DOCTORAL CONSORTIUM

PRESENTATION OF THE DISPOSITION DRAFT

NEJA SAMAR BRENČIČ[1,2]

[1] University of Maribor, Faculty of Organisational sciences, Kranj, Slovenia
neja.samar@student.um.si
[2] IZRIIS Institute, Ljubljana, Slovenia
neja.samar-brencic@izriis.si

The Covid19 crisis situation heralded long-term changes in the way health services are provided and accessed. The standards on which these services are based, or should be based, play an important role in ensuring their quality. Telehealth should be regarded as the people centred holistic service not merely as a technological solution. In the thesis I will illuminate how the methods, the procedures and the protocols which form the service of telehealth, are just as important as the technological solution or infrastructure itself. For such understanding, standards of telehealth need to be considered throughout the service development and implementation. In the process the highest service quality can be achieved if we leverage the support of properly developed assessment tools, based on specific standards. This paper will present the disposition draft of the thesis that will propose a model for evaluating services in every phase of their evolution and implementation.

1   Introduction

Problem definition

<u>Standards of telehealth (TH)</u> **services** are not yet set in national, EU and international strategies (WHO)[1]. Further on, the stages of implementation, if any, should be investigated and researched. Analysis and anticipated steps toward comprehensive solutions should be proposed.

Standards and accreditation processes are a well known and broadly used quality assurance in all fields of development, production and services. Yet due to the novelty of telehealth and related areas or sub-areas, the standards as well as accreditation programs are being developed alongside the increased need and sporadic implementation of services in daily professional and general population activities.

The still current COVID-19 pandemic and its effects have significantly increased interest in innovative health solutions, specifically also in the field of telehealth services.

Key points of the problem (I want to address in my thesis)

In the flood of information and new solutions, potential customers, suppliers and end users are wondering which of telehealth services are useful, necessary and tested. What is the level of their quality and suitability to a specific need?

Older adults, patients and chronic patients are (potential) major users of telehealth services. Many are particularly vulnerable users, as they can need a greater degree of trust and guidance in choosing and deciding on a particular service. The issues are especially relevant at this time as we tackle the ongoing issues of the pandemic - as part of which telehealth services are being increasingly considered. The crisis situation thus heralded long-term changes in the way health services are provided at

---

[1] WHO Global strategy on digital health 2020-2025 reference on standards The strategic objective promotes standards for safety, security, privacy, interoperability, and the ethical use of data within and outside the health sector….interoperability standards…requirements for digital health in the design of norms and standards products…global minimum standards for electronic patient health records. etc.;
https://www.who.int/docs/default-source/documents/gs4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf

or accessed from a distance, namely through telehealth. The standards on which these services are based, <u>or should be based</u>, play an important role in ensuring their quality.

There are only a few international and independent standards of services in this area. So, on one side standardisation institutions and user associations call on stakeholders to co-operate and co-create in the research and development.

On the other side, developers and users of telehealth services often do not have a clear understanding of the necessity of standards to ensure service quality. Furthermore, the meaning of the term 'telehealth service' itself can carry different orientations or emphases.

The knowledge, on the side of the developers, of the complementary perspectives of the technological and service part of the solutions should be understood in order for the final product to be relevant, appropriate and to truly benefit the end user in a long-term sense.

Telehealth should be regarded as a service or resource mediated by technology that people use to access or provide health and wellness-related services, regardless of their location. Of course the technological infrastructure and service compositions will be discussed in the thesis but the importance of **understanding the service as a whole**, will be explained in the context of the need for standardisation and accreditation.

Furthermore, for telehealth service to be successful, it needs to gain the trust of physicians; health and social care and support providers; as well as formal and informal carers. Only then will telehealth solutions truly serve a purpose that relates to the overall health of a person.

In the thesis I will illuminate how the methods, the procedures and the protocols which form the service of telehealth, are just as important as the technological solution or infrastructure itself. "Non-optimal" solutions are usually more likely to be related to acceptability, training, availability and, consequently, usability, than to the technological component itself or the possible "complexity" of the technical part.

Technological solutions, which are only a part of the service of telehealth, are thus considered as likely to be successfully implemented only when certain service standards are achieved. The development and **implementation** of such standards as part of digital health strategies are still in their infancy.

In the near future, more attention and focus will be needed to establish operational procedures that can ensure appropriate quality standards for both the technological part and the services themselves. Only in this way will the developers and service providers be able to respond appropriately to the increase and changes in needs, demand and user choices.

It is recognised that many telehealth services, especially those that relate to tele- and video-consultation with health staff are now being developed in an emergency. However, the standards within which services operate remain a matter of common interest, possibly heightened in importance for all the stakeholders involved.

Telehealth is now no longer just an alternative form of health(care), so the development of standards, certifications and regulations must also be included in national priorities. This will ensure not only technological quality, but equally important quality of service.

Following the necessity for standardisation is also the issue of accreditation. More and more medical service providers want to develop their expertise through the accreditation process or gain approval of the quality for their services.

1.1   Structure of the disposition of the doctoral dissertation

1. Problem definition
>   1.1. Significant research in the field of Telehealth Standardization and Accreditation Programs - International State of the art research and praxis
>   1.2. Research and praxis in Slovenia

2. Objectives of doctoral dissertation
>   2.1. Expected original contribution to science

3. Assumptions and potential limitations

4. Intended research methods

5. Intended chapters and subchapters

1.2   Significant research in the field of Telehealth Standardization and Accreditation Programs

1.2.1   International State of the art research and praxis

As a part of the thesis research I found that the subject is so novel and even undefined to that level that under the same term there are different services in praxis.

I decided to start organising the terms so that the demarcation and definition of terms might further serve the standardisation of processes and also contribute to the rise of the quality of services. For that purpose I prepared a paper for the FOV Portorož Conference that was held in March 2023 titled *Demarcation and usage of the terms Telehealth, eHealth, Telemedicine and Digital health.* I decided to examine the worldwide occurrence of each phrase using the Scopus database in pursuit to add to the definition of the concepts of these services. Other similar terms or sub-terms

will be a subject of further studies. A total of 95,884 documents contained one of the four terms in the title, abstract or keyword. Telemedicine was the most common term, with 64,149 documents referring to it, followed by e-health by 23,754 and then telehealth with 22,387 and Digital health with 8,599 documents. Articles were the most common type for the four key terms, followed by review articles and conference papers .

Table 1: Number of documents with telehealth, e-health, telemedicine and digital health and their combinations in title, abstract and keyword for the period 1964 – 2022

	Title	Abstract	Keyword	Title or Abstract or Keyword
Telehealth	6,048	10,065	17,769	22,387
eHealth	7,310	13,724	15,476	23,754
Telemedicine	12,883	21,735	57,278	64,149
Digital health	2,509	4,619	4,553	8,599
Telehealth or eHealth or Telemedicine or Digital health	28,771	46,696	78,657	95,884

source: Scopus

In Table 1 we can see the number of documents referring to each term and their combinations in title, abstract and keyword. The majority of these articles (95%) were in English, (see Table 2) and 10 articles were also written in Slovenian language.

In the search all journal categories, all languages and dates of the publication to the exception of the year 2023 for accurate statistics were included.

Table 2: The top three languages of the articles retrieved using the four search terms telehealth, e-health telemedicine and digital health in the title, abstract or keyword

	no.	%
English	91,601	95
German	1,592	1,6
French	985	1,02

source: Scopus

The distribution over time, by document type and by country was provided by Scopus functionalities.
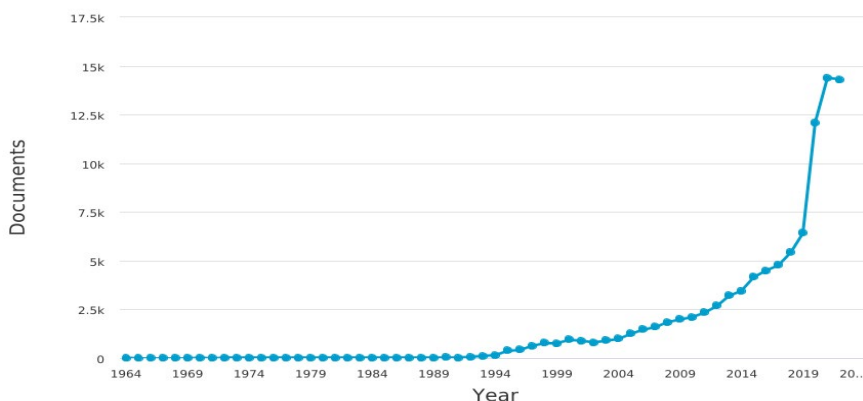
Figure 1: Number of documents per year total

The findings of the research exposed that the terms telehealth, e-health, telemedicine and digital health are frequently used reciprocally or interchangeably. I noted that the diversity in the use of the four concepts indicates the vagueness of the concepts and the need for a more precise definition of services and the establishment of certain definitions.

The conclusion regarding various usage of terms in the literature was that Telehealth, e-health, telemedicine, and digital health are concepts that have emerged due to advancements in technology in the last two decades and are still being defined.

Different levels of acceptance and use of the four terms points to the ambiguity in definition and in understanding specifics of each concept and the concrete service that is behind that particular concept. Telemedicine being the earliest and most popular term is followed by the term telehealth and e-health, based on the number of publications in the Scopus database. Least used also due to its novelty is the term Digital health. The number of publications is steadily increasing for all of the four terms as it was also foreseen by the authors in the past decade.

While these terms are related, they have distinct differences that need to be understood. In order to reach such understanding, the protocols of the service that is behind each term needs to be defined. Only then the process of standardisation can begin as the proper terms will be used by practitioners, developers and

financiers. The terms will be defined by the individual parts of the service that are characteristic of it and actually fall under a specific service title.

Further research will be needed in order to prepare a more precise demarcation of services. That might further serve the standardisation of processes and also contribute to the rise of the quality of services.

1.2.2   Research and praxis in Slovenia

Slovenia is witnessing a progress in development of telehealth solutions on local and national level. Some overviews have been done in the past 3 years that give us some insight into the situation.

In June 2022 I have prepared a brief assessment in regards to standards for Telehelath including Telemedicine, of all listed Telemedicine services. As a basis I used an article by Rant and Rudel (2020) and compared it with online search in June 2022 to verify the services are still operabile. The results showed that there were four kinds of services available at the time of the assessment, namely (1) national, developed by the NATIONAL INSTITUTE OF PUBLIC HEALTH (National eHealth, Teleradiology, Teletransfusion, Tele-Stroke, Teleconsultations, etc.) (2) national /semi-privat, developed by TELEKOM SLOVENIA, (eHealth, eCare, e-WorkHealth, etc.) (3) national / research developed by The Medical University Ljubljana (Telefarm) and (4) national / private developed by private companies (MKS Cezar, T-Med Gluco, Gospodar Zdravja, etc.), total 21 services provided by 14 entities in Slovenia.

Further research is planned for the thesis that will include literature search and **an updated list** of all available Telehealth services (Telehealth, Telemedicine, Telecare etc.).

2   Objectives of doctoral dissertation

Based on many years of research and practical work and case studies in the international environment, I realised that it is possible to provide better quality of TH services.

In the thesis I will be introducing a decision-making model and an appropriate decision-making tool, that will present a possibility for determining suitability of various Telehealth services according to TH standards and suitability according to criteria for specific services.

As a part of the research work I will prepare a **unique model of assessment for Telehealth services** that will serve as a tool during the planning of the solution or during the development phase. It will also serve for possible upgrading of the existing services.

The intended outcome of the dissertation is a **model for the evaluation of services** (according to a certain standard that can be included as a condition) to increase the quality of TH and their standardisation in order to achieve the highest quality possible also for passing the accreditation processes.

2.1 Expected original contribution to science

Such a model does not yet exist in the proposed form, according to the best of my research and knowledge and it represents an original innovation in the field of Telehealth.

In the disposition of the doctoral dissertation I will further present the research gaps, assumptions and potential limitations, intended chapters and subchapters, basic literature and the analysis of the originality of the topic.

3 Intended research methods

The research method is in the process and will need further input and fine tuning.

Proposed method is the following:

1. Development of the criteria tree with stocks of value with sufficiently clear descriptions.
2. A set of criteria for the DEXI model.

For example: if the acceptance of telehealth services and how they are evaluated by users is a model example, then the proposal can be from here on for more demanding and advanced evaluations according to standards and pre-accreditation procedures that will be used by developers.

3. Testing of the model I. (End-user group)

Focus groups of 8 - 10 users will test the services and answer the questionnaire in the laboratory environment.

The focus group will rate the usability of the app, services, etc. according to the DEXI model.

I need to further decide if

a) The focus group has available set of services for them to choose from or
b) The focus group chooses the existing or hypothetical services
c) Is the first entry their proposal - e.g. they choose from a set of services or do they enter services themselves.

For example Samsung Health App, Telekom eOskrba, Smart watch xx, Monitoring patients Caesar, eHealth - some of these services, e.g. eRecipe
Telecap, etc.

4. Testing the model II. (Expert group)

We forward the written answers to experts - an expert group, who will also evaluate based on these opinions.

The testing can be organised as a focus group or individual testing.

F.e. user group of 3 experts that talk to each other in a controlled environment and give a qualitative assessment or they propose assessment individually. These options will be considered also relating to the availability of experts.

Each assessment will be done only one time for one application.

Previously to the testing the questionnaire will be proposed to the ethical commission for review.

In the disposition I will propose the (1) Planned course of research work and (2) Display of the basic elements of the assessment model.

4   Proposal of a potential mentor

Proposed mentor for the thesis is the associate professor dr. Uroš Rajkovič, University of Mariboru, Faculty for organisational sciences, Kidričeva cesta 55a, Kranj.

4.1   Proposal of a potential co-mentor

Proposed co-mentor is professor dr. Malcolm Fisk, De Montfort University, Faculty for Computing, Engineering and Media, School of Computer Science and Informatics, The Gateway, Leicester, LE1 9BH.

5   Proposal for the scientific discipline of the competent department

A proposal for a scientific discipline: Organization and Management of Information Systems. Proposed department: Department of Informatics

References

Fatehi F., Wootton R. (2012). Telemedicine, telehealth or e-health? A bibliometric analysis of the trends in the use of these terms. J Telemed Telecare. 18(8), 460-4.
Samar Brencic N., Rudel D. (2021). Can a self-assessment tool help raise standards of eHealth and telemedicine services that are rapidly developing under COVID-19 emergency? JTTA journal Vol.16 suppl.
Samar Brencic N., Rudel D., Fisk M. (2021). The importance of standards for quality Telemedicine and eHealth services in COVID-19 pandemics, JTTA journal Vol.16 suppl.

Samar Brencic N., Rudel D. (2020). Standards of quality for telehealth services for older adults - their augmented significance in Covid-19 pandemics; 22th International multi-conference information society, Conference proceedings, 393 - 395.

Samar Brencic N., Rudel D. (2020). Pomen standardov za kakovostne storitve zdravja na daljavo (v času COVID-19 pandemije), Digitalni mostovi v zdravstvu : e-Kongres MI'2020 : zbornik prispevkov in povzetkov SDMI, ur. Tomaž Marčun, Ema Dornik Dostop do e-publikacije: https://sdmi.si/files/strokovna_srecanja/zbornik%20MI2020.pdf

Samar Brencic N. et al., Intuitive and intelligent solutions for elderly care, 2020. V Chaari, Lotfi ed.. Proceedings of the 2nd International Conference on Digital Health technologies, Advances in Predictive, Preventive and Personalised Medicine Series 12, Springer International Publishing, DOI 10.1007/978-3-030-49815-3.

Rudel, D., Fisk M. (2012). Telescope – telehealth services code of practice for Europe. Inform Med Slov; 17(1), 38-44.

Rudel, D., Fisk M. (2011). Definitions of Terms in Telehealth. Infor Med Slov, 16(1), 28-46. http://ims.mf.uni-lj.si/archive/16%281%29/21.pdf (Accessible 2011-10-12).

Rudel, D., Fisk M. (2018).Telehealth Quality Group EEIG, International Code of Practice for Telehealth Services, Ljubljana.

Thiel T., Deimel L., Schmidtmann D., Piesche K., Hüsing T., Rennoch J., Stroetmann V., Stroetmann K. (2018). SmartHealthSystems: International Comparison of Digital Strategies', Empirica, Bertlesmann Stiftung.