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CRITICAL REFLECTION ON PRACTICE DEVELOPMENT

Sustainable practices in health science research: a critical reflection of doctoral students' contributions at the fourth annual Baltic Sea Region Network in Personalized Health Care summer school

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Abstract

Background: The concept of sustainability suggests development should maintain protective environments for current and future generations. Healthcare practice and research within the Baltic Sea Region, and around the world, have not implemented sustainable development indicators to complement broader existing international goals. In the summer of 2019, European doctoral students attended the fourth annual Baltic Sea Region Network in Personalized Health Care summer school, themed 'Environmental Sustainability of Healthcare Research'.

Aim: This critical reflection focuses on doctoral students' discussions related to sustainable development in healthcare and science, exploring a shift in approach in the context of technology use and travel.

Conclusion: Doctoral students became self-aware and critical of current practices in healthcare and science in terms of sustainability. Existing goals for sustainable development have not been paired with clear indicators to guide clinical and academic practices.

Implications for practice:

- Incorporating collaboration and participation into healthcare and science cultures can promote sustainable innovation
- Research should be conducted to uncover the environmental and economic impacts of current practices in these fields
- Clinicians and health researchers should be given indicators of sustainable development in order to achieve existing sustainable development goals

Keywords: Environmental sustainability, collaboration, health services research, travel for health professionals, telehealth, critical reflection

Background

The Baltic Sea Region Network in Personalized Health Care is an international multidisciplinary network of 10 universities located across nine Baltic countries (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Sweden). Established in 2015, it is currently being coordinated by the University of Turku in Finland. One of the network's goals is to enhance the training and career prospects of doctoral students pursuing health science programmes. The network also seeks to promote collaboration in multidisciplinary research on personalised healthcare and to strengthen the number of internationally recognised experts in the Baltic countries.

Aims of the summer school

The network organised its fourth summer school programme at the Rīga Stradiņš University in Latvia in June 2019. The school aimed to discuss environmental sustainability of healthcare research, offer feedback to doctoral students, including this article's authors, on their research projects in a supportive environment, and strengthen research collaboration within the network.

Aims of critical reflection

Through lectures and preparatory assignments, doctoral students participated in a multidisciplinary and multicultural atmosphere of inquiry into the implementation of sustainable practices and guidelines within healthcare practice and research. Bringing together students from many countries within the region resulted in a natural comparison of workplace traditions, routines and practices. The students identified a need to express the group discussions through a critical reflection report, to highlight the concept of sustainability in healthcare practice and research. This article is a guided reflection (Johns, 2000) exploring and synthesising the discussions during the summer school. It starts by identifying a concept of sustainability and goes on to describe the experiences of reflecting on discussions with our international colleagues, using the five phases of Johns' guided reflection.

Sustainability in practice, implementation and research

Sustainability has the goal of maintaining environments that do not harm current or future generations' opportunities for good health (Anåker and Elf, 2014). The summer school attendees considered their personal and professional motivations to mitigate harms being done to the planet and modern societies through climate change and global inequities. This article explores the doctoral students' reflections on sustainable development following their study of the attributes of sustainability (Anåker and Elf, 2014). The six attributes are:

1. *Ecology*: preventing the depletion of material and resources
2. *Environment*: promoting sustainability through environmentally friendly actions
3. *Future*: ensuring resource availability and security for current and future generations
4. *Globalism*: thinking globally for solutions
5. *Holism*: impacts on the health of individuals, communities, and societies as a whole
6. *Maintenance*: an understanding that systems should be developed to withstand a variety of global and environmental pressures

During their final presentations, students stated that real change toward sustainable development in healthcare practice and science required international and multidisciplinary collaboration. Collaboration supports two ways to promote change towards sustainable health systems and research practices. First, creative solutions for effective change in sustainability involve learning about differences between countries' economic resources and the technological extent of their healthcare services. This might, for example, involve holding events in countries with lower economic resources to support their economies and to limit the cost for their researchers of travelling to other countries. Second, collaboration can contribute to a change in culture of health science and practice, through sharing information about different traditions and practice patterns (for example, stopping the use of old technologies that contribute to paper and food waste in clinical settings by learning about other practices from abroad). This can support innovative planning for the implementation of new approaches that have not been tried before in particular settings.

The past decade has seen calls to improve sustainable development of health organisations (Lega et al., 2013). It has been recommended that scientists, policymakers and professionals translate their theories about sustainability into practice, through collaborative multidisciplinary studies and implementation (Happaerts and Van Den Brande, 2011; Owen et al., 2012; Lega et al., 2013). The United Nations recommends immediate and further action on the World Health Organization's Sustainable Development Goals (SDGs) – an urgency underlined by the pressure exerted by the global coronavirus pandemic and the significant challenges that await in its aftermath (WHO and UK Health Protection Agency, 2011; UN Office for Disaster Risk Reduction, 2015; Hák et al., 2016; WHO, 2018; Djalante et al., 2020). However, there remain few clear indicators to support sustainable practices for health organisations and researchers (Hák et al., 2016).

Over the past three decades the major efforts towards sustainable development of health systems and organisations have avoided tackling what Lega and colleagues (2013, p S47) called the 'black box' of clinical processes – the responsibility of clinicians, with which managers should not interfere. The rationing of practice and cost-containment approaches lack multidisciplinary collaboration and have had no influence on culture changes (Lega et al., 2013). The Sendai Framework, the Paris Climate Accord, and the WHO's SDGs provide direction toward ideal sustainable futures in healthcare practice and research, but a model with progress markers is required to integrate goals into practice settings (WHO and UK Health Protection Agency, 2011; United Nations Office for Disaster Risk Reduction, 2015; Hák et al., 2016). The attributes of sustainability described by Anåker and Elf (2014) could supply the clear indicators required.

We reflected on the topics of travel, technology usage, and cultures of personalised care. These are incorporated in the sustainability concept in the following stages of reflection. The reflection also explores how an understanding of multidisciplinary and multicultural collaboration and the attributes of sustainability could support practical steps toward sustainable development.

Stage 1: Describe the experience

The pace of technological development has increased spectacularly in recent decades and many innovative solutions have been introduced into healthcare practice and research. The discussions in the student groups at the summer school were based not only on scientific evidence of the topic but also on many unresolved issues, as technology is an emerging field and its environmental impacts have not been fully researched.

We discussed carbon emissions from internet usage and the environmental impact of technological devices. The widening application of digital technology and the consequent numbers of subscribers and devices mean energy consumption levels have reached distressing levels during the past decade. Indeed, the number of connected devices is expected to reach 100 billion by 2030 (Albreem et al., 2017). Those authors also report that the huge growth in content and data usage was expected to lead to a projected 345 million tons of carbon dioxide emissions into the environment by 2020, and that the high numbers and turnover of devices make electronic waste one of the world's fastest-growing waste streams with a 3-5% annual increase. While components of technology can be recycled and reused, in 2016 this was achieved for only 20% of e-waste products (Ilankoon et al., 2018). The ubiquity of smart devices and solutions leads to more healthcare clinicians and researchers accepting them as a quick answer to the problems of access and personalisation of health services. However, a balance needs to be struck between use and waste of products.

Transportation methods are also a key focus, as the push to lower individual carbon footprints grows. Many of the doctoral students reflected on their own travel practices and considered more environmentally friendly alternatives. We identified that sustainable technological resources should be made available and affordable for healthcare workers and researchers in order to motivate them towards adopting sustainable transportation and communication practices, such as electric bikes and

associated infrastructure, as well as free or low-cost access to platforms that support virtual meetings when and where possible. Another vital consideration is the need to ensure environmentally friendly ways of health service access, as the associated volume of transportation is a constant concern in communities around the world, especially in rural regions.

Stage 2: Thinking and feeling

Energy consumption and other environmental aspects must be considered at each stage of the technology life cycle: design, production, utilisation and disposal/recycling (Albreem et al., 2017). We acknowledged that these issues need to be critically examined when considering the introduction of new eHealth apps. The potentially positive impact on patients' wellbeing might be balanced against the environmental impact of the manufacture and use of devices, and the energy consumption related to the high volume of data collected through apps. The need to strike this balance presents difficult decisions for clinicians and researchers designing eHealth and telehealth interventions. Collaboration should be considered between disciplines and with stakeholders at all levels – service users, healthcare staff, organisations and governments.

Obtaining information about environmental impacts of different technologies was considered challenging. For example, healthcare professionals and researchers who would like to support sustainable communication and information collection practices currently have no clear way of evaluating the difference between energy and resource use between face-to-face and virtual meetings, and the impacts of choosing one over the other. Video conferencing in research and telehealth could be defined as a method that conserves energy, but there is little ready information about the extent of energy use when more meetings occur through the use of these technologies.

As health science researchers, we should recognise, discuss and study these issues, but the doctoral students expressed regret that these conversations are not common within their research study teams. Those working as clinicians also noted the rarity of discussions about the heavy use of technology, carbon emissions and waste at the practice level. Multidisciplinary and international inquiry into ideas for travel, technology and balancing global health with personalised care practices is vital, as the complexity of these goals relies on various areas of specialised knowledge and creativity outside our disciplines. As researchers, we would be remiss if we did not integrate different forms of knowledge into the design and planning stages of our research procedures and practices.

Further, conferences, summer schools, project meetings and multiday events play a crucial role in scientific and health practice communities; knowledge transfer and network building are important reasons for face-to-face meetings. Some doctoral students expressed ambivalence towards replacing face-to-face and large group conferences with video conferences in order to decrease carbon footprints. The mutual understanding of cultural backgrounds in general as well as the culture-specific understanding of knowledge and behaviour are essential elements of building a solid basis for international collaboration. Both the conference sessions themselves and the opportunities for informal interaction have a strong impact on building and maintaining close contacts with (potential) research partners. On the other hand, it is obvious that travelling – especially over greater distances – has a negative impact on the environment.

Stage 3: Evaluation

One outcome of our discussions during the summer school was our growing understanding that to a large extent, sustainability in healthcare practice and research-related activities seemed a somewhat absent, and perhaps unacknowledged, perspective. Many of us experienced that until the preparation of our pre-assignments for the summer school, we shared a layperson's view of sustainability in our field. With hardly any link to the research or clinical practice aspects of our lives, our sustainable practices had consisted of the common routines of recycling household waste and office materials. Most of the doctoral students had travelled to the summer school from abroad by air, and this was

one of the many examples brought up in our discussions about learning self-awareness in terms of our work-related carbon footprints. As a group of international health scientists, we were given an opportunity to look at the relevant literature about healthcare practice and research into sustainable activities, and we saw no evidence of any of the six attributes of sustainability (Anåker and Elf, 2014).

Stage 4: Analysis

Different technological solutions can be used in healthcare practice and science. The coronavirus pandemic has sharpened interest and there is ample evidence that eHealth can be and has been used to minimise close contact between staff and service users (Smith et al., 2020). Shifting data collection methods toward remote and electronic approaches has changed the landscape of healthcare practice and research. Assumptions are being made that remote meetings and online surveys are a more environmentally friendly choice than paper surveys and in-person meetings. Further, remote monitoring and mobile communications are making it increasingly possible for clinicians to meet with clients without making physical contact (Ganapathy et al., 2016; Banerjee et al., 2020). However, little is known about the actual resource implications of the various stages of the supply chain of electronic devices being used to contain and collect data. The impact on the environment of e-waste and energy use for the storage of data requires further investigation.

At the Riga summer school, we reflected on travel behaviours and considered different steps to facilitate sustainable travel, and now the pandemic has thrown a spotlight on the way people move around, through resultant the lockdown, closed borders and travel bans. Alongside restrictions on individuals, venues have been forced to cancel or postpone conferences, summer schools and all other business events, enhancing the importance and value of web-based meetings. In fact, this critical reflection took place with the use of web meetings and email, giving us pause to consider what can be achieved when face-to-face interaction is not possible. It is likely that the current systems will be developed further, and clinicians and researchers will strengthen their technical skills and competencies to build and maintain relationships and networks online. Nevertheless, the desire and necessity (in healthcare practice, as in many other areas) for nearness and in-person contact remains, yet we are strongly aware of the negative environmental impact. We consider it a great challenge to find the ideal balance between respecting the human need for proximity and our responsibility for nature and the environment, with the aim to draw a distinction between essential and non-essential travel.

Stage 5: Conclusion

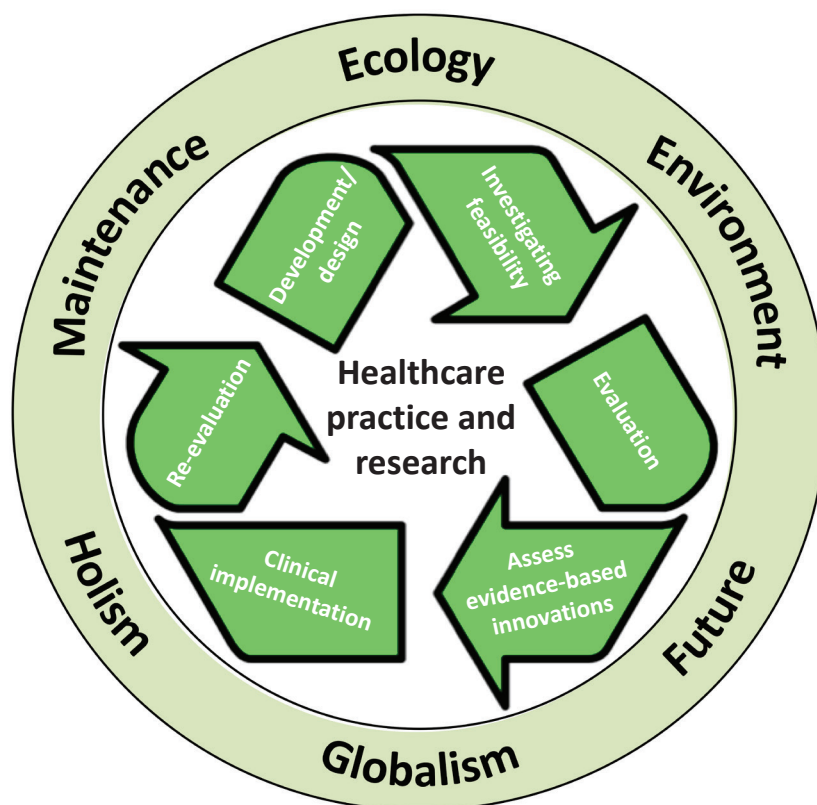
Through critical reflection and the experience of international collaboration, we identified sustainability issues related to health science and clinical practice, and the importance of promoting perspectives on the subject among our professional communities, locally and globally. Sustainability should become an actively present and transparent matter in health systems and research academies. To ensure all parties have a say in sustainability planning, there needs to be a collaborative process involving staff, clinicians, students, service users and representatives from all organisational levels and disciplines. The idea of bringing sustainability to all levels of the curriculum and organisational training was also presented during our reflections.

Finally, we present our reflection in the form of two checklists (Table 1) and a graphic (Figure 1), adapted from the attributes of sustainability in nursing identified by Anåker and Elf (2014). Individual research groups and health system professionals can reflect on their practices and study designs, and identify the current gaps for sustainable development.

Table 1: Checklist for sustainability (adapted from Anåker and Elf, 2004)

Sustainability attribute	Indicators	
	Health science research studies	Health systems and organisations
Ecology	What attempts have been made for the prevention of depletion of resources in the study design and planning phases – for example, procurement planning of technological devices manufactured through ecologically responsible means, and paperless data collection?	What attempts have been made for the prevention of depletion of resources in your clinical settings – for example, procurement planning of technological devices manufactured through ecologically responsible means, paperless communication and record keeping?
Environment	Does the research group promote greening initiatives as a common part of work culture – for example, via incentives to use environmentally friendly transport and travel for research visits, and recycling?	Does the organisation promote greening initiatives as a common part of work culture – for example, via incentives to use environmentally friendly transport and travel, recycling, food-waste management and composting programmes?
Future	Describe how the research group has maintained or plans to maintain integration of systems to promote sustainable technological or people resources into the future	Describe how the organisation has maintained or plans to maintain integration of systems to promote sustainable technological or people resources into the future
Globalism	State what steps the research group has taken to promote international collaboration for the current study and/or future phases of the current research	State what steps the organisation has taken to promote collaboration with clinical professionals from multiple disciplines and cultures for quality improvement and implementation initiatives (Lega et al., 2013)
Holism	Explain what impact your research study has on the wellbeing of the participants and/or societies from a holistic health perspective	How does your organisation consider the full cycle of care of persons when evaluating value of service delivery? (Lega et al., 2013) Does it consider the wellbeing of individuals, communities and societies from a holistic health perspective?
Maintenance	What alternatives are available for research members in the event that work cannot continue in person or onsite – for example, virtual meetings, interviews or training sessions?	What alternatives are available for administration and support staff in the event that work cannot continue in person or onsite – for example, virtual meetings, interviews or training sessions?

Figure 1: Incorporation of sustainability attributes for healthcare practice and research



Adapted from Anåker and Elf (2004) and Richards and Halberg (2015)

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