Technology-Enhanced Healthcare Education

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Technology-Enhanced Healthcare Education: Transformative Learning for Patient-centric Health

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Emerald Publishing Limited
Emerald Publishing, Floor 5, Northspring, 21-23 Wellington Street, Leeds LS1 4DL.

First edition 2024

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN: 978-1-83753-599-6 (Print)
ISBN: 978-1-83753-598-9 (Online)
ISBN: 978-1-83753-600-9 (Epub)

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Preface

A new era of Digital Health has already emerged. Emerging and streamlined technologies challenge the entire lifecycle of health care. In this context, the classical agenda for the discussion of the phenomenon has been enriched with bold, delicate, and emerging topics.

Our book intends to communicate this transformation with an emphasis on health education and the capacity of technology to transform digitally the new generation of technology-enhanced healthcare education. Our basic ideas for the unique value proposition of our multidisciplinary edition are communicated in the next paragraphs.

From the beginning, we have to emphasize that in the centre of our approach and our analysis of the patient. We are very much interested in high-quality patient-centric health care with an emphasis on the utilization of health literacy and the composition of dynamic health and clinical services to move forward the vision of the digital transformation and value-based health care.

The arrival of technologies, such as artificial intelligence metaverse, cloud computing, and many others, strategists, policy-makers, physicians, health literacy experts, healthcare practitioners, computer scientists, psychologists, and social scientists provide a new sophisticated context for the design and implementation of socio-technical medical and clinical health services.

In parallel healthcare education institutions in their quest for a revised, updated, resilient, and robust strategy to reflect on these changes, need to deploy new methodological approaches, adopt innovative methods and vision, and the new generation of healthcare practitioners that will satisfy patients and all the other stakeholders.

In this volume, we bring forward various aspects of this resilient strategy for next-generation digital health and technology-enhanced healthcare delivery:

- Communication of lessons learned, case studies, and experiences from the implementation of digital health projects.
- Coverage of the digital transformation agenda for health education and health care.
- Designing of active and transformative learning strategies for healthcare education.
- Discussion of patient-centric challenges for healthcare education.
- Provision of a novel methodological approach to patient-centric health care.

- Strategizing the use of new technologies for enhanced quality of healthcare education.
- Utilization of health literacy for the delivery of high-quality health care and empowering health professionals, organizations, and communities.

Health research showed that satisfaction with patient centrality are golden rules that health and social organizations should have if they wish to qualitatively increase their services. In this context, the patient's experience means that the humanization of care must be always present and also enhanced with a technological component that utilizes tools and services enabled by artificial intelligence, augmented and virtual reality, and services, such as telemedicine and teleconsultation.

The strategies for the development of services in the areas of health and health education are constantly integrating digital solutions that provide biological, psychological, emotional, individual, and social added value.

The domain of Health Education and Training represents a progressive scientific domain with developments in both knowledge creation and applied practices. It is also related to an interactive connection of health specialists to patients. This is exactly the context of our scientific and methodological contribution through the applied approach we deploy. The development of a volume that captures the latest developments:

- On active and transformative learning for Health Education and Training.
- On Medical Technologies (MedTech) tools that are integrated into the medical practice.
- On instructional design and technology-enhanced learning as an enabler of enhanced quality in Medical Training and Education.
- On policy-making related to the integration of Innovative methodological approaches to patient-centric health training.

The new challenges in Healthcare Education at postgraduate and undergraduate levels require new methodological approaches and transparent integration of active and transformative technology-enhanced learning approaches. From this perspective, our book promotes the best practices and lessons learnt from the current pandemic period and also sets the priorities for the post-COVID-19 eras.

The purpose of the publication is to deliver an innovative edition for health specialists, health literacy specialists, educators, higher education medical experts as well students from medical, nursing, psychological schools, and health management professionals, and to update their knowledge and skills and capabilities with a patient-centric-oriented approach to Health Education.

The volume contributes:

- To the theory and the body of knowledge of the domain of Health Education and Training with novel theoretical approaches and methodological propositions.
- To the practice and the best practices of instructional design of Healthcare Training and Education.

- To the applied knowledge of the domain with key contributions to the integration of academia, industry, and research.
- The edition serves a diverse audience including health specialists and educators in a variety of health sciences.

This edition involves a multidisciplinary team that shares a set of synergies aimed at improving the patient's experience and their satisfaction within health organizations. Teamwork brings together professionals from the fields of engineering, communication sciences, biomedical, patient safety managers, doctors, and nurses.

The methods communicated in this book are based on quantitative and qualitative research, case study, participated and unattended observation, ethnographic studies, and methodologies that use techniques, such as qualitative content analysis, which aims to deepen the participants' feelings, their perceptions and vision of the world and the experiences experienced at the individual and group levels.

This volume also promotes this unique value proposition mix:

- Communication Competences
- Digital Health
- Digital Transformation in Health Education
- Gamification and Health Areas
- Health Education Strategies
- Health Services and Health System
- The Paradigm Shift from the Biomedical Model to a Biopsychosocial Model where emotions work with reason/rational
- The patient experience in the Health System

We thank all the authors who contributed to this book, as well as the EMERALD editors.

May this book open the door to research, to the debate of cases and good practices so that researchers and all those interested in these subjects can improve their performance and knowledge.

Cristina Vaz de Almeida & Miltiades Lytras

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Chapter 1

How Digital Health Gives Clues for a Better Health Literacy Patient Experience

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Abstract

Humanized digital solutions that provide better access, understanding and use of health services enable better decisions and better patient's experience focused on humanization of care. This translates into better health literacy in the digital area.

Currently health care is inseparable from digital health, and this evidence was highlighted during the COVID-19 pandemic. For this analysis, a cross-sectional study was carried out, with 335 valid answers in a quantitative and qualitative research to evaluate the opinion of the respondents regarding their digital health use and the means used, as well as the perception of emotions generated before and during the pandemic. A qualitative content analysis was also performed on the open question about the future of health.

The results showed a humanization in digital is essential and that it is necessary to prioritize the human relationship and find the meaning of space, communication and proximity of health face-to-face, respecting as differences.

This chapter will also propose the presentation of challenges and results from the application of health literacy on patient empowerment in the health system, based on humanized digital solutions.

Keywords: Health literacy; digital health; communication; health; humanization; patient experience

Technology-Enhanced Healthcare Education:
Transformative Learning for Patient-Centric Health, 1–17

doi:10.1108/978-1-83753-598-920231001

Introduction

Globally, on 3 February 2023, there have been 754,018,841 confirmed cases of COVID-19, including 6,817,478 deaths, reported to WHO. As of 31 January 2023, a total of 13,168,935,724 vaccine doses have been administered (WHO, 2023).

The pandemic has led to a major imbalance in health systems around the world and the rupture of some worldwide, requiring drastic change in face-to-face care, both due to lack of capacity and to prevent the spread of the disease.

On the other hand, the pandemic required organizations and health systems to quickly move to remote health solutions, given the permanent need for continuity of care for the population (WONCA, 2002).

Digital health has advanced with strength since the beginning of the crisis, as a mechanism for replacing some consultations that allowed instalment solutions of a habit that had to be suddenly changed for both patients and health professionals.

Even patients accustomed to provide online health services crave a frictionless health experience (*Change Healthcare,* 2020). Those who are familiar with digital access still want to have more access to services, schedule *an online consultation*, ask for follow-up/follow-up easily, ask questions with direct answers and pay for the service in one place (Change Healthcare, 2020).

Cacciamani et al. (2020) among the four pillars to face a pandemic, whether telemedicine, tele-education, surgical service and outpatient clinic. But there can be no digital health 'without the effective involvement of health professionals (Thakur & Pathak, 2021), either for telemedicine, tele health, videoconferences or mobile applications for consultations, screenings or follow-up' (Vaz de Almeida, 2020a). However, the sense of space, time and presence were dimensions lost during the pandemic by thousands of people.

Pagoto and Bennett (2013) stress that behavioural scientists are needed to facilitate the translation of digital health innovations, from companies to practical research. We add, however, that behavioural scientists are needed to translate and transform digital health barriers into outcomes for patients. In this transition from the real to a virtual communication skills development is essential to retain the person in this connection and involve them (Ramos, 2020; Rodrigues, 2020) in the process of health and change.

The investment in people, environments and processes was necessary for this change from real/face-to-face to real/virtual to occur. The theoretical principle behind this change is that health and its professionals continue to carry out their mission. It should be ensured that there is reflection and intervention in substitution, maintaining a critical set of the characteristics of a face-to-face environment when moving to a virtual one. In addition, Europe is faced with a high level of low health literacy, where around 50% of people cannot adequately access, understand and use health information (Sørensen et al., 2012; Espanha, Ávila, & Mendes, 2016) and in terms of access to new technologies, there is still part of the population that is very info excluded and therefore leading to inequalities.

Pagoto and Bennett (2013) stress that in terms of dissemination and reach, mobile applications have exceptional potential, much more than traditional interventions and highlight existing scientific limitations, requiring more clinical trials

that allow the integration of mobile applications in clinical care, effectively contributing to the clinical and public health impact.

It is also important that in this communication (Kreps, 1988) in distance health, the health professional develops strategies for better retention and memorization, with personalized service and adapted to the age and context of the patient, which stimulate the patient's adhering to health instructions (SNS 24, 2019).

The effort made by health professionals has undergone a greater adaptation to: digital interaction with or without video, use of clearer language and especially with several repetitions. We know that the repetition of information is a technique of health literacy (Almeida et al., 2020) that promotes memorization.

Digital health solutions can provoke a revolution in the way people access services, promote their health and well-being (Vaz de Almeida, 2020a), achieving higher health standards (WHO, 2020). There are some services that can be performed using only the phone as can be seen in Chart 1.1.

Ferreira et al. (2012) analyzed, in an observational study, prospective in a sample of 453 patients included in the INR telemonitoring system (*International Normalized Ratio*), from 2006 to the end of November 2010, the efficacy and safety of a telemonitoring system of patients undergoing anticoagulant therapy. Ferreira et al. (2012) consider that technology is at the forefront of healthcare and self-monitoring projects over the phone, mobile phone or internet are important, and that the telemonitoring system is safe and effective in the remote control of INR analysis.

For Medeiros et al. (2020) telemedicine is a logistics solution for remote medical care, allowing the disseminating of guidelines and ensuring greater accessibility of the patient to the health service. Medeiros et al. (2020) developed a descriptive study of a qualitative nature, through a report of telemedicine experience with care to patients and collaborators of a oncohematological centre, to mitigate the transmission of COVID-19. It is concluded that the strategies

Chart 1.1. Services Performed With Telephone Use.

1. Visits established/scheduled by telephone for meeting between patient and health professional
2. Virtual *check-ins: fast check-in* (five minutes average) with patients via phone or other device, to decide if a visit to the health unit or home is required
3. Review of images submitted by patients. These can record videos and/or images and send it to the healthcare professional (store and forward)
4. Electronic visits: visit to the asynchronous office between patient and health professional through a patient portal or by email. These requests are then answered asynchronously
5. Remote monitoring: physiological data, through parameters with medical devices

Sources: Own elaboration based on Almeida et al. (2020) and Vaz de Almeida (2020a).

that facilitate the doctor–patient contact in the distance modality, especially in a scenario, are important measures to ensure the perpetuation of care to cancer patients; monitoring of oncologic complaints; as well as a better management of hospitalization.

In the case of employees, Medeiros et al. (2020) emphasize that this strategy allowed a better organization of scales, according to the need for confinement, and the possibility of contacting employees routinely, facilitating the early detection of possible symptomatic cases within the clinical staff. They conclude that the association of this distance care, through an institutional platform that has distance service for employees, can allow early decision-making and with lower negative repercussions on local transmissibility (Medeiros et al., 2020).

Palmeira et al. (2020) evaluate the experience of nursing telemonitoring of overweight women, through a descriptive study, with a qualitative approach, conducted at the outpatient service in obesity, in Salvador-Bahia, Brazil, with 42 overweight women. Among the results obtained through testimonials, the central category 'increasing self-care awareness' emerged, which was represented by three thematic categories: (1) experiencing frequent and interactive feedback with the nurse for weight control; (2) improving self-care; and (3) feeling satisfaction with the results achieved. The results showed that educational activities through tele-nursing, from a dialogical perspective, contribute to enhance self-care.

Methodology

This study is quantitative and qualitative and was based on a questionnaire survey, disseminated (online) by the social networks and the networks of each researcher through LinkedIn, Facebook, *WhatsApp and by email*, and an analysis of content of the open response. *LinkedIn* is a professional-run network and *Facebook is the largest online* social network, bringing together 2.45 billion monthly active users (Clement, 2019) and almost all *social media users are* on this network (Influencer Marketing Hub, 2019).

The questionnaire consists of 19 questions, of which 18 closed with a yes or no answer required to continue the questionnaire, and an open question of non-compulsory answer (p. 19) *about what my opinion will be about what the future in health will look like in Portugal?*

The aim of the questionnaire was to know the respondents' opinion related to their situation regarding digital health and the means used, as well as the perception of emotions generated before and during the pandemic.

The questions sought to ask whether people consider health important to themselves; new health technologies such as teleconsultations (Ferreira, 2018), if they have ever accessed this type of health service and feel comfortable having/receiving visits/consultations through digital means are considered effective and important.

From the perspective of health literacy and the size of access, the person was asked whether they can easily access digital platforms linked to health (e.g. through SNS 24, My SNS, teleconsultation with their Hospital or *Health Unit, call center appointment*).

Regarding the relationship with the health professional, it was asked whether they prefer to be attended in person by physicians, nurses and other health professionals, and also feel accompanied by health professionals and, in this health relationship, whether the manifestation of affection (therapeutic) is an important factor.

In the psychological and affective domain, questions were asked about the perception of loneliness in the face of a pandemic and about well-being. Regarding the dimension of understanding, it was asked whether it is easy to understand at first what the health professional tells him.

On the communicative and relational aspects, it was questioned whether health professionals should be more careful in how they communicate with people when working through digital platforms (e.g., a clear and accessible language), support the understanding of health content, be positive and support the user/patient and whether there is digital health without affections and emotions. To evaluate the attitude and behaviour of the core of the person's relationships in relation to health through digital, family and friends were asked whether family and friends are people interested in digital health (at a distance).

The Digit2Demic questionnaire survey was applied from 15 September to 21 October 2020.

To clarify more deeply some of the answers obtained a new questionnaire was carried out with nine (n = 9) brief answer questions and disseminated to the geographical areas and institutions that had the greatest participation: geographical area of Greater Lisbon (Setúbal) and geographic area of Coimbra. Within these areas, one of the researchers disseminated with her network of contacts aces Arco Ribeirinho and the network of personal contacts, and another researcher dissected at the University Hospital Center of Coimbra (CHUC) between 5 and 25 November 2020.

This second questionnaire served to deepen a set of questions related to the importance of follow-up and that professional the respondent would choose in this distance health follow-up; as well as what it considers important to have a relationship in health through digital means; the importance of affections and what are the consequences if it does not exist and felt greater loneliness during the pandemic. A solution was also requested for what can be done.

In the evaluation of the answers to the open question, a digital analysis of the respondents' sentiment was performed and a cloudwording was evaluated using *the digital platforms DriveWordCloud, TagCrowd* and *SEOscout*. Thus, it was possible to highlight not only the recurrence of each theme addressed in the answers, but also the repetition of certain words and their contextualization. The strengths and weaknesses were also determined and assessing a global feeling to the result of the responses.

Findings

The Digit2Demic online questionnaire survey obtained 335 valid responses of which most respondents are female (80%) and 20% of whom were male.

As for its geographical location, the majority of respondents are from Coimbra (51.3%), Lisbon (18%) and Barreiro (9%), and have a high educational level (93.4%), with 66% of people licensed and 27.4% with a master's or doctorate.

Most people (98%) answered that professionals should be more careful in the way they communicate and how they do it, reinforcing what the other literature says about the importance of people staying connected and with a social relationship.

Regarding the analysis of results, carried out with SPSS v25, we obtained confirmation that health is important for almost 100% of respondents, before and during the pandemic, having increased slightly in the response 'during the pandemic' from 98.81% to 99.4%. The second deepening questionnaire that was made and disseminated in the region of Setúbal and Coimbra (CHUC) resulted in the idea that it is necessary to work on the understanding and acceptance of these alternative solutions in the first place, to reduce the stigma that only face-to-face consultations give results.

It was also evidenced that digital health must have environmental and psychological conditions to be able to function in the best way, namely the sense of space, communication and affections, which are brought from the relationship in face-to-face health, while respecting their differences.

The vast majority consider new technologies in health important, from 72% (before the pandemic) to 88.3% during the pandemic, although the increase in access to teleconsultation between the period before the pandemic and during the pandemic was only 9%, from 37% to 46% of people who resorted to teleconsultation services. On the other hand, there has been an increase of almost 30% in the comfort of people surveyed to receive consultations through digital means (49–75%) although there are still 25% who do not feel comfortable with this system during the pandemic.

Respondents also consider that communication in health made through video conferencing (with image and sound) became more effective during the pandemic (43.5–58.2%).

In relation to the preference for face-to-face care by physicians, it decreased from 94.3% to 74%, respectively, before and during the pandemic. There are 26% who reported not preferring face-to-face care by physicians during the pandemic (6–26% of negative response). Also, preference for face-to-face care by nurses decreased from 93% to 76%. The number of people surveyed who do not prefer to be attended in person by nurses increased from 7% to 24%, and the variation was similar in relation to the previous question (care by physicians), and in physicians the variation is 20% and in nurses 17%.

The respondents prefer the face-to-face relationship with the nurse if we compared answers 2 and 3. However, *they consider it important to follow up regularly, in which teleconsultation may be an alternative in the impossibility of face-to-face follow-up or to facilitate the contact of patients with professionals*.

Regarding what they consider most important in this distance follow-up by the health professional, the response to the second deepening questionnaire focused mainly on the profile of the health professional, the confidence generated in this relationship, their competence, and therefore their knowledge, abilities and attributes (Tench & Konczos, 2013).

As for the attributes of the professional, in this follow-up is better, he/she must have empathy, availability and interest in patients. As for the size of their skills,

the health professional is required to be able to *know the health situation and problems, not to always ask the same questions*; keep his word and call *when he says he will call.*

Solidarity was also raised as well as a repeated concern and guarantee in data protection. When asked if they prefer to be cared for by both professions (doctors and nurses) in person, there is a decrease from 95% to 74%, equivalent to less than 21% of people who prefer to be attended in person and 26% who respond that they do not prefer face-to-face care (p. 4). The reasons relate to their fear of face-to-face contact being able to spread the disease.

There is a split almost half over those who feel and those who do not feel accompanied by health professionals (question 5). There are 49% of people who report that they do not feel accompanied by health professionals during the pandemic versus 85% who felt accompanied before the pandemic.

Affection is important in the health ratio to 96% before the pandemic and 92% during the pandemic. There was a slight increase in those who consider that affection is not important in the health relationship, having gone from 5% to 7% (2% variation). This relationship of affection is important *especially for the construction of a bond with the user.*

In the questionnaire and deepening on the issues of the existence of affection in the context of the relationship in health through digital, the respondents reveal that the lack of affection by digital health services has implications for trust, omission of situation, and problems and respect. The respondents of this deepening questionnaire report that there is mistrust, inhibition, lack of will and security with these consultations, non-compliance with the indications given by the professional, have no desire to expose the doubts and problems you face or even omit problems.

The lack of demonstration of affection and proximity through digital was, in most cases, affirmed by all respondents, *and that this lack of affection in the therapeutic relationship leads to and aggravates isolation, loneliness, depression, especially of the older population.*

In the dimension of health literacy, relative to the immediate understanding 'at first' of what the health professional says decreased from 93% to 79%, a variation of 14%. For 21% it is difficult to understand the first-time health professional during the pandemic, a growth of 13% when asked about their perception before the pandemic.

There are still 31% of respondents who do not know how to easily access digital platforms, although they have decreased that number from 37% before the pandemic to 31% during the pandemic. We can combine this answer with question 13, which reveals 9% of people who had increased access to teleconsultation during the pandemic.

Question 9 shows an increase in the perception of loneliness among respondents, from 41% before the pandemic to 83% during the pandemic, a growth of 40%. Only 17% report that they have no perception of loneliness.

As a solution pointed out, some of the respondents report that a strategy to reinforce the accessibility and participation of the person in his health would be useful in the *creation and reinforcement of multidisciplinary teams that can perform*

home visits (with the necessary care), or through video calls. This solution would also benefit the feeling *of loneliness and anxiety generated by distancing from face-to-face contact.*

When we go deeper into the question of whether there is more loneliness during the pandemic and what could be done to combat loneliness, the total number of answers confirmed that *there is loneliness, especially among the elderly.* But there are strategies (European Commission, 2020a)to keep people in touch and accompanied by: (1) the maintenance of social activities in smaller groups, and for people who are more isolated, regular visits; (2) maintain family and social contact through digital means on a regular basis or, in the case of the elderly, proximity network through state security forces, such as national guards, social support teams of municipal councils and parish councils, local associations and volunteering; or (3) a helpline that signals situations of loneliness to a local home support team with regular visits that promote stimulating occupational activities, allowing digital interaction with other people. It was also proposed the continuity of some outdoor activities, with reduced groups of people and fixed, as well as cultural activities and television programs directed to the well-being.

We verified in fact that the perception of well-being decreased from 91.94% (before the pandemic) to 64% (during the pandemic), corresponding to a variation of 27% of the total respondents. There are also 36% who say they do not feel well-being frequently during the pandemic period.

When asked to answer the second deepening questionnaire, to know what is most important to the person, so that there is a relationship in health through digital means, the answers were based on trust, credibility, qualifications guaranteed, skills, sympathy, the protection of patient data and the professional secrecy that is necessary for the health professional to have.

The pandemic process confirmed that teleconsultation does not replace face-to-face consultation, although the 'no' response was lowered compared to the previous one (94.3%) during the pandemic (88%). Only 12% positively stated that the teleconsultation replaces the face-to-face consultation.

The large percentage of responses states (96.4% before the pandemic to 98%) that professionals should be more careful in how they communicate when working through digital platforms. Family and friends become more interested in digital health, from 22% to 46.5%. However, more than 50% (53.4%) remain uninterested in digital health.

And the Future of Health?

A qualitative content analysis of the 197 answers to the open question was performed.

In the general analysis of the results, there was a slightly positive feeling (56%).

The answers are very focused on the reality experienced between March 2020 and the date of the questionnaire survey (March to September 2020) and respondents demonstrate through the answer to the open question (p. 19) a difficulty in assessing the future reality.