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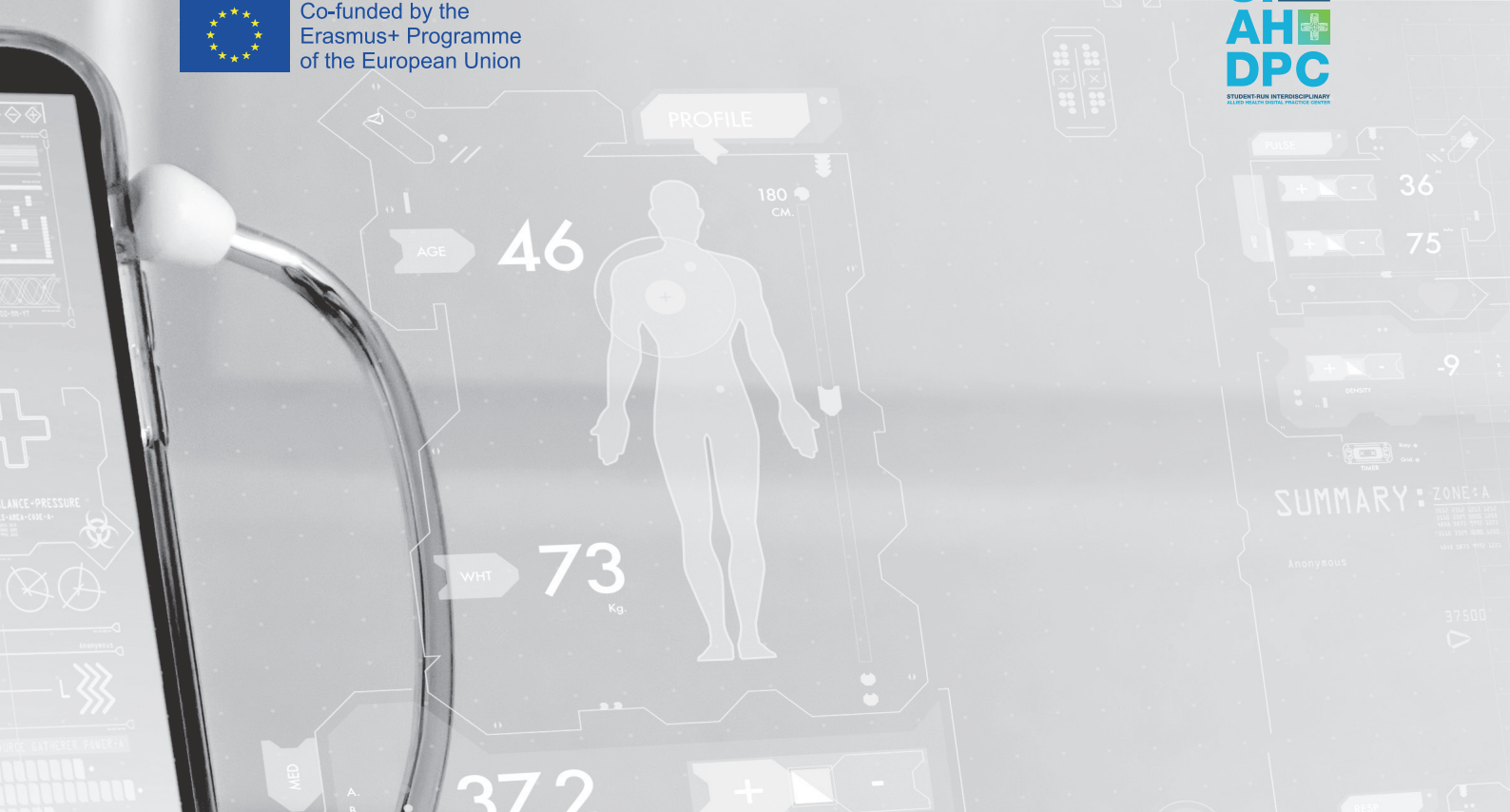
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Roadmap for the development and delivery of virtual therapy, remote and telehealth services

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Roadmap for the development and delivery of virtual therapy, remote and telehealth services

Preface

The document introduces the SIAHDPC Roadmap for the development and delivery of virtual therapy, remote and telehealth services (project output 3.4) which has been developed as part of the project Student-Run Interdisciplinary Allied Health Digital Practice Center (SIAHDPC) funded by the Erasmus+ Programme of the European Union (Key Action 2, Capacity Building).

The Roadmap builds on and presumes previous outputs (SIAHDPC Teaching Toolkit, output 3.1 and output 3.2) in which innovative teaching resources were presented to facilitate the integration of digital (assistive) technologies in health educational programs at higher education institutions (HEIs). This general competence focused work shall now be specified for the delivery of telehealth education in simulated environments.

The aim of this Roadmap is to build competences of PA HEIs staff for developing and delivering virtual therapy, remote and telehealth services using digital technologies. The Roadmap provides an comprehensive overview of current developments and the use of a methodological framework that facilitates transfer of acquired knowledge (simulation setting) to actual work environment (e.g. Care-Center) and how to safeguard user involvement while considering relations to patients.

The Roadmap is designed as innovative teaching material to serve to the relevant professionals and students of allied health in terms of providing hints to the PA HEIs on how to incentivize their students to come up with original ideas for improvement or new solutions and question the given technological solution.

The materials of this Roadmap will be made publicly available, enabling also educators external to SIAHDPC to find inspiration for their teaching activities. However, the use of all materials underlies a Creative Commons License (Attribution-NonCommercial-ShareAlike 4.0 international) that is compliant with Erasmus+ requirements with regards to the establishment of open educational materials.





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1. Introduction

More and more digital devices and services are developed, implemented and used in the health care sector and therefore changing the way we provide and think about health care services, which affects relevant competences, roles and tasks of healthcare personnel (Kuhn, 2019). Telehealth services, as one major field in this development, are becoming increasingly popular and are penetrating more and more areas (C. M. Rutledge et al., 2021). They are increasingly used where health care services can barely be provided for structural, demographical or economic reasons, like in rural areas or underserved areas (Chike-Harris, 2021).

In order to use telehealth services in an appropriate way, it is necessary to provide adequate training for nurses, practitioners and other related health care personnel as well as the development of telehealth modalities with the curriculum (C. M. Rutledge et al., 2021). Training and education can build a useful bridge between the possibilities which is provided by technology and the areas of implementation in the health care sectors (van Houwelingen et al., 2016). The trainings should be oriented on the real-life implementation of services and thus use simulation techniques to enhance the training effect, such as student knowledge acquisition, confidence and satisfaction with the training (Mulyadi et al., 2021).

The usefulness of telehealth applications and the training required for this is acknowledged by scientists (Booth, 2006; Cassidy et al., 2021; Chike-Harris, 2021; Kuhn, 2019) and politicians (Leicht, 2021) and is promoted by international associations (AMA, 2019; WHO, 2016; World Health Organization, 2021). As there are already different guidelines and toolboxes concerning the topic of telehealth education for nursing students (Edwards, 2018; Halpern, 2016; Martin et al., 2022; Rienits et al., 2016; Carolyn M. Rutledge et al., 2017; C. M. Rutledge et al., 2021) and telehealth implementation for nursing practitioners available (AMA, 2019; Edwards, 2018), it is the aim of this Roadmap to give a comprehensive overview of these methods and guidelines and present them in a structured way.



2. Definitions and understanding of necessary concepts

As our tasks to understand the steps for a successful teaching of telehealth using simulation techniques implies two concepts with multiple and broad meanings, we start by given an overview of the meaning of telehealth (2.1) and simulation (2.2). By this, we give a first idea of the teaching and training method of simulation and the specific content of telehealth services.

2.1 Telehealth

Telehealth is a very broad term with many different uses associated with it. Thus, the number of different definitions is large. In this roadmap, we use the American Medical Association's definition according to which telehealth can be defined and categorized in two major areas:

“Telemedicine includes a variety of tools and platforms allowing clinicians to connect with one another as well as to connect with patients. Telehealth between patients and clinicians is most commonly seen as:

1. Asynchronous text and photo exchanges through patient portals, health system apps, or website chat features or
2. Synchronous audio and video appointments through telehealth platforms, apps, or in-clinic technologies (AMA, 2019).”

This definition leaves room for a broad spectrum of services with a different degree of digital service. Be it a fully synchronous digital service, a hybrid service with just a part of the service being digital or all forms of patient's self-management using digital devices and programs. Technologically, the focus lies on “the use of electronic information, devices, and telecommunication technology to provide direct patient care, remote monitoring, and education at a distance” (Carolyn M. Rutledge et al., 2017). With this wide range, more and more health services can be supplemented, transformed or created by the means of these technologies. For example, teleconsulting services, remote home monitoring solutions or digital health applications are increasingly used.

Some major advantages for using telehealth services are to “increase continuity of care, extend access beyond normal clinic hours, reduce patient travel burden, and help overcome clinician shortages, especially in rural and other underserved populations” (AMA, 2019). Concerning possible uses of telehealth services, van Houwelingen et al. provided a comprehensive list:



Replacing face-to-face visits with e-visits via the use of videoconferencing
Monitoring vital signs such as blood pressure, blood glucose levels or heart rate via devices for self measurement
Monitoring movements in and around the home via activity monitors
Responding to personal alarms by patients to let nurses or family members know when something goes wrong
Teleconsultation, for example for wound assessment

Table 1: Possible uses of digital services (van Houwelingen et al., 2016)

To have a better idea for which purposes and areas telehealth can be applicable and a useful supplement to regular services, (Rutledge CM, Haney T, Bordelon M, Renaud M, Fowler C., 2014) present a list of possible services which were developed by students in a training program for telehealth:

Diabetic/blood glucose monitoring and patient education program
Palliative care program using home telemonitoring
Home telemonitoring for chronic disease management
Daily meeting program with Community Services Board for patient discharge planning
Televisit program with chronic GI patients for 3- to 6-month follow-up visit
Remote psychiatric telemedicine consultation program
Alzheimer's patient support and education
Mental health/psychiatric support and counseling for incarcerated juveniles
Endocrinology consultation program for diabetic patients
Telemedicine for a hospital-based NICU program (cardiology and genetics consultations)
Telemonitoring of "moms-to-be" with pregnancy-induced hypertension
Monitoring and support program for children with chronic illness
Stroke consultation program
Teledermatology consultation program
Video-conferencing for specialty consultations for patients with chronic disease
Team-electronic "transport" of radiology images and pediatric echocardiograms

Table 2: Further possible case scenarios for telehealth services (Rutledge CM, Haney T, Bordelon M, Renaud M, Fowler C., 2014)



2.2 Simulation

In the healthcare sector, especially in medical training, simulation is a well-established method to gain practical knowledge and hand-on experience of certain skills (Sørensen et al., 2017; Waleed Mohammad AlHarbi, 2016). The lab environment most common used for simulation for practical skills are so called skills labs (Bugaj & Nikendei, 2016). In general terms, simulation can be defined as the following:

“Simulation-based training is defined as a methodology for learning in which trainees are (1) immersed in an environment filled with realistic visual, auditory and tactile cues, (2) required to integrate multiple skill sets while working with colleagues, equipment and supplies just as in the real world, and (3) provided the opportunity to reflect on their performance. The goal of simulation-based training is to evoke the same responses during training as would be elicited in the real environment, thus allowing trainees to understand their strengths and how to replicate them as well as their weaknesses and how to avoid them (Halamek et al., 2019, p. 2).”

In the context of simulation for telehealth services, the definition can be specified in the following way:

“Simulation is an experiential learning approach for developing telehealth service delivery skills. Simulation allows learners to apply knowledge and skills in a safe and low risk environment whilst also providing opportunities for direct feedback (Martin et al., 2022, p. 270).”

By using simulation the actual clinical scenarios and real patients are reproduced using a simulation environment and different techniques, from standardized patients for educational and therapeutically ends to virtual reality training settings. Some of the most basic types of simulation techniques include the following: use of high-fidelity mannequins or technologies, low-fidelity mannequins, partial task simulators, virtual reality, standardized patients, e-learning setups or hybrid simulations (Koukourikos et al., 2021).

By using a risk free training environment for practical skills research shows that simulation has many positive effects on learner’s outcomes. It affects the way students acquire knowledge, develop psychomotor skills, their self-efficacy and finally the general student satisfaction (Cant & Cooper, 2017; Mulyadi et al., 2021; Oh et al., 2015). “Simulation offers the student nurse the opportunity not only to practice clinical nursing skills, but also the chance to begin to learn and explore how it feels to be a nurse (Almoussa et al., 2021).” So compared to traditional learning methods simulation seems to be more effective (Shin et al., 2015). Halamek et al., (2019) identify the following advantages for simulation-based training:

Poses no risk to patients
No threat of medical liability when errors are made



Can be scheduled at convenient times
Allows specific learning objectives to be consistently achieved
Facilitates the integration of multiple skill sets
Creates realism (including time pressure)
Accommodates the needs of individuals and multidisciplinary teams
Provides an opportunity to determine the likelihood of success
Can be scaled in intensity to meet the needs of trainees at all levels of experience

Table 3: Advantages of simulation based training (Halamek et al., 2019)

The first decision to make when designing a simulation scenario is the objective in accordance with the later real-life scenario for which the simulation is supposed to prepare for. This gives the simulation the guiding framework. After that the simulation needs to be prepared, the participants need to be briefed in advance what they are supposed to do, then the actual simulation occurs and finally there should be room for a debriefing to reflect on the simulation and to improve the outcome for the learners.

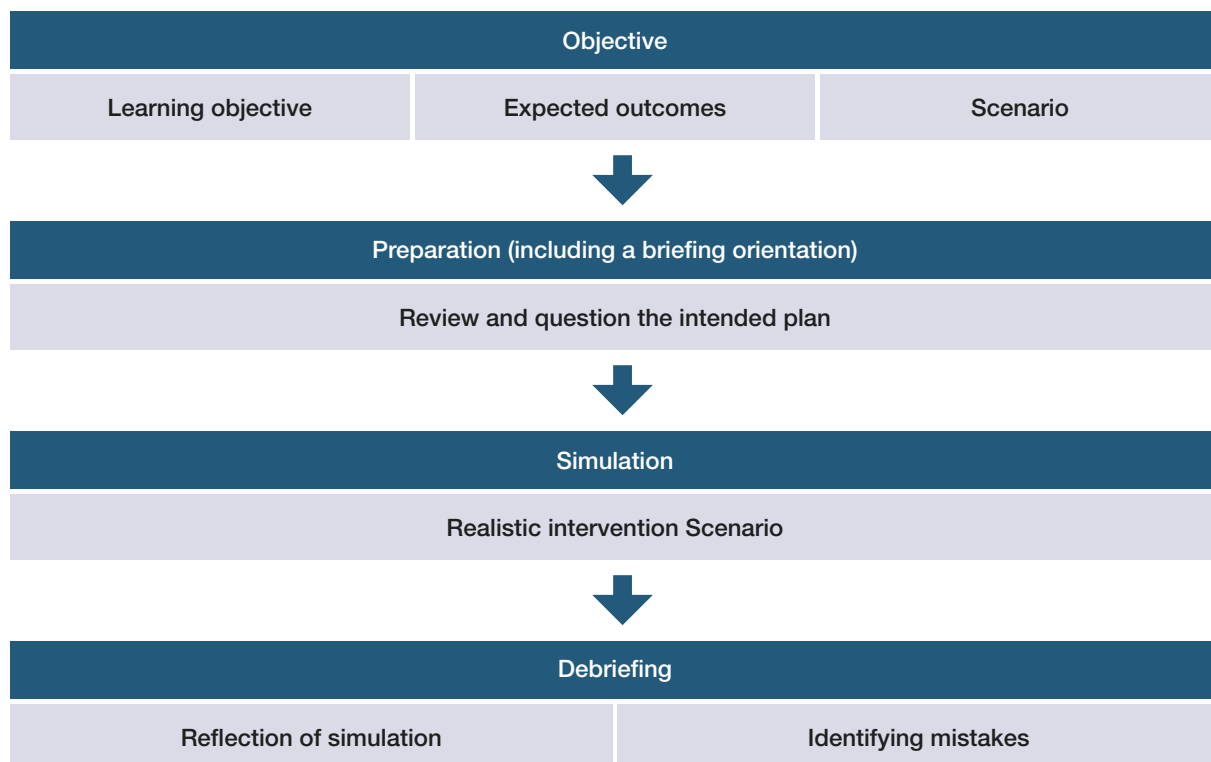


Chart 1: Flowchart of a simulation based teaching



The preparation or briefing phase is important to prepare the simulation itself and the participants. (Halamek et al., 2019) describe the importance as follows:

“A briefing is a discussion about an event that is yet to happen in order to prepare those who will be involved and thereby reduce the risk of failure or harm. The briefing allows those who will execute an activity to review and question the intended plan and any contingency plans that have been developed. This is done in an effort to increase the likelihood that the activity will be safely and successfully conducted (Halamek et al., 2019, p. 1).”

With the debriefing after the intervention it shall be made sure that the simulation is reflected upon, room for feedback and to identify made mistakes. As such, it is a crucial part for the student’s learning effect. (Lee et al., 2020) classify different type of debriefing methods:

Categories	Debriefing types
Debriefing operator	Faculty or instructor-led debriefing Self-debriefing Peer-led video debriefing
Debriefing timing	In simulation debriefing Post simulation debriefing
Debriefing form	Individual versus group
Structured guideline use	Unstructured debriefing Structured debriefing (rubric or structured questions, DML, LCJR)
Media type	Not used media (oral, verbal, discussion debriefing) Video debriefing Written debriefing Using the scripts or worksheet Using the media (internet chat, discussion boards, blogs etc.) Using the simulator log

Table 4: Different types of debriefing types (Lee et al., 2020)

Watts et al., (2021) propose the following eleven steps and criteria to meet their standard for best practice simulation:

Perform a needs assessment to provide the foundational evidence of the need for a well designed simulation-based experience.
Construct measurable objectives that build upon the learner’s foundational knowledge.
Build the simulation-based experience to align the modality with the objectives.
Design a scenario, case, or activity to provide the context for the simulation-based experience.
Use various types of fidelity to create the required perception of realism.
Plan a learner-centered facilitative approach driven by the objectives, learners’ knowledge and level of experience, and the expected outcomes.
Create a prebriefing plan that includes preparation materials and briefing to guide participant success in the simulation-based experience.
Create a debriefing or feedback session and/or a guided reflection exercise to follow the simulation-based experience.
Develop a plan for evaluation of the learner and of the simulation- based experience.
Pilot test simulation-based experiences before full implementation.

Table 5: Best practice criteria for simulation-based teaching (Watts et al., 2021)



3. Necessary competences for telehealth services and educational strategies

For the proper establishment of telehealth applications and services it is crucial for the health care personal to receive a proper training on how to implement these new services in an appropriate manner. For that reason, this Roadmap concentrates on the following two questions:

- 1) Which competences are need to provide telehealth services?
- 2) How can these competences be taught using simulation?

Therefore, competences for implementation and current guidelines and frameworks for telehealth simulation in pedagogical settings are presented.

3.1 Competences for the implementation of telehealth services

In order to include the new services in the curricula in the best possible way, it is first necessary to identify the breadth of skills required. In accordance with (Carolyn M. Rutledge et al., 2017) the National Organization of Nurse Practitioner Faculties (NONPF) supports the following list of Telehealth competences:

Telehealth etiquette and professionalism while videoconferencing
Skills in using peripherals, such as otoscope, stethoscope, and ophthalmoscope
An understanding of when telehealth should and should not be used
An understanding of privacy/protected health information regulations
Proficiency in the use of synchronous and asynchronous telehealth technology
Knowledge of appropriate documentation and billing of telehealth technology
An ability to collaborate interprofessionally using telehealth technologies
Proficiency in taking a history, performing an appropriate physical exam, and generate differential diagnoses using telehealth

Table 6: List of telehealth competences (Chike-Harris, 2021; Carolyn M. Rutledge et al., 2017)

As we can see in the above list in Table 6 there are different types of competences needed for providing telehealth services. Various areas of theoretical and practical knowledge are identified as prerequisites for the assignment, such as etiquette and regulatory requirements, as well as knowledge about the breadth and implementation of possible services. One further list of



competences was developed by (C. M. Rutledge et al., 2021) along the Four P's of Telehealth framework, namely Planning, Preparing, Providing and Performance Evaluation. This classification assigns different competences to the various phases of implementation. In planning more theoretical, general knowledge about definitions of, benefits and barriers to telehealth services and in the phases of implementation more practical skills concerning the development and implementation of the telehealth services.

Categories of Telehealth Competencies Based on the Four P's of Telehealth Framework		
Domains of Four P's	Content	Expected Outcomes
I. Planning: Planning for the implementation of a telehealth program	<ul style="list-style-type: none"> • Telehealth Definitions • Target Populations/ Settings • Target Health Care Issues • Regulation/ Reimbursement • Benefits to Telehealth • Barriers to Telehealth • Equipment/ Technology • Required Personnel 	Learners will determine/ discuss the needs and requirements for delivering telehealth services.
II. Preparing: The process of readying for telehealth implementation	<ul style="list-style-type: none"> • Protocol Development/Evaluation • Consent & Confidentiality • Establish telehealth delivery program (equipment, technology, space) • Skillset (telehealth etiquette, equipment use, providing care via telehealth) 	Learners will have the knowledge and skills to establish and deliver a telehealth program.
III. Providing: Delivering/ conducting telehealth services	<ul style="list-style-type: none"> • Beginning: Setting the Stage for Visit • Middle: Conducting the Visit • End: Wrap-up (Charting, Referral, Follow up) 	Learners will effectively perform telehealth visits/encounters.
IV. Performance Evaluation: Evaluating the impact and outcomes of the telehealth program	<ul style="list-style-type: none"> • Develop an overall assessment plan for a telehealth program <ul style="list-style-type: none"> ○ Access ○ Financial impact ○ Patient/provider experience ○ Effectiveness 	Learners will evaluate the success of a telehealth delivery program.

Table 7: List of telehealth competences along four steps of implementation (C. M. Rutledge et al., 2021)

Here the competences are arranged around the different steps of the implementation, the contents and thus knowledge necessary for each step, the expected activities and the outcomes for the learner. For instance in the planning phase of a telehealth intervention it is necessary to understand the concept and implications of telehealth services, its benefits and



barriers, “to select an appropriate target population, identify relevant health care issues, select technology that is feasible, and address the identified need” (C. M. Rutledge et al., 2021, p. 303). The effective consideration and use of these competences should guide the curriculum development, the further practice and implementation and further research for an effective use of telehealth services.

3.2 Teaching telehealth services using the method of simulation

Following the previously outlined necessary competences for providing telehealth services, it is necessary to not just educate in a theoretically manner, but to give hands-on training. A major and most common way to do so is the method of simulation. In general, as previously outlined, it needs to be scenario-oriented and objective-led.

With the need to follow a certain scenario for the training, i.e. follow the training along a real implementation of the telehealth service, we see a strong connection to the questions of a successful implementation of a telehealth service. According to the Telehealth Service Implementation Model (TSIM) there are necessary strategic steps to consider, namely 1) the definition of the scope of the service and 2) which problem is being solved by the service. So - 10 - for the further development the essential question for the scenario development are the clinical purpose, the technological means, legal and regulatory boundaries and the achieved outcome (MUSC). Even in the context of a simulation, the real service and its conditional steps need to be considered. One example how scenarios are used for teaching purposes is given by (Torblå Olsen J, Prinz A, Smaradottir B., 2019). They use two scenarios 1) a fall scenario of a person in his/her home with geolocation and several sub scenarios of telecommunication 2) a measurement scenario with a person measuring his/ her pulse using a tablet device.

The first question to answer is what my objective of the training is, i.e. what is the scenario of future telehealth service I do have in mind as my target. The second question is which bundle of skills, competences and insights you want to teach by the simulation in the light of the future telehealth service. Thirdly, it comes to the question how you can develop the simulation accordingly.

3.3 Presentation of selected Guidelines for telehealth simulation training

The chosen and in the following presented Guidelines, Toolkits and Models for teaching telehealth using the method of simulation give different advices for teaching telehealth. We want to extract the essential part from each publication and present it one by one, in order to illustrate and give examples in which ways those telehealth simulations can be conducted and what needs to be considered in advance.

Toolbox for teaching telehealth (Martin et al., 2022)

Martin et al., (2022) presented a very practice oriented and hands-on toolbox for teaching telehealth using the method of simulation. The toolbox introduces to a wide area of possible scenarios, which can be trained. In the light of telehealth application, they pick up the topic of digital knowledge and competences and connect it with the appropriate simulation design.



Telehealth knowledge, skills and adaptations	Design examples in response to core capabilities
Domain 1: Compliance	<p>Script the actors to ask questions regarding the laws around practicing across state jurisdictions via telehealth</p> <p>In a follow-up activity, encourage the learners to document the interaction and consider what additional information they might record with relevance to telehealth</p>
Domain 2: Patient privacy and confidentiality	<p>Script the case so that learners must get informed consent to take photographic stills of the client during the interaction</p> <p>Script the case so that the client must remove a shirt to expose their shoulder, and have the actors ask about the security of the platform that the learner is using</p>
Domain 3: Patient safety	<p>Script the clinical case so that the client is potentially at risk (i.e. during supervised exercise), and if the learner does not respond to this in a timely manner, have the actor experience an adverse event (i.e. fall)</p> <p>Script the clinical case to include an adverse event that the learner has to respond to (i.e. shortness of breath)</p>
Domain 4: Technology skills	<p>Script that the client has poor Internet connection and that their video is 'freezing'</p> <p>Script that the client cannot turn their camera on, and have the learner guide them through this</p> <p>Script a discipline-specific task that is complex via a two-dimensional camera (e.g. completing a functional assessment)</p>
Domain 5: Telehealth delivery	<p>Script that the client has the video facing the ground and continues to walk off screen, encouraging the learners to provide education about technology use needed for telehealth</p> <p>Script that the client is hearing impaired and unable to understand what the learner is saying, encouraging the learner to demonstrate the communication adaptations required of telehealth (e.g. increased use of non verbal language)</p>
Domain 6: Assessment and diagnosis	<p>Script that the learner must conduct an appropriate assessment via telehealth. (i.e., mental health assessment, post-operative follow up, assessment of a musculoskeletal injury).</p>
Domain 7: Care planning and management	<p>Script that the learner must deliver an appropriate intervention via telehealth (i.e. repeat prescription consultation, health promotion through lifestyle change and exercise prescription)</p>

Table 8: Design examples of telehealth simulation by different domains (Martin et al., 2022)



These domains of competence show the variety that can be taught for a successful telehealth simulation and to establish the appropriate competences. The design propositions show the specification that can be arranged in conducting the simulation.

Teaching telehealth Consultation skills (Rienits et al., 2016)

Rienits et al., (2016) introduce to consultation skills and focus on one application of telehealth. Conducting a consultation is most common and compared to other services rather easy to implement. Still you consider several necessary steps and conduct appropriate trainings for future service providers. Rienits et al. name four essential objectives of their lessons, what they want to teach: “the various types of uses of teleconsultation, the legal, ethical and financial considerations, the technical and the procedural issues, the problems and benefits for patients and doctors (Rienits et al., 2016).” They used a four-step approach to achieve these objectives:

Station 1: establishing a connection: technical set-up and specification of the surroundings
Stations 2: role-playing a teleconsultation: Simulation of scripted scenarios
Station 3: viewing a teleconsultation: teaching etiquette and evaluation
Station 4: discussing the ethics and dilemmas: Group discussion

Table 9: Four step approach teaching telehealth consultation (Rienits et al., 2016)

These four steps show the scope of training. Beginning with the technical set-up, followed by the conducting and ending by soft-skills as the capability to critically assess teleconsultation and its ethical implications.

iSOAP Model for Incorporating Telehealth Within Simulations (Chike-Harris, 2021)

The iSOAP Model is an acronym and stands for Introduction, Subjective, Objective, Assessment and Plan. Those are the five steps for conducting a consultation and (Chike-Harris, 2021) compares the face-to-face training to the telehealth simulation training and its specifics along the five steps. By the comparison one can see that the telehealth training needs a lot more considerations and planning.



5 steps	Considerations for telehealth simulation
Introduction	<ul style="list-style-type: none"> • Confirm patient consent • Verify patient safety • Establish agreement • Determine appropriateness • Obtain location & emergency contact • Collect PCP & pharmacy information • Discuss how visit will be conducted • End visit at any time if not appropriate for telehealth
Subjective	<p>Collect Subjective Data Using Telehealth Etiquette & Interventions</p> <ul style="list-style-type: none"> • “Web-side” manner employed to establish therapeutic relationship • Collect same subjective data as face-to-face
Objective	<p>Guide patient and/or presenter to perform physical exam via videoconferencing</p> <ul style="list-style-type: none"> • Without peripherals using creative strategies • With peripherals (may direct use of technology) • With or without “store and forward” data (lab, x-rays, RPM, etc.)
Assessment	<p>Complete the Assessment Develop Diagnoses</p>
Plan	<ul style="list-style-type: none"> • Bill & code for telehealth visit • Provide plan to patient (patient portal, email, text, mail, EHR) • Schedule follow-up/referral (in-person or via telehealth) • IPC via telehealth • Order diagnostics for remote delivery

Table 10: Five Step Approach for considering telehealth implementation (Chike-Harris, 2021)

4. Overview of Guidelines for Implementation

Teaching the use of telehealth services using simulation and thus educating the allied health care workforce is one necessary step for a successful preparation and implementation of telehealth services. The overall process of the implementation is very complex. Many steps need to be considered, starting from the strategic starting point, the development phase of the program, technological set-up and equipment, the legal and regulatory environment and preconditions and the final execution of the service in the real-life setting.

Many Guidelines structuring and aiding this process have been developing from different organizations for different purposes and areas of application. In this overview, we want to point to most common of these Guidelines as an outlook and inspiration for a further program development.

General Guidelines
American Medical Association: Telehealth Implementation Playbook
American Telemedicine Association: ATA'S QUICK-START GUIDE TO TELEHEALTH DURING A HEALTH CRISIS
California Telehealth Resource Center: Telehealth Program Developer Kit
Northeast Telehealth Resource Centers: Roadmap for Planning Development
Medical University of South Carolina: Telehealth Service Implementation Model (TSIM™): A Framework for Telehealth Service Development, Implementation, and Sustainability
World Health Organization 2016 – Framework for Implementing Telemedicine

Guidelines for specific areas
Australian College of Remote and Rural Medicine: How to Conduct a High Quality Remote Consultation
Australian Physiotherapy Association: Telehealth Guidelines. Response to COVID-19
College of Registered Nurses of Nova Scotia: Telenursing-practice-guidelines
University of Plymouth: Telerehab Toolkit
World Health Organization 2021 – How to plan and conduct telehealth consultations with children and adolescents and their families



5 Conclusion

In conclusion, developing a student-based telehealth service requires a robust methodological framework and simulation-based strategies. The framework must be student-centered, allowing for a personalized and adaptable approach to healthcare delivery. Simulation-based strategies can provide a safe and controlled environment to test the telehealth service, identify potential challenges, and train students to respond to different scenarios effectively.

Additionally, the development of a student-based telehealth service requires collaboration among different stakeholders, including healthcare professionals, educators, and technology experts. They must work together to design a telehealth service that meets the needs of students while adhering to regulatory and ethical standards.

Overall, the application of well-designed methodological framework and simulation-based strategies are critical to the successful development and implementation of a student-based telehealth service. These tools can help ensure that the service is effective, efficient, and meets the needs of its intended audience.



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