – Virtual patient

Module 10: Aspects of CRM, Teamwork, Leadership, Communication

Course 10.1 – Crisis resource management (Lucia Mirabella - UniFg)

Course 10.2 – Practical scenarios

Lesson 10.2.1 – Epilepsy (missing doctor - Facilitators - Cristina Ibáñez, Juan Perdomo, Beatriz Tena, Lidia Gómez - HUBC)

Lesson 10.2.2 – Infant dyspnoea (missing team leader – Facilitators – Marc Lazarovici, Philipp Fischer)

Lesson 10.2.3 – Toxicology case (missing doctor – UNIFG)

Lesson 10.2.4 – Epilepsy (missing nurse - Facilitators - Cristina Ibáñez, Juan Perdomo, Beatriz Tena, Lidia Gómez - HUBC)

Lesson 10.2.5 – Toxicology case (missing nurse – UNIFG)

Lesson 10.2.6 – CPR (panicked relative - Facilitator – Une Stømer – UiS)

Lesson 10.2.7 – Hypertensive crisis (panicked relative – Facilitators – Mihai Ștefan, Cornelia Predoi – EICD)

Lesson 10.2.8 – SABES (panicked relative – infant dyspnoea – to check)

Lesson 10.2.9 - LMU – thermal injury (panicked relative with two patients)

The 9 cases in special situations are part of WP 5. The repartition was discussed in the Bucharest face-to-face meeting, and all partners agreed to record these cases as a supplement to those in WP4. There was no special requirement to use separate learners for these cases, so most centres agreed to use the same learners from WP4 and thus make them benefit from additional simulation in these special situations.

Further on, through several e-mails, LMU proposed to replace the missing nurse scenario regarding thermal injury, due to the fact that for them all simulations are without nurses, so it wouldn't qualify as a special scenario. Further on, they recorded, and all partners validated in the on-line meeting held on 16 October 2023.

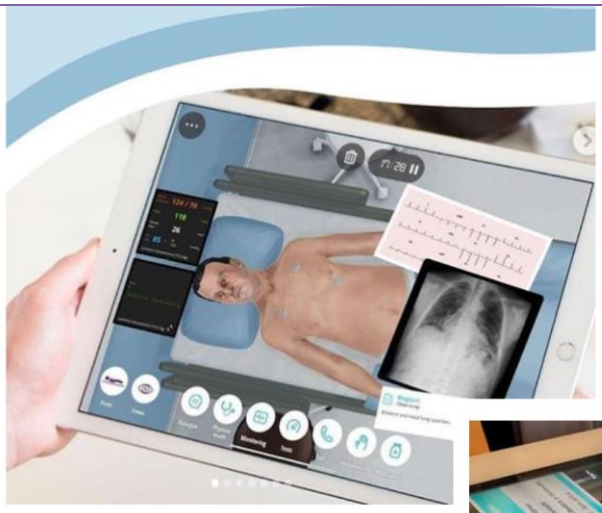
The platform will allow a stepwise access to the practical scenarios, for each course, after completing the theoretical section of the course.

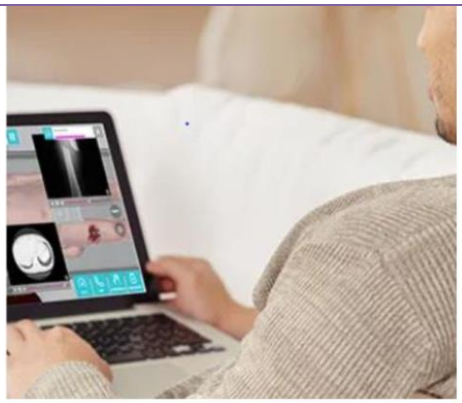
Therefore, after each theoretical course, the learners will go through the allotted practical recorded scenarios.

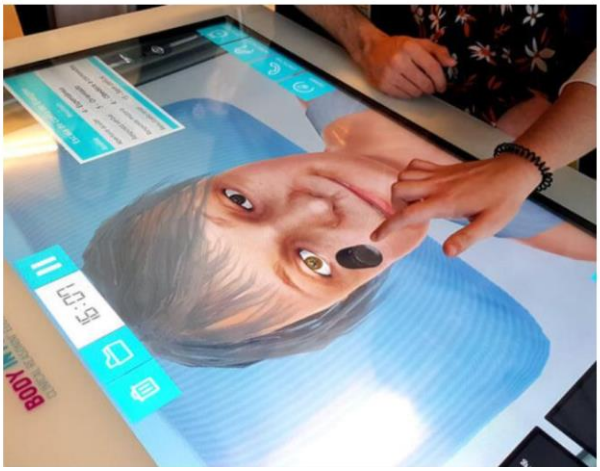
Following the same stepwise approach, after completing the practical simulation section of each course, the learner will get access to a **third section – the virtual patient.**

This will be comprised of cases provided by TTW and available at this time as a list at the link already sent to all partners via e-mail.

The choice of virtual patients appropriate for each course will be made by partners after recording the practical scenarios. Each partner should find at least one option of virtual patient for adding to the platform, corresponding to the practical scenarios for which they are responsible, from the list provided by TTW.







Based on the blended learning concept, the SAFETY course will have the following structure:

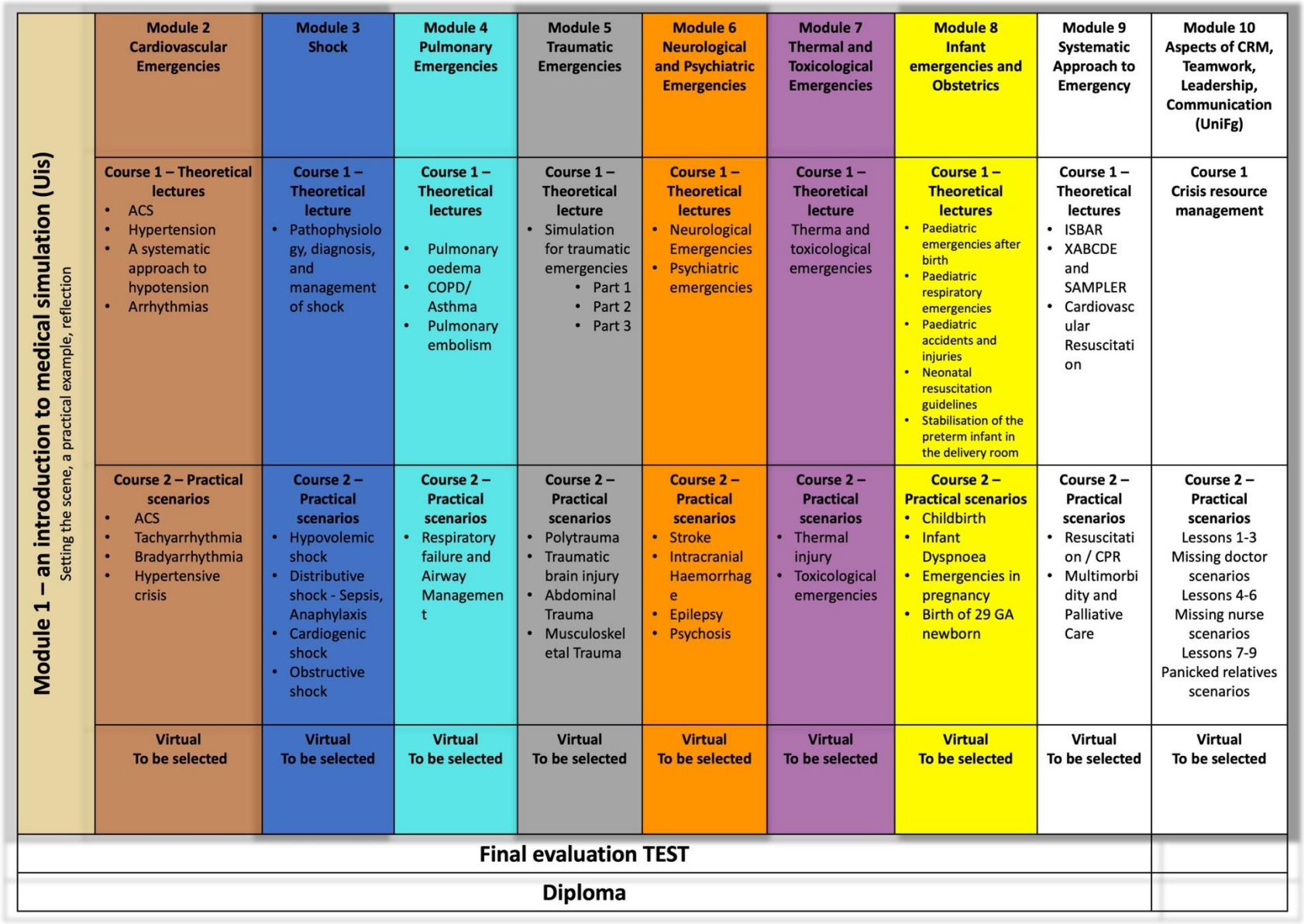


Figure 1 - Summary of the SAFETY e-learning course

Testing the e-learning modules
As stipulated in T 4.5, *The university partners will get tested by at least 40 LEARNERS from non HEIs partners (contacted by HEI partners), and at least 3 companies from no-partner Companies. HEI partners will deal with contacting the 40 LEARNERS, while Company partners will deal with contacting the 3 no-partner Companies.* Practically, at this point in the project, there should be a beta version of the online platform functioning. Using this beta version, each academic partner should contact at least 8 learners to go through the entire course (theoretical modules, practical modules, virtual patients), including the evaluation quizzes, and give feedback using a standardized questionnaire. The testing of the platform should be done fully online, without the physical presence of the tester, as it would be done when the final version of the course will be online. Feedback will be concentrated on getting information from participants regarding the clarity of the platform, the ease of access, whether they would recommend the course to their peers or not and two free answer questions regarding what they liked most and did not like most about the course. All tools to be used in the evaluation of the course will be designed and provided by EICD.

Turning feedback into improvements of the e-learning course
As stipulated above, after analysing the feedback from the learners, the SAFETY team will select what is relevant to the improvement of the course and implement the modifications in the final version of the platform. It is not viable to re-record a particular practical scenario, due to logistical issues. It will be discussed among partners, after obtaining the relevant information, what required improvements can and must be implemented, and for which the team maintains its opinion as to being preferred.

Deliverables after WP 4
An e-learning platform containing: ● 10 recorded courses, subdivided into several presentations each, with a total of minimum 10 hours of video material ● 25 recorded clinical scenarios (practical courses) ● Virtual patients provided by TTW ● A set of MCQs dedicated to evaluate the students, during and after completing the full SAFETY course Additional deliverables for internal use: ● Tools for internal and external evaluation ● Consent forms to use for piloting the practical courses with 200 learners

Goals and deadlines	
All the Universities to develop a first deck of slides and video for one sub-module (max 20 minutes), following the guidelines contained in R4.3 Action Plan to develop learning courses	03.02.2023
All the University partners, led by EICD, to check and comment the work done by the other Universities for the theoretical modules	17.02.2023
All the University partners to share opinions about the first theoretical modules in a dedicated meeting	from 20.02.2023 to 24.02.2023
EICD to revise the R4.3 Action Plan to develop learning courses for what concerns theoretical modules according to the decisions taken in the dedicated meeting	28.02.2023
All the Universities to prepare the ppt presentations for the videos they should record	30.04.2023
All the Universities to prepare the pre and post-quizzes for assessing the knowledge of the learners	30.04.2023
All the Universities to record the videos of the theoretical modules	31.05.2023
All the universities to select the virtual patients already available for Take The Wind	31.05.2023
InfoTech to associate the selected virtual patient in the Moodle Platform	15.06.2023
All the Universities to develop a first practical module (recording of a simulation session), following the guidelines contained in R4.3 Action Plan to develop-learning courses	15.03.2023
All the University partners, led by EICD, to check and comment the work done by the other Universities for both the theoretical modules	24.03.2023
All the University partners to share opinions about the first practical modules in a dedicated meeting	from 27 to 31 March 2023

EICD to revise the R4.3 Action Plan to develop learning courses for what concerns the practical modules according the decisions taken in the dedicated meeting	03.04.2023
All the Universities to record the videos of the scenarios	31.05.2023

All the Universities to pilot the courses with the 40 external learners (including Medical students, residents, healthcare professionals, and physicians) and 3 no-partner companies representatives:	June/July 2023
EICD to prepare the evaluation report considering the feedback of the learners	July/August 2023
All the Universities will revise the training materials	September/October 2023