SAFETY

simulation for medical practice

SIMULATION APPROACH FOR EDUCATION AND TRAINING IN EMERGENCY

ACTION PLAN

for the e-learning course

SAFETY Work Package 3 – R3.1

Lead partner: LMU, with all partners support

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

Contents

Introduction

The SAFETY project aims at challenging the current teaching method, based on the old algorithm *"study, look, do, teach"*, which is lacking in safety for the operator and for the patients. The healthcare staff (doctors, nurses, paramedics, allied healthcare professions), will start working clinically immediately after finishing their studies, with very little occasion for prctice, and have to practice on the patients first. In this way, errors normally due to the learning process directly affect the patients.

SAFETY can be considered as a technique (served by technology) to amplify the learning process with high fidelity guided experiences. It offers the possibility for learners to practice an activity in a safe environment without compromising patient safety, it can be used to provide a wide range of curriculum requirements through clinical cases and role-playing games, Part-Task trainer (simulator of procedures) or full scale simulators where a learner works through a simulated scenario, often using a high-tech mannequin.

SAFETY also offers the opportunity to improve understanding and awareness of participants' importance of human factors in health care, whose neglected aspects return as low attractiveness rate of the Emergency Medicine sector. Human factors, the set of behaviors, physical conditions and psychological states, can influence the ability of the individual and of the team to manage complex situations appropriately and a deeper understanding has been acquired in the last 20 years of the role of human factors in clinical error. This usually is addressed with the so-called debriefing phase coming after the practiced simulation. SAFETY can be effectively used to teach not only technical knowledge and skills, but also non-technical and behavioral skills, allowing learners to learn to manage human factors by using them favorably for safe and effective healthcare.

Furthermore, medical career and also medical systems are lacking of improvement programs of communicationand non-technical skills. This leads to an increase in errors related to medical practice, which often lead to poor service.

On the other hand, the project envisage to create the possibility for medical university and medical system to cooperate, share knowledge and boost innovation in training programs, meeting theoretical knowledge and practice experience, integrating expertise and ability with non-technical skills, behavior and communication.

Overcoming all the shortages discussed, it will be possible to create a higher quality training and education, implementing best practices in the medical and health fields, for reaching higher level of medical care. Through SAFETY we canstandardize medical education, improving the quality and the efficiency of education and training.

To this aim, the following document represents a first tangible result of **WP3 (Preparing and testing the training material for e-learning theoretical and practical modules**, led by the LMU team**)** to be shared with all partners and adopted as guide for the development of the components of the e-learning course.

Target groups

The following Action plan is intended to deliver an integrated e-learning course, containing theoretical modules as well as practical simulation scenarios. While the course itselfis directed at both our stakeholders categories, respectively **students** and **academics (Simulation Experts and Academics in related fields)**, the theoretical modules are aimed directly at the students and the depiction of the scenarios at the academics, who are meant to implement those in da-to-day education.

Students will be learning the theoretical foundations of the relevant identified topics through the theoretical modules. They will then participate in the simulation scnenarios as delivered by the academics at their university.

Academics will adapt the scenarios, as presented in the e-learning course, to their specific environment and deliver those scenarios to the students. They will also clarifiy, if necessary, any open questions remaining from the theoretical modules.

Theoretical basis

The e-learning course will be based on the information gathered in the project so far and condensed in the so-calles Book of Knowloedge (BoK).

In order to better structure the development of the e-learnng course, the main relevant findings and conclusions from the BoK are summarised below.

The main data that emerged was the importance that is attributed to the teaching method in simulation by both groups. Both students and academics assigned an average score higher than 4.5 on the Likert scale to learning procedural techniques (Technical Skills) and communication and teamwork techniques (Non-Technical Skills), if developed in simulation.
Interesting results emerged from the analysis conducted on the state of teaching in the field of critical and emergency medicine. The questions aimed at investigating the university training offer showed how students believe they have acquired good training skills for the approach and management of patients, compared to what academics believe. This mainly derives, in addition to the theoretical training obtained, from the possibility of participating in practical medical simulation sessions. An interesting fact was also the use of software and platforms for e-learning; taken up mostly in recent years due to the SARS-COV2 pandemic, it is accepted by both groups with greater preference from academics.

The opinion expressed regarding communication and teamwork in emergency situations (Non-Technical Skills) is interesting. Both groups showed a high degree of appreciation for the subject matter; academics have shown more awareness of the importance of acquiring the ability to work in teams and communicate

effectively in emergency situations than students; students, on the other hand, perceive that they have a good preparation in teamwork and communication compared to what academics thought of them.

With reference to the answers provided by the students:

- *As the training received increases, there is a greater demand for courses conducted in e-learning mode, a greater demand for feedback and longer courses; on the other hand, there is less demand for courses containing technical skills and notions of team work.*
- *As the university educational offer increases, there is a greater demand for courses based on emergency management, from a procedural and team management point of view; there is less demand for courses conducted in e-learning mode and of a shorter duration.*
- *As preparation in teamwork increases, there is a greater demand for courses conducted in e-learning mode; on the other hand, there is less demand for courses based on emergency management, from a procedural and team management point of view.*
- *As the ability to manage health emergencies increases, there is a greater demand for courses conducted in e-learning mode and over several hours; the lower the demand for courses based on the learning of Technical Skills.*
- *As the acquisition of technical skills increases, there is a lower demand for courses based on the acquisition of the technical skills themselves; On the other hand, there is a greater demand for courses based on team working of a longer duration.*
- *A distinction was noted with respect to geographic distribution. Students from Northern European countries (Germany and Norway) require courses more based on learning procedural management and emergency team management, in which there is active feedback, compared to Southern European countries (Italy, Spain, Romania).*
- *Older students have a higher demand for courses based on technical skills, a lower need for those conducted in e-learning mode, and a higher demand for feedback during courses compared with younger students.*
- *Finally, the difference with respect to the different courses of study attended was assessed. Students enrolled in nursing studies require courses that are less based on learning how to manage emergencies from a procedural and team management point of view than students enrolled in degree courses in medicine and surgery. On the other hand, paramedics and doctors in specialist training require courses based more on these attributes than the students of medicine and surgery themselves.*

These results confirm that higher quality training guarantees the knowledge necessary to make students more confident in approaching patients.
Students more advanced in training require fewer and fewer courses based on learning procedural techniques, as they have already been acquired along their path. On the other hand, by acquiring greater maturity, their request for courses geared to managing teamwork during emergencies increases and their willingness to discuss, manifested by a greater request for feedback, increases.

With reference to the answers provided by academics:

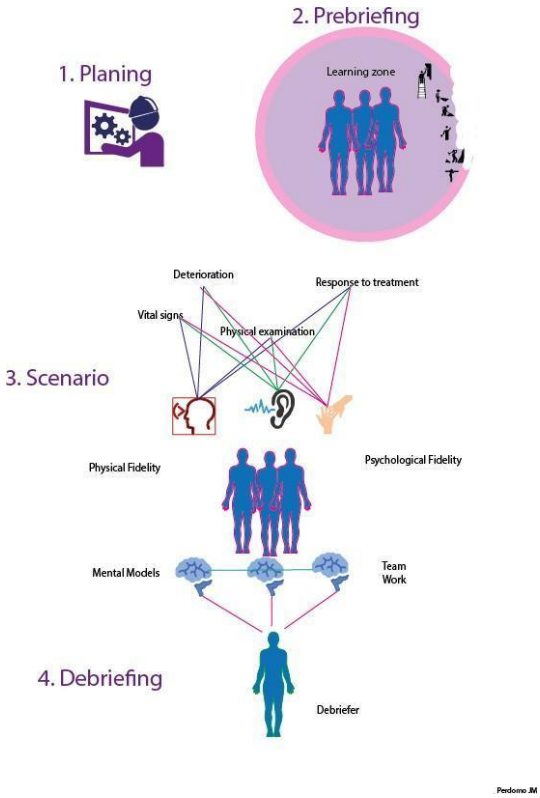
- *A gender distinction was noted. Male academics required more courses conducted in e-learning mode and less based on learning procedural and emergency management for their students than their female colleagues.*
- *With increasing years of experience, academics are more likely to believe that courses more focused on learning procedural emergency management are useful and more willing to provide and receive feedback. On the other hand, more experienced academics consider learning team communication less useful during emergencies.*

These results seem to highlight that academics, linked to the traditional teaching method, albeit supported by new technologies, tend to prefer the use of simulation for teaching technical skills to the detriment of non-technical skills and communication skills that are fundamental to management of a health emergency.

Focus on good practices

Definition

According to the European Union, a **good practice** encompasses a process or a methodology that represents an effective way of achieving a specific objective, one that has been proven to work well and produce expected results, and it´s therefore recommended as a model or as a useful example.



- ## Good practices related to the scenario planning
    - Link between daily clinical practice and scenario educational targets is recommended (methodology)
    - Scenario based on learner's background and context is recommended (methodology)
    - Simulation-based education programmes should be developed in alignment with formal curriculum, mapping or learning/training needs analysis undertaken in clinical or educational practice (methodology)
    - Simulation should be integrated into the existing curriculum rather than including simulation as additional, independent exercises (methodology)
    - There should be variation in the difficulty or complexity of the scenarios (methodology)
    - Domains (cognitive/affective/psychomotor) of learning involved in the activity should be described using educational theory (Bloom's taxonomy or higher). This encourages faculty to aim to provide holistic teaching of the skill (methodology)
    - The cycle of learning should be considered when planning simulation (methodology)
        - Knowledge acquisition
        - Skills proficiency
        - Decision making
        - Simulation in teams
        - Clinical experience
    - Simulation programme should include human factor approach (methodology)
    - Integration of desire of learning, individual roles and priority of the institution is recommended (methodology)
    - Multidisciplinary simulation should be promoted. Those who work together should learn together (methodology)
    - Link between the educational goal and the specific simulation technique to be used is recommended (methodology)
    - Definition of a realistic environment to achieve the educational objectives is recommended (methodology)
    - Definition of appropriate fidelity to achieve the learning objectives/outcomes is recommended (methodology)
        - Conceptual (i.e., vital signs and lab results reflect the diagnosis)
        - Physical/Environmental (i.e., setting of in-situ versus simulation lab, equipment, tools, sensory props, manikin, moulage).
        - Psychological (i.e., evokes underlying emotions, beliefs, and self-awareness of learners).
    - Link between the educational goal and the specific simulation device (task trainer, manikin, virtual reality, etc) is recommended (methodology)
    - Identification of appropriate simulation modality to meet the learning objectives/outcomes is recommended (methodology):
        - Low technology (i.e., task trainer, case study, role play).
        - High technology (i.e., high complexity simulation manikin mimicking human body functions).
        - Simulated Patient (i.e., live patient versus virtual patient technology).
        - Virtual/Augmented Simulation (i.e., three-dimensional (3D)

immersion using Head-mounted Display VR (HMD VR), haptic enhanced task trainers, computer screen-based, immersive rooms, interactive clinical case scenarios with branching case structure).

- Instructors should be properly assigned to the scenario, based on their experience, and learning goals of the course. An appropriate ratio instructors/learner is recommended (methodology)
- Clear standards of the criteria to be a simulation faculty member are recommended (methodology)
- Trainers should have specific training in simulation (methodology)
- The maintenance of a safety learning environment is the uttermost priority of trainers (methodology)
- Trainers should have a validation of experience in simulation recognized by the infrastructure manager and / or the educational and / or scientific manager (methodology)
- Trainers must have pedagogical experience enabling them to integrate simulation into a program (methodology)
- Trainers must be experts on the specific scenario subject (methodology)
- Senior trainers should be involved in simulation regularly (6 or more simulation sessions per year) (methodology)
- The skills of trainers should be regularly assessed (methodology)
- Instructors should have a continue personal development program (methodology)
- Junior trainers should attend to an introductory course which includes adult learning theories, simulation terminology, simulation technical aspects (methodology)
- Junior trainers should have specific training in debriefing, as debriefing is recognised to be the most important of learning in simulation (methodology)
- Junior trainers should observe or co-facilitate existing courses alongside a more experience instructor (methodology)
- Junior trainers should have a streamlined process to become senior instructor (methodology)
- Junior trainers must be supervised by the infrastructure manager (methodology)
- Simulation instructors should participate in ongoing continuing educational offerings, and/or targeted work with an experienced mentor (methodology)
- Proper location/physical space should be ensured for the prebriefing, scenario and debriefing (methodology)
- In case of in-situ simulation, the costs involved in-situ simulation should be considered (methodology)
- In-situ refresher training should be considered: Repetitive sessions known as low dose, High frequency training has been demonstrated not only to maintain competence, but also to improve performance (methodology)
- To perform a pilot test simulation experience before full implementation is recommended (methodology)
- BI studio: This tool helps the instructor to select and/or set scenarios according to the students' needs or goals meant to be achieved. The results and choices are done according to the Body Interact app (device, Take The Wind SA)
- During the planning period is recommended (methodology):
    - To define the target learner population

        - To define educational goals and their evaluation elements
        - To define the material and equipment required according to the desire realism
        - To define the human capital required
        - To define scenario duration and session sequence
        - To define the bibliography required before, during and after the scenario

- ## Good practices related to prebriefing
    - Promotion of psychological safety by having written statements and policies on confidentiality is recommended (written consent by participants) (methodology)
    - An explanation of how the session is planned to happen is recommended (methodology)
    - A reminder of confidentiality and fiction principles is recommended (methodology)
    - A reminder of ethical rules and professionalism contract is recommended (methodology)
    - An exposure of the type of technology to be used is recommended (methodology)
    - A reminder of other psychological elements to make the participants feel comfortable: absence of judgment, absence of intentional tricks; is recommended (methodology)
    - Participants' expectations should be explored (methodology)
    - Logistic factors should be conveyed (methodology)
    - It is recommended that roles and what to expect from participants, instructors, collaborators, observers, and technicians are explained (methodology)
    - An introduction to the simulated environment should be considered (methodology)
    - Writing o recording prebriefing plan should be considered (methodology)
    - Instructors should be competent performing prebriefing (methodology)
    - Prebriefing should be adapted to learning goals (methodology)
    - Prebriefing should be adapted to participant's experience and knowledge (methodology)
    - Preparation material should be provided to participants. The use of adult learning theories to prepare this material is recommended (methodology)
    - The possibility of recording and/or observation by others (peers, external staff, etc) should be discussed (methodology)

- ## Good practices related to the scenario
    - Dedicated personnel should be responsible for the maintenance of equipment and associated records (simulation technician) (methodology)
    - Simulation technicians (methodology)
        - Should be competent in equipment, maintenance, and troubleshooting
        - Should be aware of the adult learning theories
        - Should maintain a safe learning environment
        - Should be involved in the designing of simulation cases
    - Consumables used in simulation must be clearly identified as no longer usable

for patients. This is especially important in in-situ simulation (methodology)

- Equipment used during in-situ simulation activity should be replaced to ensure that the clinical environment and drug stocks —where relevant— are left in a safe condition for continued delivery of patient care (methodology)
- To keep updated the inventory of available equipment and its maintenance, as well as the stocks of consumables is recommended (methodology)
- The recycling of consumables should be planned in accordance with the regulations (methodology)
- It is recommended to maintain a competency-based training program for personnel to operate applicable equipment such as (methodology):
  - Simulator equipment
  - Medical equipment
  - Audio-visual equipment
  - Electronic health record systems
- The equipment should provide the same experience to all participants (methodology)
- It is recommended to deliver cues to draw attention of the participants to critical or noncritical information related to the context of the scenario or case (methodology)
- A manual should be maintained to ensure consistency between design and delivery of the programme and reproducibility among instructors (methodology)
- Testing of all simulation equipment should be undertaken before and after every session (methodology)
- Body Interact is an interactive digital simulator for problem-solving and clinical reasoning using virtual patients. This tool has different patient options and ranges of difficulties. It also provides feedback on performance (device, Take The Wind SA)
- QCPR feedback technology can be used to provide real time feedback to participant during scenario (device, Laerdal)
- The SkillGuide can be used to provide participants with compression-ventilation measurement and feedback during CPR scenarios (device, Laerdal)
- CPRmeter App can be used to provide real-time coaching during the scenario (device, Laerdal)
- VitalsBridge: The use VitalsBridge during simulation training can present vital signs onto a commercially available patient monitor (device, Laerdal) ASL 5000™ Lung Solution: This is a breathing simulator intended for high-fidelity ventilation management. It can simulate any respiratory condition you may encounter, on any ventilator in any mode of ventilation (device, Laerdal)
- TruVent: This virtual simulation app can be used to teach ventilation management safely without the need for a ventilator or a simulator (device, Laerdal)

Good practices related to debriefing

- It is recommended to implement quality management processes to guarantee psychological safety and avoidance of inappropriate false reassurance (methodology)
- Participants should feel comfortable during debriefing (methodology)

- Debriefing should be learner-centred (methodology)
- To maintain coherence between planned learning goals and debriefin g (methodology)
- Debriefing should be structured —incorporating various phases— but flexible (methodology)
- The debriefing structure may follow one of the most frequent models:
  - Debriefing for Meaningful Learning (DML)
  - Debriefing with Good Judgment
  - Diamond
  - Gather, Analyse, Summarize (GAS)
  - PEARLS for System Integration (PSI) Frameworks
  - Promoting Excellence and Reflective Learning in Simulation (PEARLS)
  - Plus-Delta
  - Review the event, Encourage team participation, Focused feedback, Listen to each other, Emphasize key points, Communicate clearly, and Transform the future (REFLECT)
  - The 3D Model of Debriefing (Defusing, Discovering, and Deepening)
  - The Critical Incident Stress Debriefing Model
- Objective performance indicators must be used (methodology)
- It is recommended to promote discussions over teamwork (methodology)
- Behaviours and interactions of a successful team must be subject to discussion (methodology)
- The debriefing should occur immediately (less than 5 minutes) after simulation so that thoughts, feeling, and actions are captured without degradation or distortion (methodology)
- Debriefing should be preceded by prebriefing (methodology)
- Conclusions and goals should be recorded to facilitate subsequent debriefings (methodology)
- Trainers should be trained in debriefing (methodology)
- Debriefing should be conducted by skilled instructor (methodology). Evidence from research suggests that the perceived skills of the debriefer have the highest independent correlation to the perceived overall quality of the simulation experience. The debrief should include the following communication skills (methodology)
  - Socratic approach
  - Open-ended questions
  - Active listening
  - Non-judgmental demeanour
  - Silence to encourage learner(s) input
- SimCapture: This software can enhance the effectively management, recording, and assessment during simulation training, both on-site and in-situ. It captures audio, video, annotations, patient monitors, and simulator data in a single web-based interface (device, Laerdal)
- QCPR feedback technology can be used to facilitate debriefing (device, Laerdal)
- SimPad PLUS with SkillReporter can be used to facilitate real-time feedback, records data and calculates overall performance (device, Laerdal)
- The SkillGuide can provide quick review of CPR performance to use during

debriefing (device, Laerdal)
- The CPRmeter can provide instant access to objective key performance metrics, leading to quick feedback and debriefing (device, Laerdal)
- BI studio: This tool helps the instructor to see the results of the student's performance. The results and choices are done according to the Body Interact app (device, Take The Wind SA)

- **Good practices related to evaluation and improvement**
  - Additional debriefing should be conducted once the simulation session is finished (methodology)
  - Implementation of learners' feedback is recommended (methodology)
  - It is recommended to have a strategy to implement changes based on the analysis of learners' feedback (e.g., using the PDCA-cycle) is recommended (methodology)
  - It is recommended to recognize the strengths and weaknesses of the established simulation program (methodology)
  - It is recommended to included different levels of Kirkpatrick's evaluation (methodology)
  - Outcomes should be clearly defined and evaluated. Metrics for improvement should also be defined. Assessment describes the measurement of learner outcomes whereas evaluation describes the measurement of course or program outcomes (methodology)
  - The existence of a referent responsible for coordinating research programs using simulation is recommended (methodology)
  - The list of trainers performing research or scientific activities within the simulation program as well as their participation in national or international scientific meetings should be regularly updated.

ANNEX 1: Book of Knowledge

Simulation equipment

Every University partner has a simulation laboratory in their reach. The equipment available varies and was identified during the course of WP3 through a survey . The companies participating in the project agreed to supplement and provide necessary simulation equipment that might lack at some university partners to depict certain scenatios – thus, a more uniform presentation of the scenarios can be guaranteed.

The survey also covered the experience of the participating university and commercial partners, in order to ensure acorrect distribution of the cases, according to experience and ability of each partner.

Materials needed

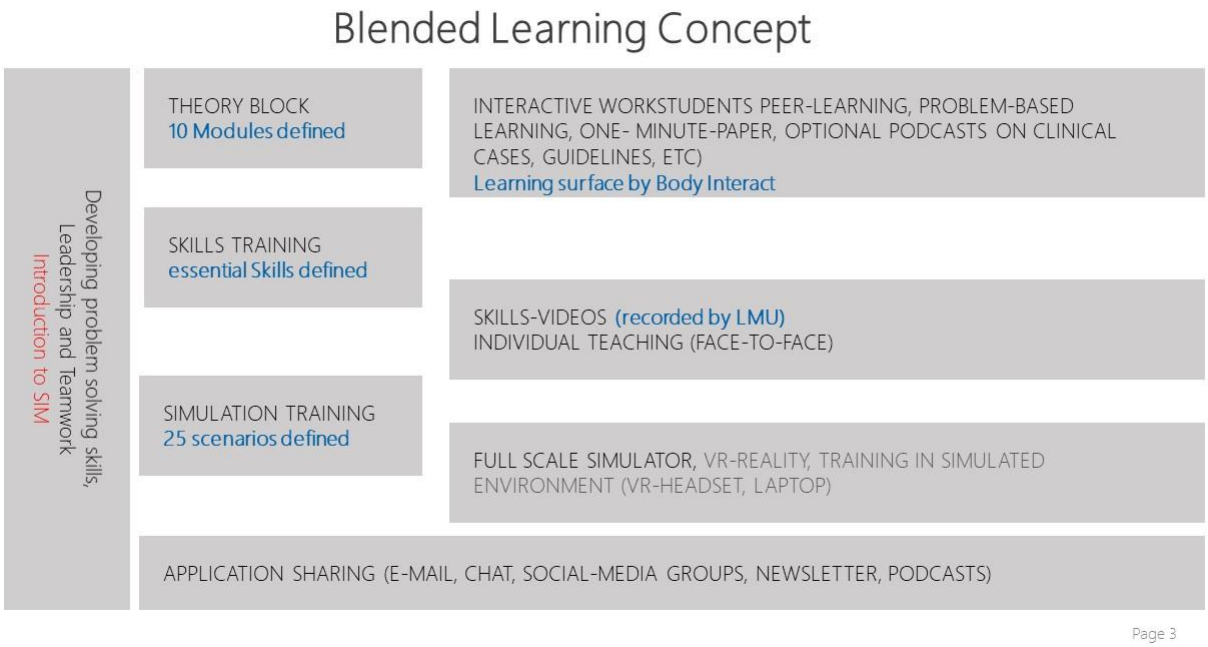
- Full manikins for full scale simulation
- Partial manikins for skills training (Airway Management trainer, venous & arterial, io access trainer, etc.)
- SimCapture, vSIM, SonoSim (**Laerdal**), iSimulate
- VR Trainer (Body Interact, Acadicus, Immersive Interactive, OMS, SimX)

ANNEX 2: Questionnaire

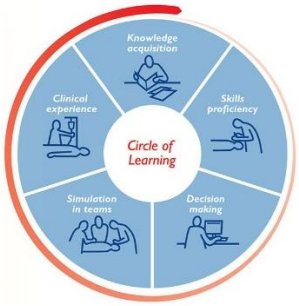
Pedagogical strategy

Based on the work done in WP1 and WP2, the following criteria and pedagogical strategy were condensed for the e-learning course.

A blended learning strategy will be implemented. The results of the partner meetings could be condensed into a graphical overview of this concept.



The conceptual basis for the whole e-learning course is the so-called Learning Circle - Learning as continous process.When regarded through time, the cirle becomes a spiral, as more knowledge is acquired



The conceptual basis for acquiring the necessary theoretical knowledge is briefly defined by the following criteria:

- Flipped Classroom
- On-demand learning course (delivered by theory content largely coordinated with scenarios)

- Interactive Learning, Problem-based Learning, optional Podcast on Guidelines or latest news
- Videos, also pointing out relevant points
- Include quizzes
- Lectures based on powerpoint

The conceptual basis for acquiring the necessary skills is based on the following concepts:

- Videos (procedural learning), include feedback in video
- Simulation (motor learning)
- Defined skills training on manikins depending on target group

The following Theoretical Modules were identified and consented as being relevant for the topic:

1. Systematic Approach to Emergency (xABCDE, SAMPLER, BLS/ALS Algorhythm, ISBAR Model)
2. Cardiovascular Emergencies (ACS, Hypo-/Hypertension, Arrhythmia)
3. Pulmonary Emergencies (Pulmonary Embolism, Pulmonary edema, COPD/Asthma, Bolus)
4. Traumatic Emergencies (Polytrauma, Traumatic Brain Injury, Thoracic Trauma, Abdominal Trauma, Musculoskeletal Trauma)
5. Neurological & Psychiatric Emergencies (Stroke, Epilepsy, ICB)
6. Shock (Hypovolemic shock, Distributive shock, Cardiogenic shock, Obstructive shock)
7. Infant Emergencies & Obstetrics
8. Thermal and Toxicological Emergencies
9. Aspects of CRM, Teamwork, Leadership, Communication
10. Aspects of Simulation Training

Every university partner has been assigned two of these topics, as per the following matrix

Theoretical modules	UNIFG	HUBc	EICD	LMU	UiS
Systematic Approach to Emergency					x
Cardiovascular Emergencies			x		
Pulmonary Emergencies			x		
Traumatic Emergencies		x			
Neurological & Psychiatric Emergencies				x	
Shock		x			
Infant Emergencies & Obstetrics				x	
Thermal and Toxicological Emergencies	x				
Aspects of CRM, Teamwork, Leadership, Communication	x				
Aspects of Simulation Training					x

The practical modules (aka scenarios) need to cover a vast majority of the emergency medicine themes. It has been decided to follow the XABCDE approach and define the necessary skills as follows:

X Vascular Compression, Wound Packing, Tourniquet, SAM Sling

A cervical spine immobilization, Reclination, Esmarch, Suction, Insertion of nasopharyngeal and oropharyngeal tubes, Insertion, Insertion of SGA & EDT,

B Auscultation, Percussion, Oxygen Supply, Pulse Oximetry, Capnometry, thoracic decompression

C Evaluation vascular status (Pulse, CRF, Blood pressure) ECG (3 lead/12 lead), iv cannula insertion, Electrotherapy

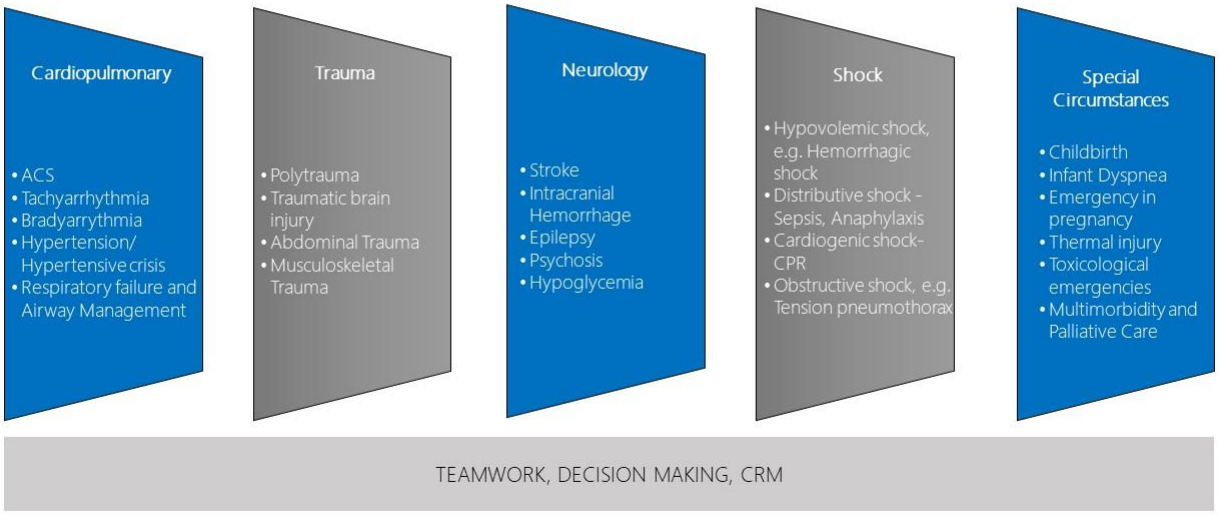
D GCS, Inspection of Pupils, (Glucose)

E Temperature and Wound Management

Others

BLS, ALS, Immobilization of patient

The resulting scenarios are structured in a graphical format in order to reenforce the logical relationships between them



The scenarios were distributed to the individual partners as follows:

Scenarios	UNIFG	HUBc	EICD	LMU	UiS
ACS					x
Tachyarrhythmia			x		
Bradyarrythmia		x			
Hypertension/ Hypertensive crisis			x		
Respiratory failure and Airway Management	x				
Polytrauma		x			
Traumatic brain injury				x	
Abdominal Trauma	x				
Musculoskeletal Trauma			x		
Stroke					x
Intracranial Hemorrhage				x	
Epilepsy		x			
Psychosis	x				
Hypoglycemia					x
Hypovolemic shock, e.g. Hemorrhagic shock			x		
Distributive shock - Sepsis, Anaphylaxis			x		
Cardiogenic shock		x			
Obstructive shock, e.g. Tension pneumothorax					x
Resuscitation / CPR					x
Childbirth				x	
Infant Dyspnea				x	
Emergencies in pregnancy		x			
Thermal injury				x	
Toxicological emergencies	x				
Multimorbidity and Palliative Care	x				

Working framwork

In order to achieve the desired results, the cooperation within WP3 needs to be very close. A timeline depicting the various steps of the content creation was designed as follows:

10.06.2022 develop the first version of the training materials (theoretical modules)

24.06.2022 Peer-reviewers to revise the training materials (theoretical modules)

15.07.2022 deliver the final version of the training materials (theoretical modules)

24.06.2022 develop the first version of the training materials (practical modules)

08.07.2022 Peer-reviewers to revise the training materials (practical modules)

22.07.2022 Partners to deliver the final version of the training materials (practical modules)

Development of Theoretical Modules and Scenarios (practical modules) is done in a step-by-step iterative procedure. The first review round was assigned as per the following tables.

Theoretical modules	UNIFG	HUBc	EICD	LMU	UiS
Systematic Approach to Emergency		x UiS			
Cardiovascular Emergencies	x EICD				
Pulmonary Emergencies	x EICD				
Traumatic Emergencies				x HUBc	
Neurological & Psychiatric Emergencies			x LMU		
Shock				x HUBc	
Infant Emergencies & Obstetrics			x LMU		
Thermal and Toxicological Emergencies					x UNIFG
Aspects of CRM, Teamwork, Leadership, Communication					x UNIFG
Aspects of Simulation Training		x Uis			

Review structure for theoretical modules

Scenarios	UNIFG	HUBc	EICD	LMU	UiS
ACS		x Uis			
Tachyarrhythmia	x EICD				
Bradyarrythmia				x HUB	
Hypertension/ Hypertensive crisis	x EICD				
Respiratory failure and Airway Management					x UNIFIG
Polytrauma				x HUB	
Traumatic brain injury			x LMU		
Abdominal Trauma					x UNIFIG
Musculoskeletal Trauma	x EICD				
Stroke		x Uis			
Intracranial Hemorrhage			x LMU		
Epilepsy				x HUB	
Psychosis					x UNIFIG
Hypoglycemia		x Uis			
Hypovolemic shock, e.g. Hemorrhagic shock	x EICD				
Distributive shock - Sepsis, Anaphylaxis	x EICD				
Cardiogenic shock				x HUB	
Obstructive shock, e.g. Tension pneumothorax		x Uis			
Resuscitation / CPR		x Uis			
Childbirth			x LMU		
Infant Dyspnea			x LMU		
Emergencies in pregnancy				x HUB	
Thermal injury			x LMU		
Toxicological emergencies					x UNIFIG
Multimorbidity and Palliative Care					x UNIFIG

Review structure for the scenarios

A process of review and iterative development was put into place and consented with all partners – thus, the distribution and pathway of the theoretical modules and the scenarios is clear to every university partner.

The tasks for the commercial partners were also defined in close cooperation with all the parties involved. According to each company's profile, the tasks are as follows:

Body Interact

Conception of Virtual Simulation Patients on the basis of the theoretic modules

AMC

Evaluation of the designed practical scenarios

Laerdal

Support with simulators and materials

LMU has been and will closely follow the individual steps of the process, while remaining at the disposition of all partners for necessary clarifications.

Module templates

LMU has designed a template for both the theoretical modules as well as for the simulation scenarios. These templates are based on the forms generally used to complete such tasks and were adapted iteratively after conversations with the university partners. All the relevant information as per the experience of the partners is captured in this template (Annex 3). The theoretical modules were also designed to follow a specific structure and frame, as per below:

1. Abstract
2. Symptoms
3. Differential Diagnose
4. Diagnostic and skills needed
5. Therapy and skills needed

The duration of a theoretical modules is designed to be either 45 min (1 Educational Unit) or 2 Unit, aka 90 minute.

ANNEX 3: Scenario template

Assessment

The assessment of the modules will be developed and implemented by EICD. Experts for the review of the material have been identified and invited by each partner. Also, in the questionnaire addressed to the university partners regarding simulation modalities and materials (see section Simulation equipment) the options for evaluating and testing the material have been explored. These replies will enter the final evaluation structure for the material produced in WP3.

The theoretical modules and scenarios will be assessed and reviewd in a round-robin structure, each partner reviewing the materials of another partner. After gathering the feedback, a reviewed version of the material will be produced.