Professionals – developers of digital social and health care

The health and welfare care sector requires sustainable, efficient, and environmentally friendly practices to adapt to continually evolving needs. The exponential growth of digital social and health care has created a crucial necessity for professionals' engagement both in management and practical solutions. The expansion of remote care options potentially frees up time for personalized care and service, meeting the demands for faster, more cost-effective treatment and care, and enhanced patient safety. Professionals from various fields play essential roles in ensuring the research, development, and deployment of digital solutions. They are responsible for ensuring that these digital social and health care initiatives align with the real-world needs of patients/clients and service providers, comply with regulatory requirements, and ultimately, enhance care outcomes. The conference brought forward examples that showcase how research findings have been translated into practical solutions that enhance health and welfare services, improving accessibility, efficiency, and overall patient outcomes.

The 29th Finnish National Conference on Telemedicine and eHealth (#eHealth2024), had as main theme: From Research to Impact on Digital Health and Welfare Services. The conference covered themes from international and national digital health trends and solutions. The program included presentations on artificial intelligence, remote consultations, cyber security and regulations, competencies in digital health care, uptake and impact of digitalization, clinical decision support systems, eHealth economics, data access and data quality, and evidence on the impacts of digital health care and experiences on the assessments. The conference featured presentations on digital learning environments, development, and research, offering a chance to discuss technological solutions and local digital healthcare activities in a Gallery Walk setting. It included parallel programs in English and Finnish, along with joint plenaries."

The principal keynote speaker Dr. Georg Dorffner has performed research in artificial intelligence since the 1980s focusing mostly on medical applications. With his long experience of the ups and downs of AI research he highlighted the breakthroughs of the past 10-15 years. He presented examples of AI systems that already outperformed human experts in some well-defined areas in radiology and dermatology and envisioned the future towards artificial general AI. He underlined the importance of the medical personnel to understanding the main capabilities and limits, as well as ethical implications behind the AI technology.

Digital rehabilitation could improve access to rehabilitation particularly in low- and middle-income countries where rehabilitation possibilities are limited. Lällä and colleagues had surveyed the attitudes of 58 rehabilitation professionals in Rwanda towards digital rehabilitation. The initial positive attitude of 91 per cent of the responders remained almost at the same level in follow-up. The intention to use this technology correlated positively with the positive attitude.

The research by Särestöniemi and colleagues focused on leveraging the potential of using microwave technology for detecting skull fractures at the accident site, which could streamline patient care. This technology could also monitor the healing process in smaller healthcare centers, identifying possible issues early. Non-contact sensing devices would also be beneficial for young children. Microwave techniques offer safe, low-cost, and accurate

detection by identifying differences in scattering parameters due to fractures. The study evaluates this technique using simulations with human head models and flexible antennas. Results indicate that microwave technology can detect various skull fracture types and suggests optimal frequency ranges for detection, making it suitable for portable, point-of-care devices.

The SMASH-HCM project aimed to improve hypertrophic cardiomyopathy (HCM) management through a human digital-twin-based platform. The initial steps involve gathering design and functional requirements with end-users. In their study, Auranen and co-workers define functional requirements for a digital health solution to enhance HCM patient self-management, incorporating concepts as health literacy, personalization, behavior change frameworks, and gamification. The methodology includes a literature review, AI-assisted user persona development, and structured user story mapping, with input from both clinicians and patient advocates. The analysis identifies 19 design and 19 functional requirements, such as interactive educational tools, health and lifestyle monitoring features, risk assessment visualization, and better communication channels. The findings highlight the need for intuitive, accessible tools to sustain patient engagement and empower self-management. The proposed solution aims to align with clinical objectives and improve health outcomes and long-term patient engagement.

The study performed by Jarva and colleagues reports the results of a health monitoring application requirements elicitation by using a participatory design approach with clinicians and researchers. The study revealed 25 identified themes under the four major themes relating to functional, content and ethical requirements of the application and the use(r) purposes of the application. The application was preferred to contain diverse functionalities to track and monitor the user's health in an automated manner and through user self-reporting. The researchers suggest that the mobile application should be developed to entail a comprehensive outlook on the individual's current health status by focusing on automated functions, straightforward interface and ease of use to induce attraction.

There is a lot of discussion about the use of artificial intelligence in healthcare. Niemelä, Kemppainen and Vuollet wanted to find out what the experts and managers in wellbeing services counties in Finland actually thought about the possibilities to use AI in their organization. The interviews of altogether 42 people found six areas where AI had potential to be applied. These were clinical healthcare, patient interaction and self-care, support services, management, preventive healthcare, and social welfare services. The responders were expecting particularly generative AI to address workload, financial, and service demand challenges. The culture not supporting experimentation in wellbeing services counties and regulation were seen as factors slowing down the deployments of AI applications. There is a need to increase the knowledge of the personnel about AI to make full use of this technology in the health and social welfare field.

In a quantitative national study, Turja and Ahonen found answers on how health and social care professionals evaluate their AI competence and how work experience correlated to perceived AI competence. The Finnish health and social care professionals perceived AI as a highly important element in the overall digital competence. They furthermore expressed that their current level of competence, for example in ethical implementation of AI, is lower than what the importance of AI technologies in everyday work would necessitate. Also, health

and social care professionals with work experience from 16 to 20 years had the most AI competence deficit. National and regional cooperation with educational institutions should be used to strengthen the AI competence of health and social care professionals in a form of both formal and informal education.

Today people are increasingly willing to follow up their health, e.g., by using healthy eating apps. There are no commonly used digital dietary screener tools to measure and report diet quality. No such open tools or reliable consumer-oriented nutrition websites exist either for consumers interested in their quality of diet. The article by Järvelä-Reijonen et al introduces two public online services including (1) a web app to measure diet quality with automated personalized feedback system based on the scientifically validated Healthy Diet Index (HDI) and nutrition recommendations, and (2) a website for a self-care path to support the individual in making dietary changes. The professional can guide the patient/citizen to fill in the dietary questionnaire in the Finnish Nutrition Navigator from which the user will get the automated feedback and a code. The Finnish Nutrition Path gives information and support for dietary changes.

In their article Tryykilä and Kontio studied the barriers to commercializing digital health solutions and present a model, a preliminary commercialization roadmap. According to the study, the key challenges identified include the ethical unsustainability of applying agile software development methods in healthcare, the complex and often prohibitive regulatory environment, and the lack of industry-specific funding and competence. The research also reveals the need for interdisciplinary collaboration and effective commercialization pathways. A preliminary model illustrating the development pathway of digital health innovations is proposed, aiming to address identified challenges and streamline the commercialization process

In society, health and social care are constantly under pressure to reform. Success requires impact-based operations in the wellbeing services counties. In their article (in Finnish) Antikainen, Rönkkö, Tarkiainen and Rajainmäki propose that value-based health and social care require efficient information management and system integration. The person-centred data model combines social welfare and health care service events, information related to health and service needs, the client's experience and cost data over time. The model challenges traditional models based on organizational structures and can be used for a variety of purposes. The person-centred data model of the wellbeing services county of Kanta-Häme improves the effectiveness data of healthcare and social welfare, supports management, development and research, and helps to respond to growing challenges and improve the quality and effectiveness of services.

Koivu and colleagues reported (in Finnish) about the early results of the EU-funded SMASH-HCM project. The project develops and applies digital twin technology to significantly improve the stratification of the risks of patients of hypertrophic cardiomyopathy (HCM). The large research consortium aims to address HCM from the molecular level to cell level and further to organ and multi-organ views. The project plans to apply data analysis and explainable AI methods to the digital twin of the patient. The first models have already been created, but they need to be extended to cover more functionality of the cardiovascular system. The project has interviewed clinical experts about what would be most essential features of the HCM decision support software they will be receiving as the result of the project.

In conclusion, the conference provided a great platform for an international audience to get updates on the latest developments in this rapidly evolving area, exchange ideas and renew friendships.

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