



Suomen Telelääketieteen ja eHealth seura
Finnish Society of Telemedicine and eHealth

eHealth2020 International Conference

**The 25th Finnish National Conference on
Telemedicine and eHealth**

“From Dream to Reality”

1.10.2020

Virtual Conference

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Foreword

The 25th Finnish National Conference on telemedicine and eHealth

Arto Holopainen, President

Finnish Society of Telemedicine and eHealth

Dear invited guests, dear participants of the conference,

It is my great pleasure to warmly welcome all of you to our eHealth2020 international and 25th annual national conference, which theme this year is "From Dream to Reality".

This year, the COVID-19 pandemic has had far-reaching implications for face-to-face events. Due to concerns regarding the spread of COVID-19 disease the Finnish Society of Telemedicine and eHealth has decided to transform physical face-to-face conference into a fully virtual conference for first time ever.

Finnish Society of Telemedicine and eHealth (FSTeH) has been promoting the use of information and communication technology in health care since 1995. Our most important activity is to arrange educational events and to participate to the national discussion. Our society also publishes the Finnish Journal of eHealth and eWelfare (FinJeHeW) together with the Finnish Social and Health Informatics Association (FinnSHIA). Since 2004, we have delivered the annual Finnish eHealth award from the significant accomplishments in the field of telemedicine and eHealth. The required activity can be for example a doctoral thesis in this area or some other important activity in the national or international level supporting the society's goals.

We are supporting continuous education and training of health professionals in the eHealth sector by coordinating special competence for healthcare information technology to physicians, dentists and veterinarians together with Finnish Medical Association Finnish Dental Association and Finnish Veterinarians Association. Our conference will contribute 5 hours of theoretical training for Finnish physicians', dentists' and veterinarians' special competence for healthcare information technology. It will also contribute 5 hours (depending on medical speciality) of theoretical training in the specialist training for Finnish physicians (acceptance applied from University of Oulu).

Our society supports the international visibility of Finnish eHealth expertise by scholarships and our representatives participate to healthcare information technology standardization with IHE (Integrating Health Care Enterprise) Finland and other international standardization organizations. Our society is a founding member of Nordic Telehealth Association (NTA) and International Society of Telemedicine and eHealth (ISfTeH). Our society's secretary Pirkko Kouri holds one of the ISfTeH's board member seats as ISfTeH's vice-president.

This year's conference covers themes from updating the knowledge about International and Nordic eHealth trends and solutions. The program is aimed at healthcare and other professionals and service providers. The conference offers unique meeting place and new information to physicians, nursing staff as well as to responsible persons for management, planning and education. Top quality international keynote lectures are accompanied by up-to-date scientific abstracts. In order to help scientists, strive for brevity and clarity in their communications, we offer this year again a compact style of presentation called "5 Minute Rapid Scientific" presentations.

On behalf of Finnish Society of Telemedicine and eHealth I would like to express my gratitude to all lecturers and scientific abstract presenters for their valuable contributions. Our sincere thanks belong also to all our company presenters and partners. Without your support, this conference could not be the networking event it is today.

I wish everybody a very successful virtual conference!



Arto Holopainen

Organizer



Suomen Telelääketieteen ja e-Health seura Finnish Society of Telemedicine and eHealth

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Finnish Institute for Health and Welfare (THL)

Finnish Society of Telemedicine and eHealth

Finnish Society of Telemedicine and eHealth (FSTeH) is an important forerunner in the field of telemedicine and eHealth in Finland as well as internationally. The aims of the Finnish Society of Telemedicine and eHealth are to promote the health of the population through telecommunication and to disperse the expert knowledge within health care. To reach the aims the Society will arrange seminars, lectures and presentations, courses and symposia, develop a functioning electronic communication system between the members, exert publishing activities, supports research within the discipline, formulate statements in issues dealing with telemedicine and have contact with other telemedicine organisations.

We have a close collaboration with other national and international organisations, health care service providers and users. The purpose of the society is to promote education and development in the field of telemedicine and eHealth. Finnish Society of Telemedicine and eHealth is member of international networks such as International Society for Telemedicine and eHealth, Nordic Telemedicine Association, IHE International and European Connected Health Alliance.

The board accepts the members based on application. Membership will be available for individuals or companies and organisations, as well as supporting membership. Foreign and overseas members do not pay an annual fee, if they submit a regular report of the progress of eHealth in their respective countries

Each year, the FSTeH delivers the Finnish National eHealth Award to a distinguished person in the field.

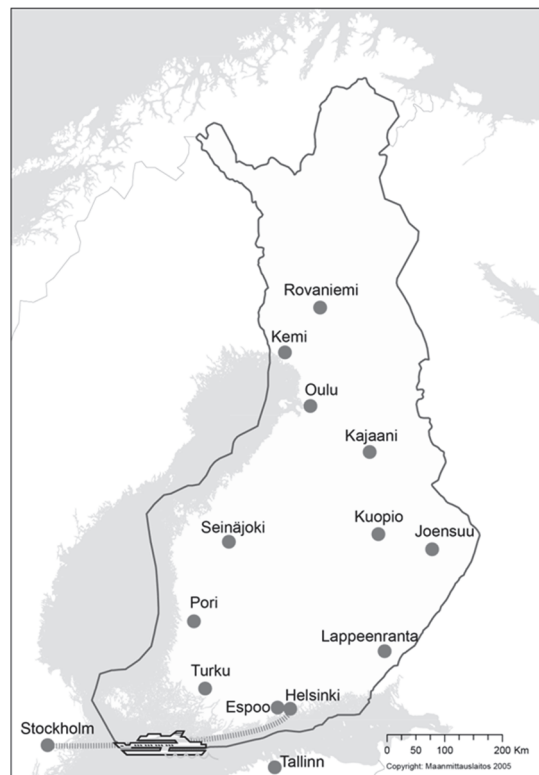
Internet: www.telemedicine.fi

Facebook: www.facebook.com/ehealthfinland

Twitter: www.twitter.com/FSfTeHP

The main activity of the FSTeH is annually organized the Finnish National Conference on Telemedicine and eHealth. The conference rotates between different cities and telemedicine sites to give local organizers the opportunity to promote their achievements

- 2020 – Virtual conference (International)
- 2019 – Kuopio (International)
- 2018 – Cruising Helsinki-Stockholm (International)
- 2017 – Turku
- 2016 – Cruising Helsinki-Stockholm (Nordic)
- 2015 – Espoo
- 2014 – Tallinn, Estonia (International)
- 2013 – Seinäjoki
- 2012 – Cruising Helsinki-Stockholm
- 2011 – Joensuu
- 2010 – Cruising Helsinki-Stockholm
- 2009 – Oulu
- 2008 – Cruising Helsinki-Stockholm
- 2007 – Kuopio
- 2006 – Helsinki, Nordic Congress of eHealth and Telemedicine, NCeHT (International)
- 2006 – Cruising Helsinki-Stockholm
- 2005 – Lappeenranta
- 2004 – Kemi
- 2003 – Cruising Helsinki-Stockholm
- 2002 – Seinäjoki
- 2001 – Rovaniemi
- 2000 – Turku
- 1999 – Kajaani
- 1998 – Pori
- 1997 – Oulu
- 1996 – Kuopio (International)
- 1995 – Turku



Acknowledgements

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www.1177.se/Stockholm/

Buddy Healthcare

www.buddyhealthcare.com

CareLigo

www.careligo.se

Cubist

www.cubist.se

Data for Good Foundation

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www.dossiersolutions.no

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www.gnosco.se

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Henkaus

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iGrant

<https://igrant.io>

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www.joyhaptics.com

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Kiwok

www.kiwok.se

Medicubex

www.medicubex.com

Ninchat

www.ninchat.com

Nordic Center for Sustainable Healthcare

www.nordicshc.org

Predicell

www.predicell.com

RAMP Medical

www.rampmedical.com

Research Institute of Sweden (RISE)

www.ri.se

Silvi

www.silvi.ai

Timmi

www.timmi.fi

Triumpf Health

<https://triumf.health>

Upgraded - Health Startup Association of Finland - The Hub

www.upgraded.fi

Special thanks to the Savonia University of Applied Sciences and Laurea University of Applied Sciences students for conference arrangements.

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Program

THURSDAY October 1st 2020 (Finnish time, Eastern Europe Time)

MAIN STAGE - Nordic digital health experience

Chair: President, Chief Innovation Officer Arto Holopainen, Finnish Society of Telemedicine and eHealth, City of Kuopio

10.00	Finnish Society of Telemedicine and eHealth opening words <i>President Arto Holopainen</i> <i>Finnish Society of Telemedicine and eHealth</i>					
10.15	My Kanta Pages as a citizen service <i>Chief Specialist Vesa Jormanainen</i> <i>Finnish Institute for Health and Welfare (THL)</i>					
	Greetings and cooperation between Finland and Sweden in health <i>Ambassador Liisa Talonpoika</i> <i>Embassy of Finland, Stockholm</i>					TRACK 5
	From dream to reality with Nordic health innovations <i>COO Niina Aagaard</i> <i>Nordic Innovation</i>					TRACK 4
	Personal Connected Health and adoption of telehealth in Denmark <i>Former Vice Chair Claus Nielsen</i> <i>Personal Connected Health Alliance DK</i>					TRACK 3
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						TRACK 1
11.15	Social break with NIA - Sanna Virkkunen, Black belt teacher of NIA					
11.30	Helsenorge - five most popular services? <i>Product Manager Nina Linn Skou Ulstein</i> <i>Helsenorge / norskhelsenett, Norway</i>					
	Swedish E-Health landscape <i>International Coordinator Erik Frisk</i> <i>Swedish eHealth Agency</i>					TRACK 5
						TRACK 4
						TRACK 3
						TRACK 2
						TRACK 1
12.30	Social break and lunch					
MAIN STAGE - Reality of data-driven care - private and public sector hand-in-hand & reference cases						
Chair: Chief Specialist Vesa Jormanainen, Finnish Institute for Health and Welfare (THL)						
13.00	Swedish E-Health: from coordinating a vision to COVID-catalysed implementation <i>Senior Advisor Nima Jokilaakso</i> <i>Business Finland</i>					
	HealthTech Nordic connecting future solutions with Nordic care providers <i>Director Margareta Wallentén</i> <i>Innovation Skåne, Sweden</i>					
	Unlock the power of personal data <i>CTO & Co-founder Lal Chandran</i> <i>iGrant, Sweden</i>					
	Trust in handling personal data <i>Co-founder Claus Nielsen</i> <i>Data for Good Foundation, Denmark</i>					TRACK 5
	Data connecting care <i>CEO Aki Kuivalainen</i> <i>Predicell Oy, Finland</i>					TRACK 4
	eHealth and eWelfare in practice <i>CEO Ville Mujunen</i> <i>Ninchat Oy, Finland</i>					TRACK 3
	Automated room management for smart hospitals <i>CEO Jukka Valkonen</i> <i>Timmi Software Oy, Finland</i>					TRACK 2
	Dermicus implementation - early skin cancer diagnosis for NHS England <i>Business Development Director Philip Daniels-May</i> <i>Gnosco Sweden AB</i>					TRACK 1
14.30	Delivery of the Finnish national e-Health awards & presentation of eHealth2021					
15.00	End of conference					

THURSDAY October 1st 2020 (Finnish time, Eastern Europe Time)

TRACK 1 - Data lakes or leaks

Chair: Fredric Lievens, International Society for Telemedicine and eHealth (ISfTeH)

10.00 Finnish Society of Telemedicine and eHealth opening words

*President Arto Holopainen
Finnish Society of Telemedicine and eHealth*

10.15 First in Europe: secondary use of health data in Finland and Findata services

*Head of Data Services Mervi Siltanen
Findata - Social and Health Data Permit Authority, Finland*

Clinical quality in patient data and data lake

*Director Risto Kaikkonen
Solita Oy, Finland*

TRACK 5
TRACK 4
TRACK 3
TRACK 2
MAIN STAGE

11.15 Social break with NIA - Sanna Virkkunen, Black belt teacher of NIA

11.30 Data lakes supporting regional health and social care planning

*Director of Healthcare and Social Welfare Kirsti Ylitalo-Katajisto
City of Oulu, Finland*

Building an eHealth ecosystem in Germany

*Founder at iHospital InnoLab Nana Bit-Avragim
EIT Health, Germany*

TRACK 5
TRACK 4
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TRACK 2
MAIN STAGE

12.30 Social break and lunch

TRACK 1 - Testbeds and medical devices - Pros & cons

Chair: Chief Medical Officer Annette Kainu, Terveystalo Digital Health

13.00 Overview of testbeds in Finland

*Chief Innovation Officer Arto Holopainen
City of Kuopio, Finland*

Practical experiences of bringing cutting edge medical technology to market

*Head of Global Sales John Meewella
Kipuwex Ltd, Finland*

How to implement Medical Device Regulation (MDR)?

*Research Director Alpo Värri
Faculty of Medicine and Health technology, Tampere University, Finland*

Information security in health care

*Professor Thomas Schmidt
University of Southern Denmark*

TRACK 5
TRACK 4
TRACK 3
TRACK 2
MAIN STAGE

14.30 Delivery of the Finnish national e-Health awards & presentation of eHealth2021

15.00 End of conference

THURSDAY October 1st 2020 (Finnish time, Eastern Europe Time)

TRACK 2 - Personalized care - Thank you!

Chair: Research Director Alpo Värri, Tampere University, Finland

10.00 Finnish Society of Telemedicine and eHealth opening words

*President Arto Holopainen
 Finnish Society of Telemedicine and eHealth*

10.15 What is the role of future pharmacies in digitalized care?

*Director of Pharmaceutical Affairs Charlotta Sandler
 Association of Finnish Pharmacies*

Personalized and data-driven care in veterinary practice

*CEO, Expert Veterinarian Eva Kaisti
 Veteva LTD, Finland*

TRACK 5
 TRACK 4
 TRACK 3
 TRACK 1
 MAIN STAGE

11.15 Social break with NIA - Sanna Virkkunen, Black belt teacher of NIA

11.30 Digitalization and personal care in dentistry

*Medical Director of Oral Health Services Anne Komulainen
 Finnish Student Health Service Foundation*

Building human-centric wellbeing of the future

*Senior Lead in Human Data Economy Ilkka Räsänen
 The Finnish Innovation Fund Sitra*

TRACK 5
 TRACK 4
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 TRACK 1
 MAIN STAGE

12.30 Social break and lunch

TRACK 2 - Digital competence in health

Chair: Vice-President Pirkko Kouri, International Society of Telemedicine and eHealth (ISfTeH)

13.00 Viewpoints in nursing professional's eHealth competence in multidisciplinary practice

*Research Director Alpo Värri
 Tampere University, Finland*

Health literacy from active citizen point of view

*Founding Director Kristine Sørensen
 Global Health Literacy Academy, Denmark*

Special competence in health information technology for human, dental and animal doctors

*Professor Jarmo Reponen
 University of Oulu, Finland*

Patient Safety through competence management

*Country Manager Janne Sonnenberg
 Dossier, Denmark*

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 MAIN STAGE

14.30 Delivery of the Finnish national e-Health awards & presentation of eHealth2021

15.00 End of conference

THURSDAY October 1st 2020 (Finnish time, Eastern Europe Time)

TRACK 3 - Citizens as users of digital health
Chair: CEO Minna Storm, Ecca Nordic, Finland

10.00	Finnish Society of Telemedicine and eHealth opening words <i>President Arto Holopainen</i> <i>Finnish Society of Telemedicine and eHealth</i>				
10.15	1177.se made for Sweden <i>Manager e-health/IT, Emma Enström</i> <i>Inera AB, Sweden</i> Sustainable healthcare progress in the Nordics matters globally <i>Founder Daniel Eriksson</i> <i>Nordic Center for Sustainable Healthcare, Sweden</i>	MAIN STAGE	TRACK 1	TRACK 2	TRACK 4
11.15	Social break with NIA - Sanna Virkkunen, Black belt teacher of NIA				
11.30	Smart Life in Finland <i>Head of Smart Life Finland, Kari Klossner</i> <i>Business Finland</i> Where is Nordic Health heading? RISE boosting innovation and collaboration <i>Project Manager Joakim Börjesson</i> <i>Research Institute of Sweden (RISE), Sweden</i> Digital care paths and advisory services - Health Village <i>Development Manager Pia Liljamo</i> <i>Oulu University Hospital, Finland</i>	MAIN STAGE	TRACK 1	TRACK 2	TRACK 4
12.30	Social break and lunch				
TRACK 3 - eHealth and eWelfare in practice Chair: Director Salla Seppänen, Laurea University of Applied Sciences, Finland					
13.00	Supporting self-care and fluent customer journeys <i>ICT Programme Director Hanna Nordlund</i> <i>Digifinland Oy, Finland</i> Remote health services in student health care <i>Director, Medical Director, General Health Maisa Kuusela</i> <i>Finnish Student Health Services</i> Intersection of social care and health care <i>Service Manager Hannele Komu</i> <i>Siun sote Regional Social and Health Care Authority, Finland</i> Digitalization in self-care in type 1 diabetes: view of a T1DM patient <i>Director Salla Seppänen</i> <i>Laurea University of Applied Sciences, Finland</i>	MAIN STAGE	TRACK 1	TRACK 2	TRACK 4
14.30	Delivery of the Finnish national e-Health awards & presentation of eHealth2021				
15.00	End of conference				

THURSDAY October 1st 2020 (Finnish time, Eastern Europe Time)

TRACK 4 - Co-creation orchestration

Chair: Professor Jarmo Reponen, University of Oulu

10.00 Finnish Society of Telemedicine and eHealth opening words

*President Arto Holopainen
 Finnish Society of Telemedicine and eHealth*

10.15 Connecting health ecosystems

*Chair Brian O'Connor
 European Connected Health Alliance*

Motivating multi-sectoral experts to participate in co-creation

*Director Tuija Hirvikoski
 Laurea University of Applied Sciences, Finland*

TRACK 5
 TRACK 3
 TRACK 2
 TRACK 1
 MAIN STAGE

11.15 Social break with NIA - Sanna Virkkunen, Black belt teacher of NIA

11.30 What challenges businesses are facing when connecting with healthcare

*Professor Minna Pikkarainen
 VTT Oulu, Finland*

Benefits of co-creation in service design

*Business Director Kimmo Kivirauma
 Solita Ltd, Finland*

TRACK 5
 TRACK 3
 TRACK 2
 TRACK 1
 MAIN STAGE

12.30 Social break and lunch

TRACK 4 - Upgraded / Health100 – COVID-19

Chair: Director Inga Chernova, Upgraded - Health Startup Association of Finland - The Hub

13.00 Sharing data for personal wellbeing

*Senior Advisor Hannu Hämäläinen
 The Finnish Innovation Fund Sitra*

Respiratory monitoring post COVID-19

*Co-founder Seppo Salorinne
 Kamu Health Oy, Finland*

Remote touch: medicine for the effects of isolation

*CEO, Co-founder Jussi Tuovinen
 JoyHaptics Oy, Finland*

The potential of digital therapeutics in improving children's health

*CEO Kadri Haljas
 Triumph Health, Finland*

Remote health monitoring

*CEO, Co-founder Abhishek Jayaprakash
 Henkaus Oy, Finland*

The role of autonomous eHealth stations in early diagnostics and telemedicine by 2025

*CEO Vili Kostamo
 MedicubeX Oy, Finland*

Digital screening of surgery patients in the new normal closing the gap between competency based resident training and reality in surgery

*Chief Sales Officer Markus Lind
 Buddy Healthcare, Finland*

TRACK 5
 TRACK 3
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 MAIN STAGE

14.30 Delivery of the Finnish national e-Health awards & presentation of eHealth2021

15.00 End of conference

THURSDAY October 1st 2020 (Finnish time, Eastern Europe Time)

TRACK 5 - Rapid scientific presentations

10.00 Finnish Society of Telemedicine and eHealth opening words

*President Arto Holopainen
Finnish Society of Telemedicine and eHealth*

10.15 Theme: Personalized care

O-1 Digital ecosystem for empowering healthier choices in daily life

*Kristiina Patja^{1,2}, MD Ph.D, Sanna Ritola^{1,4,2} M.Sc Jari Närhi² M.Sc., Michael Qusarshie^{2,4} BA, Pilvikki Absetz^{2,3} Ph.D.
¹University of Helsinki, ²Provention Oy, ³Collaborative Care Systems Finland, ⁴Wellness Foundry*

O-2 SHAPES secure cloud platform for healthcare solutions and services

*Jyri Rajamäki¹, D.Sc. (Tech.), PhD
¹Laurea University of Applied Sciences, Espoo, Finland*

O-3 Power of crowdsourcing - New wave of medical consultation

*Aleksi Pajunen¹ M.D., Wille Komulainen¹ M.D.
¹University of Helsinki*

Theme: Data lakes or leaks

O-4 Strong electronic identification: an opportunity to verify one's identity in electronic services. Are everyone involved in Finland?

*Tuulikki Vehko¹, Ph.D, Hannamaria Kuusio¹, Ph.D, Eero Lilja¹, MSc, Suvi Parikka¹, MSc, Anna-Mari Aalto¹, Ph.D, Docent
¹Finnish Institute for Health and Welfare*

O-5 A business investigation study for sustainable telemedicine center business model using Business Model Canvas and Monte Carlo simulations

*Mahmoud Elsanhoury¹, M.Sc. (Tech.), Reino Virrankoski², D.Sc. (Tech.), Shaima Abdelmageed¹, D.Sc. (Tech.), Timo Mantere¹, D.Sc. (Tech.), Mohammed Elmusratim¹, D.Sc. (Tech.)
¹University of Vaasa, School of Technology and Innovations, Department of Computer Science
²Aalto University, School of Electrical Engineering, Department of Communications and Networking*

Theme: Digital competence in healthcare

O-6 eHealth in Finnish undergraduate medical education: defining core content

*Timo Tuovinen MD¹, Jarmo Reponen MD PhD¹, on behalf of the MEDigi eHealth division
¹Research Unit of Medical Imaging, Physics and Technology, Faculty of Medicine, University of Oulu, Finland*

O-7 Creating advanced virtual orientation for the nursing practice - Case Kuopio University Hospital

*Julkunen S, R.N, Master student in Master's Degree Programme in Digital Health^{1,2}, Kouri P, PhD, Principal Lecturer in Health Care Technology¹
¹Savonia University of Applied Sciences, Kuopio, Finland, ²Kuopio University Hospital, Finland*

Theme: Testbeds and medical devices

O-8 Co-creation for an early version of an app for primary care acute reception

*Niina Keränen^{1,2}, MD, MSc, Anna Herukka³, Jarmo Pääkkönen⁴, MSc, Jaana A. Kokko³, MEng, Jarmo Reponen^{1,2}, MD, PhD,
¹FinnTelemedicum, Research Unit of Medical Imaging, Physics and Technology, Faculty of Medicine, University of Oulu, Finland; ²Medical Research Center Oulu, Oulu University Hospital and University of Oulu, Oulu, Finland; ³City of Oulu, ⁴Centre for Health and Technology, Faculty of Medicine, University of Oulu, Finland*

O-9 Digi-HTA, a new process to perform health technology assessments for digital healthcare services in Finland

*Jari Haverinen^{1,2}, MSc, MHSc, Niina Keränen^{2,3}, MD, MSc, Petra Falkenbach¹, MSc, Timo Kolehmainen⁶, MSc, Jarmo Reponen, MD, PhD^{2,3}
¹Centre for Health and Technology, Faculty of Medicine, University of Oulu, Finland; ²FinnTelemedicum, Research Unit of Medical Imaging, Physics and Technology, Faculty of Medicine, University of Oulu, Finland; ³Medical Research Center Oulu, Oulu University Hospital and University of Oulu, Oulu, Finland; ⁴Finnish Coordinating Center for Health Technology Assessment, Oulu, Finland*

11.15 Social break with NIA - Sanna Virkkunen, Black belt teacher of NIA

TRACK 4
TRACK 3
TRACK 2
TRACK 1
MAIN STAGE

THURSDAY October 1st 2020 (Finnish time, Eastern Europe Time)

TRACK 5 - Rapid scientific presentations

11.30	<p>Theme: Citizens as users of digital health</p> <p>O-10 A small and easy to use sensor for measuring vital signals in children in hospital and at home Seppälä Eveliina¹, BHSoc; Ferdinando Hany¹, MSc, Myllylä Teemu¹, DSc ¹Research Unit of Medical Imaging, Physics and Technology, University of Oulu</p> <hr/> <p>Theme: eHealth and eWelfare in practice</p> <p>O-11 The impact of the increasing use of e-health services – Leaders’ perceptions of changes in the practice of the emergency department Marja Ylilehto¹, Paramedic (Master), BSc, RN ¹Oulu University Hospital, Department of Administration, Health Village</p> <p>O-12 Virtual clinic for oral health care (VIRSU) Jukka-Pekka Skön¹, D.Sc. (Tech.), Jesse Honkanen¹, M.Sc., Rajeev Kanth¹, D.Sc. (Tech.), Kaarina Sirviö¹, PhD. ¹Faculty of Health Care, Savonia University of Applied Sciences</p> <hr/> <p>Theme: Co-creation orchestration</p> <p>O-13 Co-creating innovations for public healthcare Pauliina Hyrkäs¹, M.H.Sc. (Health Admin.), Timo Alalaakkola¹, M.Sc. (Econ.) ¹Oulu University Hospital, Northern Ostrobothnia Hospital District</p> <p>O-14 Information ergonomics in eHealth Jussi Okkonen¹, Senior Research Fellow ¹Faculty of Information Technologies and Communication Sciences, Tampere University, Finland</p> <p>O-15 Sustainability of healthcare innovations: an ecosystem perspective Yueqiang Xu¹, PhD, Minna Pikkarainen^{2,3}, Professor of Connected Health, PhD ¹Oulu Business School of Oulu University ²Research Unit of Medical Imaging, Physics and Technology and Oulu Business School of Oulu University ³VTT, Technical Research Centre of Finland</p> <p>O-16 Constructing big data: the case of Kanta services 2010–2019 in Finland Jormanainen V¹, MD MSc, Reponen J., Professor of Practice MD PhD ¹Finnish Institute for Health and Welfare (THL), Helsinki, Finland ²University of Oulu, Oulu, Finland</p>	TRACK 4 TRACK 3 TRACK 2 TRACK 1 MAIN STAGE
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12.30 Social break and lunch

TRACK 5 - From dream to reality - frontrunning solutions and strong project partners

Chair: CEO Minna Storm, Eeca Nordic, Finland

13.00	<p>Meta analysis powered by AI Co-Founder Shivani Joshi SILVI, Denmark</p> <p>Information Driven Care in response to healthcare challenges CEO Thomas Davidsson Cubist, Sweden</p> <p>Driving growth with you heart Chairman Anders Oestlund KIWOK AB, Sweden</p> <p>Decision support addressing treatments of various COVID-19 syndromes CEO Helene Schönewolf RAMP Medical, Germany</p> <p>Holistic solutions on personalized care COO Tommi Ryyppö Healthzilla, Finland</p> <p>Empowering patients in digital self-care Founder Andreas Blomqvist CareLigo AB, Sweden</p> <p>Presentation of FSTeH company/affiliate activities Head of Corporate Affiliates Minna Storm Finnish Society of Telemedicine and eHealth</p>	TRACK 4 TRACK 3 TRACK 2 TRACK 1 MAIN STAGE
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14.30 Delivery of the Finnish national e-Health awards & presentation of eHealth2021

15.00 End of conference

**Some Finnish experiences how COVID-19 influenced professional life
Collected by the board members of Finnish Society of Telemedicine and eHealth**

COVID-19 pandemic had dramatic consequences in the eHealth domain, both in practical healthcare as well as in education and research. Also, companies were reacting promptly to the need of new digital solutions. There was no information about COVID-19 epidemic, when this conference was originally planned in 2019 and call for papers was released. Therefore, and because our society is a multiprofessional, multidisciplinary society, the board was asked to collect experiences in those domains, where they have gained experiences during spring 2020.

Please enjoy the short papers about the influences of COVID-19 in the following pages. We hope that they can bring an interesting update to the digital health material that is already published in this conference.

The impact of the COVID-19 pandemic on the digital leap of cities – experiences from the City of Kuopio

Arto Holopainen, MSc (tech), Chief Innovation Officer¹, President², Project Leader³

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Digitisation as a global megatrend has been one of the main themes in urban development goals for several years. Taking advantage of digitalisation's potential is an asset for city governance and getting closer to citizens as well as for business development and job creation. This potential has also been taken into account in City of Kuopio where city's strategy 2030 sets digitalisation as a crosscutting theme that is integrated in all levels of the strategy. However, digitalisation is seen many times very abstract concept and therefore its potential advantages are being questioned. Also, the lack of competence in digitalisation skills and ultimately the fear of losing job for digital services slows down the adoption of digitalisation. At least, this was the situation until the COVID-19 pandemic forced cities to make an almost immediate digital leap.

Pandemic brought full stop for many of the city's face-to-face services. Employees moved to remote work where possible. Schools started to operate with distance and digital learning that was a totally new way of working for especially primary schools. Health care postponed all urgent appointments and help was sought from the digital health services. Most city meetings, including the city council, were moved to digital meetings, even without previous experience of fully digital meetings.

City of Kuopio together with Savonia University of Applied Sciences launched a three-year (2020-2022) "Human-Centric Digital Municipality" -project at the beginning of 2020 that aims to prepare city for future digitalisation developments by creating new, citizen- and user-oriented ways of delivering services through purposeful digitalisation, coaching and strategic experimentation, taking into account impact, wellbeing and productivity growth. Even though the project was prepared before and without the knowledge of pandemic it provided excellent possibility to react quickly to emerged digital needs.

First step was to create a situation picture of the digital maturity stage of city services to identify areas for development with most impact. For this Finnish government digital service maturity model was used as a frame for situation picture, which revealed many services that can be made as digital quite easily.

Secondly, involving employees, citizens, and other stakeholders to finding new ideas and ways of working. For this the mayor of Kuopio encouraged employees to give ideas on how to cope with this unusual situation. Already available digital tools were harnessed as an open and low-bureaucracy idea and innovation discussion channel "Ideapulputtamo" (Idea Fountain), where peer discussion could start immediately.

Thirdly, DigitalHack 2020, an experimentation culture event, was held to find digital solutions for community's needs together with the Digital Innovation Hub of Northern Savo Region (DigicenterNS), Business Center Pohjois-Savo and Kuopio Living Lab. The prototypes of the event are the basis for further development.

Overall, this unexpected global situation created a great need for a new culture of work and leadership. The cities are facing the fact where everyone wanted to get the benefits of digitalization right away. As harsh as it sounds, the pandemic provided all the necessary reasons for digital leap, with no one questioning the benefits of digital services that can minimise face-to-face contacts.

Experiences to consider:

- The development of digital services brings a change in work requiring operational changes and the improvement of employees' skills, motivation and attitude towards change
- The commitment of management and decision-makers is a critical factor in digital transition as well as the need to review city-wide governance procedures
- Co-creating ideas to innovations with public-private-people-partnership provides agile development channel for cities

Acknowledgments: This study has been performed partly with the support of the European Social Fund (ESF) and Centre for Economic Development, Transport and the Environment South Savo / Human-Centric Digital Municipality -project (S21894).

How COVID-19 pandemic increased the velocity of digital transformation in medical and dental education

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³Finnish national MEDigi-project for digitalization of medical and dental education

In 2018 all the five medical schools in Finland started the Medigi-project in order to bring digitalization to the medical and dental education and to teach digital health to future professionals (1). MEDigi is an all-in-one project where universities are working together finding areas for harmonizing their teaching and aiming to produce common learning material and evaluation material. At the same time, national teaching infrastructure is improved and digital pedagogical skills of the teachers are supported. (2) The original plan was to bring the results into real life during the academic teaching year 2020-2021. Then in March 2020 everything suddenly changed, digital teaching methods were taken into use during a period of only a few days, not during a few months or years. This was a dramatic change to medical and dental schools, which have been rather conservative in this sense. The preparatory work already done during MEDigi became now valuable. However, the most important act was the practical work of deans, other responsible persons and individual teachers in each of the universities.

Digital teaching of digital health: University of Oulu has taught digital health to fifth year medical students during a specific e-Health expert lecture day and workshops with enterprises since 2016. This is joint teaching with nursing studies at the Oulu University of Applied Sciences. In 2020 all this teaching was transformed into digital teaching methods in less than two weeks (3). All the expert lectures were on-line interactive lectures, allowing students to participate from their homes and ask even more questions than during traditional lectures. The workshops were more complicated. Because of the large student group and limited time, the enterprises could not be present, they only provided material for groupwork. According to the initial student comments, they liked the remote lectures and a possibility to interact a lot. But they were missing the hands-on tasks and direct communication with enterprises that were available during the previous editions of this course. Groupwork within a digital learning environment does not compensate for a real thing.

For a teacher of digital health the COVID-19 pandemic has caused more lonely work than before. Our web courses like “Basics in eHealth” and “Connected Health and mHealth” are running like before, but all the interaction with their students takes place only with digital tools. The possibilities to meet students personally like before during parallel workshops is missing and feedback is thus limited. On the other hand, medical doctors in postgraduate further education like the possibility to join in without leaving their daily working environment.

Survey answers from teachers and students: We conducted a small survey of spring 2020 experiences among medical and dental teachers and students involved in the MEDigi-project. According to the initial results, all the universities moved to digital education very quickly, practically all the lectures and workshops except clinical training were provided in digital format. It was a demanding task for the teachers, but the support staff at the universities were mobilized to make this happen. The tools functioned in principle well, but the teachers recognised the need to have more training in digital pedagogy. The students were missing more practical training and the support of their peer students.

Conclusions: The major transformation towards digital teaching has now taken place in medical and dental education and there is no turning back even after the COVID-19 pandemic. However, spring 2020 has shown that no remote education can compensate for teaching practical skills in hands-on training. Both the students and the teachers need more support and specific measures are needed to support the campus community.

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Pandemic and my life

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Since pandemic start, Savonia University of Applied Sciences (Savonia) arranged its operations in such a way that safety of staff and students was of great priority e.g. Safe distance was easy to maintain. Staff or students with symptoms of a respiratory infection such as a cold, cough or fever, were in Spring and today are still not allowed to come to the campus. Cleaning services were acknowledged high, and the pace and amount of cleaning increased. For the personal protection as if hand hygiene and disinfection use is encouraged, more disinfectant bottles are available, and masks should be worn in situations where keeping a safe distance is not possible. For students, in springtime there was a lot of restriction, majority of students studied online, there were no gatherings, only small groups were allowed e.g. practicing vital nursing care procedures. Savonia provides masks for the students learning in simulation facilities and other close-contact situations, mainly in class.

My work has a lot of internationality. Pandemic time caused a lot of limitations. International collaboration was shifted online. Our ISfTeH and FSTeH meetings are held online. In Savonia all incoming and outgoing student exchanges were scheduled to begin during the spring or autumn semester are cancelled or postponed to 2021. The staff is recommended not to travel abroad, even in national level all travelling should be well-planned. This autumn semester Savonia composes by a mix of on-campus and online teachings; on-campus teachings will be arranged in large classrooms whenever possible. Furthermore, Savonia will not organise any large events on-campus. Whenever large events are to be arranged, they will be online. This means that Savonia has well-functioning technological infrastructure. Our Master students did not report any suffering related to their studies. The student-life at home changed: spouse and children were studying at home. At home, some had lack of technology for all family members in need, and some needed to teach their children simultaneously while taking care of their own jobs. Minority worked at frontline in healthcare.

My both working and personal life has some new elements. I work as a principal lecturer in healthcare technology, and I am in charge of China relations in our unit. I am used to travel a lot, and since March six working visits were cancelled. I look after my international relationships via zoom and emailing, even calling. This is not the same as visiting cooperation partners. When pandemic limitations came on force I was in charge of virtual Master in Digital health programme. Due to the e-studies, the lockdown did not affect my work so much. All my working activities realized online or by using mobile phones. However, I miss my colleagues and discussions along the working day. Besides official meetings, we could change ideas, test ideas and share news in our corridors, or have quick 'catch ups' in meeting rooms. We have monthly team meeting for 'official issues. To have more interaction our team organised regular virtual coffee meetings once a week, and it has been well-functioning. All colleagues face the similar challenges, and most of them wants to get back to new-normal. I believe that our work is changed, there will be more virtuality and people are used to work at home.

In springtime, my grand-daughter, 10 years' old was studying the 4th class at primary school, she was from Monday to Friday at our home. I was helping her with her homework, and teaching computer skills. I felt that I was also studying primary school. This experience made me understand students both working and having children at home. It is crucial to take care of oneself. I love outdoor activities and started to have daily 5 kilometres morning walk or Nordic walk, during 6-7 a.m., after exercising I swam or plopped into Lake Kallavesi. These activities made my working day so good and 'tolerable'. Furthermore, I am fortunate to have a family, and my spouse worked at home. Our children and grand-children I meet according to recommendations. We have joint WhatsApp Kouri-group, share our thoughts, videos, photos, and during lockdown feeling isolated or lonely has vanished. Still I am waiting the COVID-19 period to end, and have more similar life than before the pandemic.

Is there a silver lining in the cloud that is the COVID-19 pandemic?

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The ongoing Covid-19 pandemic has had an impact on the business development initiatives throughout the



Health Campus Turku

Health Campus Turku is a significant multidisciplinary knowledge cluster within medicine, social and health care, and technology. The cluster offers unique opportunities for research, innovation, and industry collaboration.

Health Campus Turku collaboration covers Hospital District of Southwest Finland, University of Turku, Åbo Akademi University, Turku University of Applied Sciences, Novia University of Applied Sciences, and Turku Science Park Ltd.

globe. Even though the impact has been primarily a negative one, for example due to declined export, it has had a positive side as well. The positive side has been in the health technology development, where the pandemic has had a positive impact. Especially in the South-West Finland where the health technology has focused on diagnostics and life sciences in general. For example, the Abacus Diagnostica Ltd., ArcDia International Ltd., and Labmaster Ltd. have created new products during the course of global pandemics.

This silver lining in a cloud that is Covid-19, has also been noted in the Health Campus Turku, the regional development ecosystem, which focuses on health-related collaboration. The ecosystem opened the new collaboration platform TERTTU in June 2020.

The purpose of TERTTU platform is to solve some of the problems commonly attributed to co-development in the field of healthcare with organizations that are publicly owned and operated. These organizations, such as the hospital districts, and higher education organizations, typically suffer from rigid views to their core functions, that typically revolve around a) education, b) research, and c) patient care.

It follows from these views that, for example, industry collaboration is not organization's core function, and the only way the collaboration should be done, is when it contributes to the core functions – such as research. This

has led to structural problems in industry collaboration, such as problems with reachability. This means that the companies that are interested in collaboration with the publicly owned organizations, have rarely any idea on a) how to approach the organizations, and b) what kinds of co-creation opportunities exist. Ideally, the TERTTU platform should remedy the reachability problems, and facilitate in creating new business in the field that is of the essence for the region. The TERTTU platform, and its release during the Covid-19 pandemic, is not an isolated action, but it serves the region's long-term development initiatives.

Life sciences, including diagnostics, imaging, pharmaceutical development, and health technology, are an integral part of region's Smart Specialization Strategy (S3), and TERTTU platform is one step in a longer plan of strengthening the regions image as appealing research and development partner in Europe and globally.

During the first months of the service, that covered the Finnish holidays, there have been 7 new co-creation initiatives, that are currently under process. During the process, the "not-so-silver" lining of the pandemic has been particularly evident, as the healthcare resources are understandably needed in the core functions, in the patient care, and the time available for developing new products and services has been temporarily insufficient to meet the demand. A practical outcome of this are the limitations set to research (esp. clinical trials) in the Finnish University Hospitals during the pandemic.

In addition to TERTTU platform, the region has launched other services during the pandemic that aim to help the industrial collaboration in the field of healthcare – and fields that are associated with it (such as health technology). In this field, another success story is the "Sub-Contracting Network of the South-West Finland".

The network, and the underlying electronic platform act as a marketplace for different organizations to a) depict their current need (such as specialty equipment and protective gear), and b) promote their products and services, that could be used for ensuring the service provisioning in a global health crisis.

During the first two weeks of that followed the launch of the service, 40 companies participated in the service, with the latest toll of being 64 organizations (incl. 5 public organizations, such as the City of Raisio). The service that has been created in collaboration with the Turku University Hospital, Turku University of Applied Sciences, University of Turku, Åbo Akademi University, Machine Technology Center Turku Ltd., and Turku Science Park Ltd. is in the full state of readiness to serve the region if the Covid-19 pandemic escalates in the region.

What will be the outcome of the ongoing pandemic from the perspective of industry collaboration and co-creation? First of all, the region of South-West Finland will be better equipped to meet the challenges of the next healthcare crisis, if and when they emerge. Secondly, the region will be able to better serve the companies interested in co-creation and collaboration. And in this, the emphasis is on the word "region" - instead of individual actors, the Health Campus Turku with the TERTTU platform and sub-contracting network, stand as one. In this, the age-old cliché of a "one-stop shop" has come to life.

We welcome you all to work with the Health Campus Turku.

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When COVID-19 took us apart and pulled the ecosystems together

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Introduction

Nordic health is to a large extent today based on technology enabled care [1] pursuing personalized care and the prevention of chronic diseases. The user-centric care with an emphasis on engaging the individual from prevention to rehab and follow-up aims for better quality of life and an equal access to care at any phases in a lifecycle. Nordic people are among the luckiest people in the world. Facing COVID-19 pandemic during early 2020 in the Nordics took us apart but never let us go without care. Here, I reflect on the impact of Nordic (health) ecosystems as one of the keys for enabling rapid development, implementation of new solutions, resource management and scalability.

Reflections

In February 2020 the number of digital doctor appointments was steadily growing. Then, we faced a new pandemic. The speed for increased number of digital appointments was not far away from F1 turns. According to a Swedish MedTech-SME, Visiba Care - before covid-19 - we were often faced with the question: "How do we keep patients away from care?". Now, let's rethink. We need sustainable care - if we postpone treatments, it can be followed by critical consequences, both in terms of costs and human health. Therefore, Visiba reformulated the question to "How do we keep patients healthy?" and "How do we ensure that the patient's interaction with healthcare is as smooth (and thus as cost-effective) as possible?". That is, the Nordic healthcare is about caregivers reconsidering their value delivery and evaluating new opportunities that can make the overall delivery better [2]. Data for Good Foundation (Denmark) collaborates with iGrant (Sweden) and Predicell (Finland) showing that, more than ever, these deliveries must hold the highest level of safety, personal integrity as well as personal preferences and choices for using e.g. secondary data in this value delivery. A successful Nordic ecosystem is made of actors complementing each other as external but committed resources.

I have been working with the development of Nordic health ecosystems and export partner groups for more than a decade. There, I find the Nordic citizens, their longer lives and better health and wellbeing as strong driving forces for Nordic export partners and ecosystems to innovate, research, develop, test, implement, validate and – as follows – grow together. On regional and national levels, we can name several successful pilots, test-drives and projects (such as the Swedish national COPD -project 2016-2017 [3]) that have laid

ground for further development of personalized care or the prevention of chronic diseases. How about on the Nordic level? Especially during the pandemic time, we need more (than before) Nordic projects, ecosystems, hubs, clusters and competence centers (such as Nordic Center for Sustainable Healthcare [4], HealthTech Nordic [5], Nordic Proof [6]) for learning from our differences, working on with our similarities, understanding the obstacles for smarter care and implementing the proofs of concept that make the overall care delivery better no matter where or how in the Nordics we live. Until now, this has taken a lot of time, efforts and long steps.

Pandemic cut the steady curves. From March 2020 onwards, Nordic healthtech hackathons (such as Hack the crisis [7]) paved the way for increased and joint problem solving, innovations and validations with resources and synergies far beyond regional or national borders. As I see it, ecosystems are the new normal. During the corona pandemic, care- and solution providers have come together faster, easier and more flexible. There, “what” takes places equally often with “why” and “how” and “the what” is more often a turnkey solution provided by Nordic ecosystems and consortiums. I find it very positive to reflect at these times that we gather together to solve and implement rather than to compete. Additionally, focus is on care at home, prevention and user-centric self-care.

In my work with the Nordic health export partner groups and ecosystems, there is “the one-hour difference” between Scandinavia and Finland. It is only an hour, yet, if flying around an hour one way in the Nordics, I can reach most of the main cities. During the pandemic, this “one hour” has been transferred to an extra hour in the early morning hours, late afternoon hours and disappeared as such from the noon. We meet any time, all day long, by distance and smartly at our homes. Like smart care at home.

Conclusions

The pandemic took us apart, yet, did not leave us alone. It made us rethink and react. Rapidly. In the Nordics, there is space for plenty of health ecosystems. As a matter of fact, there is space for all health ecosystems that gain health and wellbeing and provide personalized care with better accessibility, continuity and stability. “-It means security both for us as care providers and for patients that we can offer digital care services as a complement to physical meetings. In this way, we can continue to offer continuous care to the patients who need it, while at the same time improving our accessibility for the broad patient group, says Maria Ahlmark [8]”. Let us work for the new normal where Nordic health ecosystems with global presence are to stay. Let’s grow healthy!

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Scientific oral abstracts

O-1: Digital ecosystem for empowering healthier choices in daily life

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Making healthy choices in everyday life is fundamental to individuals' health and wellbeing, and ultimately helps to prevent and control chronic conditions and to reduce need for health/social care services. However, the rapid increase of lifestyle related disease prevalence indicates that most people would need more effective support in order to make sustainable lifestyle changes. Personalized medicine can provide effective digital tools for healthy lifestyle and disease self-management through personalized coaching that increases motivation and capabilities, and identifies opportunities for leading healthier lifestyles, as well as provides platforms for peer support and health promoting communities.

While a single digital solution such as dietary coaching or a physical activity app may be effective for specific behaviors or specific risk groups, individuals' needs vary, and they would often benefit from a variety of tools from stress management to sleep and tobacco to exercise. A digital service ecosystem provides an effective way to manage segmenting and personalising support for healthy lifestyle with targeted group interventions and peer support.

We will present experiences and results of implementation of digital coaching programs utilising both a single digital solution approach and a digital service ecosystem approach with two real-world studies.

Methods: In Study 1, MealLogger, a mobile image-based food journal, was integrated to a group coaching program delivered by a registered dietitian. The program aim was to help participants self-monitor and change eating habits with the support from the dietitian and peers. In Study 2, MealLogger and automated digital tools for stress management, sleep, alcohol, smoking cessation, diet, and physical activity were integrated into TARMO digital service ecosystem together with a group coaching program, and delivered by a registered dietitian. Measures for both studies include usage data from the solutions, weight change, blood pressure change, and perceptions related to lifestyle change and peer and dietitian support.

Results: In Study 1, participants lost an average of 4.9 kg with a range of 3-7.5 kg which equated to 5.3% of mass. In addition, the participants' systolic blood pressure went down by 6.4mmHg and diastolic pressure went down by 2.4 mmHg. All participants reported positive changes in their daily habits, and they believed that these changes would persist in the long term (avg. 4.1 out of 5). They felt that the group supported them in their goals (avg. 4 out of 5) and that the dietitian was able to give them the attention they needed (avg. 4.6 out of 5). Participants logged on average 5.2 sessions per day while recording 3.2 meals per day, indicating that users logged in to comment on and read comments from other group participants. In Study 2, time spent on the app per session increased from 00:05:35 to 00:07:36 in comparison to the single solution approach, showing a significant increase of engagement due to the increase of content for the participants to engage with.

Conclusions: While a one-solution approach can effectively promote learning to eat healthy and lead to clinically significant health outcomes, a broader range of solutions delivered through a digital service ecosystem improves the outcomes still further. The ecosystem approach offers great opportunities to promote transition towards people-centered care and support for health behavior change. This relieves the ethical burden of targeting health behavior change tools on base of risks as majority of population will benefit from lifestyle change.

O-2: SHAPES secure cloud platform for healthcare solutions and services

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Background: Smart and Healthy Ageing through People Engaging in Supportive Systems (SHAPES) project [1] is an ambitious endeavour that gathers stakeholders from across Europe to create, deploy and pilot at large-scale a EU-standardised open platform incorporating and integrating a broad range of solutions, including technological, organisational, clinical, educational and societal, to enable the ageing population of Europe to remain healthy, active and productive, as well as to maintain a high quality of life and sense of wellbeing for the longest time possible.

Aim: Each digital solution should be ethical, legal and appropriate for users, and the results will align with the full and ethically responsible end-to-end exploitation of the new functionalities empowered by the secure cloud platform. The aim is to determine how to contribute to the reinforcement of the legal and policy frames to strengthen the deployment of large-scale cyber-secure digital solutions and the sustainability of the digital transformation of health and care delivery in Europe.

Methods: This constructive research creates innovative constructions and artefacts (e.g. processes, practices or tools) as solutions for domain-specific real world problems. In constructive research, both theoretical and practical components should be considered and the problem as well as the solution should be tied with the theoretical comprehension. Four elements: practical relevance, practical functioning, theory connection and theoretical contribution should be included in problem solving constructs of constructive research.

Results: So far, four issues has arisen that needs special attention with regard to security and privacy aspects:

- 1) Healthcare is moving from hospitals to home. Regular, reliable homecare ensures changes in the condition and treatment, resulting in better-managed conditions and fewer hospitalizations. New digital solutions include assistive robots, eHealth sensors and wearables, Internet of Things (IoT) enabled devices and mobile applications. Cyber security is a prerequisite for the launch of these services.
- 2) Authentication and security assessment will be seen as a service. Considering the likelihood of operating in a not secured environment, SHAPES creates over-the-top secure environment enforcing security best practices. Moreover, it integrates a Security Assessment as a Service (SAaaS) cross-layered system to dynamically detect any existing and newly introduced network device, perform vulnerability assessments, certify the device against a standardised CVSS, assign it to a connectivity-appropriate VLAN and authenticate the service or device.
- 3) Empowering of citizens; health literacy, technology and individual involvement in care make healthcare more user-friendly and empowering, meaning that citizens is seen as custodians of their own health. Citizens continue to take a central role in decisions about their own healthcare, and new technologies enable and facilitate this trend. These former patients – new healthcare consumers – are driven by desire to take control over own health records and want to take active part in choosing healthcare providers and services. They are driven by the desire for more trustworthy, secure and timely healthcare information. Due to this changing role of patients, their empowerment has become a key priority for policy makers, professionals and service providers. Citizens' role is transforming from passive receivers of healthcare to active decision-makers; and managing own health data. Security is important aspect to empowering and creating the trust.
- 4) Cross-border healthcare; The EU Directive on the Application of Patients' Rights in Cross-Border Healthcare is a starting point, delivering a legal framework for individuals willing to gain greater access to information related to healthcare available across Europe. However, in order to secure above-mentioned rights and unleash the potential of cross-border healthcare exchange, new solutions are needed to secure the storage and cross-border exchange of health data.

Conclusions: The rights of ageing individuals and their ability to live a good life at home or in a home-like environment are at the heart of the services designed in the SHAPES project. Privacy and security competence play a key role in the project, from planning to implementation and assessment. However, according to an ongoing Horizon 2020 cyber security project, health care sector can be identified as the most far from the ideal cybersecurity situation [2]. The future complex environments present many challenges because the standards are not yet set at the international level. IoT products and sensors are mainly used at proprietary-based standards and getting them work at the same platforms in the smart devices will be a really big challenge.

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O-3: Power of crowdsourcing - New wave of medical consultation

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Throughout the history of medicine there has been a tradition of consultations between physicians. Getting opinion of a specialist of the field is a significant help that fills the gaps of knowledge every human will unavoidably have. With computers and the internet, it is only logical that digital channels are also being utilized in consultations.

In 1950 it was estimated that it would take approximately 50 years for medical data to double, but today it takes less than three months. As the amount of medical data is growing exponentially, it is also getting more complex and fragmented.

Consultations have been traditionally made directly between two physicians, but in this way, one usually gets only one opinion. Physicians in Finland have been utilizing social media and other digital platforms for consultation purposes to add a new way of consultations: crowdsourcing and swarm intelligence. The main idea is to post your consultation question to a group of medical doctors representing various fields of medicine. This way you will get several opinions and your colleagues are able to use likes and other reactions to value the responses.

In large scale this has manifested mainly via Facebook and Finnish Medical Associations Kollega - platform. Facebooks informal consultation channel was founded in 2013, and the group has been quite active in recent years. On a given week, there could be approximately 50 consultations, which in turn leads to 2600 patient cases per year on a social media platform that was designed to connect people, not as a professional platform.

As Facebook can't verify the background of group members reliably, Finnish Medical Association has provided a platform specifically designed for this new kind of consultation - Kollega. In Kollega, all the users are strongly authenticated, they are able to consult with their own name or anonymously, but answers must be given with the physicians own name. More than one third of the Finnish medical doctors have registered to the platform and it produces more than 700 consultations and over 4000 consultation replies every month.

Our upcoming research project aims to map this new way of consultation. Some of the questions we are interested in exploring are: What kind of topics do physicians use these platforms for? What kind of benefits can the utilization of crowdsourcing and swarm intelligence offer? What kind of problems, regarding responsibility of care and otherwise, might arise? Are certain kind of consultations more likely to yield useful answers? What can medical schools learn from the consultation data?

O-4: Strong electronic identification: an opportunity to verify one's identity in electronic services. Are everyone involved in Finland?

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Strong electronic identification, by using online banking codes or mobile certification, provides an opportunity to verify one's identity in electronic services. Many eHealth and eWelfare services require strong electronic identification. One of the most important eHealth service is My Kanta Pages providing own health records, prescriptions and an opportunity to request a prescription renewal. In Finland, one of the challenges facing health care has been a poor access to primary health care. Digital services are expected to improve the availability of public social and health care services. However, concerns have been expressed that services will be produced and developed in such a way that inability to use technology or lack of resources to purchase technology-based equipment becomes a barrier.

The study focused on recognising population groups who are vulnerable to exclusion either by unavailable access to use web or lacking to provide strong electronic identification. We used two large national surveys: 1) The survey on well-being among population with foreign background (FinMonik) was carried out during 2018- 2019. A representative random sample of 13 650 foreign-born persons aged 18-64 years was drawn from the National Population Register. The sample size comprises 12 877 when the sample overlap was removed. The survey was provided in 18 different languages and the response rate was 53 %. 2) The FinSote National survey of health, well-being and service use was conducted in 2017-2018 on general population aged 20-99 years. The response rate of FinSote survey was 45%. Shared age range for these surveys was adults aged 20-64 years and our final dataset comprised of 6 083 foreign-born and 11 029 general population. Both surveys asked respondents "Do you have at your disposal internet access at home, your workplace, library or some other place?" and "Do you have at your disposal online banking codes or a mobile certificate for electronic identification online?". The answer options for the questions were: yes and no. Foreign-born population groups (7) were defined by residence area and background country. The age-standardized proportions with confidence intervals were examined by socio-demographic background variables, and the results of the foreign-born population were compared with the general population.

According to preliminary results almost all (98%) of the general population reported access to use Internet but the proportion was lower (92%) among foreign born population ($p < 0.001$). Proportion of those using online banking codes or mobile certification for electronic identification was higher among general population (98%) than among foreign-born population (88%) ($p < 0.001$). There was variation between foreign-born population groups. We will conduct further analyses in order to clarify whether the education level or employment status is associated with the opportunity to use strong electronic identification.

Development of digital services requires user guidance, which takes into account the varying needs and operating environments.

O-5: A Business investigation study for sustainable telemedicine center business model using Business Model Canvas and Monte Carlo simulations

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Nowadays there are high expectations related to the public savings and business opportunities which can be achieved by eHealth and telemedicine. Healthcare professionals are having the ability to provide better treatments and prescriptions based on the advanced monitoring systems and stored patients' records in the national eHealth database.

Nordic Telemedicine Center (NTC) was started by a project that carried the same name on 2015-2018. The project was funded by EU Botnia-Atlantica Program and executed by University of Umeå, University Hospital of Umeå, Västerbotten Regional Administration (länsstyrelsen), University of Vaasa and South Ostrobothnian Health Technology Development Center EPTEK (now part of Seinäjoki University of Applied Sciences). The main target customer group for NTC are healthcare professionals and healthcare stakeholders in private companies and public administration. The center has physical entities in Seinäjoki, Finland and Umeå, Sweden. Center establishment costs were covered by the project, and one of the project targets was to seek a business model to sustain the center operation after the establishment phase.

This presentation summarizes the business investigation study, which was done for NTC by using Business Model Canvas and Monte Carlo Simulations. The Business Model Canvas is originally introduced by Swiss business theorist Alexander Osterwalder. They are widely applied by a variety of companies for different size of businesses. The canvas can be used to design, describe and generate the business model and the expected shape of the value proposition. The requirements (resources) and expected achievements (objectives) of the NTC business model are cracked down into nine building blocks by using Business Model Canvas to cover all aspects of the model. Designed NTC Business Model Canvas defines the corresponding aspect in each of the nine blocks, which are: the customer segment, the value propositions, communications channels, customer relationships, key activities, key resources, key partners, cost structure and revenue streams.

Customer segment block consists of Healthcare professionals, academia personnel, enterprises, municipalities and civil society. The value proposition block comprises education and awareness, providing telemedical solutions, guidance and consultancy, facilitation and catalysing innovation. Key activities are seminars, exhibitions, trainings, testing sessions, courses, newsletters and periodic magazines, mobile applications, monitoring and emergencies. NTC key resources are either physical, intellectual or human resources.

The NTC business model developed by using Business Model Canvas is then evaluated by using Monte Carlo Simulations, which offers a well-known statistical simulation tool to seek the effect of different customer behaviour scenarios. Some important business insights and speculations were validated by using the real statistics from Finland and Sweden in Monte Carlo Simulations. Finally, a SWOT analysis has been appended to the end-results of this study to highlight the strengths, weaknesses, opportunities and threats.

The study concludes that the Nordic Telemedicine Center physical entities in Seinäjoki and Umeå and the virtual connection between them can be sustainable on the long run, as NTC revenue streams are very likely to exceed NTC cost structure depending on several tuneable factors even if the nodes operate at 1/3 of its full workload. In addition, the study concludes that NTC possesses the potential and capabilities that allow gaining additional partnerships hence the extension of NTC operations to other Nordic countries such as Norway becomes more likely.

Keywords: eHealth, Telemedicine, Nordic Countries, Business Model Canvas, Monte Carlo Simulation.

O-6: eHealth in Finnish undergraduate medical education: defining core content

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Introduction: Digitalization is already an everyday part of health care, but it has not been systematically introduced to Finnish medical education. The MEDigi, a key project of the Ministry of Education and Culture, responds to this challenge. It is a nationwide Finnish project that aims to develop and implement digital teaching, learning and assessment solutions and to provide possibilities for national harmonization of undergraduate medical and dental education in Finland. The project aims also to increase the competence related to the digital tools (eHealth, digital health) used in clinical practice. (1)

Materials and methods: The first aim of the project is to support national, discipline-specific collaboration in reaching consensus of the core content of undergraduate education in medicine and dentistry. Learning material content will be categorized at three levels: core content (level 1), complementary content (level 2) and specialty content (level 3). In every faculty, regardless of curriculum and ECTS credits, level 1 core content should form the core of teaching and provide the student the base for further development of competence. The core content analysis and national agreement on core competencies will enable to specify consistent learning outcomes and evaluation criteria.

Results: eHealth division consisting experts from all participating universities started working in April 2019 with University of Oulu as a dedicated university in charge of the progress. A survey targeted to medical and dental teachers, students and related groups was conducted in Autumn 2019. Based on the survey results, collection of background information and seminar work, eHealth division finalized the core content analysis for eHealth learning by the end of 2019 (table 1).

TABLE 1. eHealth core content analysis. Details will be given in the presentation.

Main eHealth topics	Examples of subtopics and their level
1. Electronic patient record systems	Daily use (1), Advanced use (2), System Architecture (2)
2. Electrical databases and clinical decision support systems	Clinical databases (1), Clinical decision support systems that are integrated in EPR (1), AI (2)
3. National Kanta archives	Electronic prescription (1), My Kanta Pages (1)
4. Information systems and technologies used by patients that are integrated to health care system	Virtual Hospital / Health Village (1), Treatment plan and related technical solutions (1)
5. Information security and data privacy	Principles and practices (1), Legislation (1)
6. Patient and health data: storage and usage	Structured Information (1), Secondary use of health and social data (2)
7. Interaction in digital environment	Ethics (1), Teleconsultation (1),
8. Big Data in Medicine and Healthcare	Big data (2), Precision medicine (2), Omics (2)
9. Health technology assessment	Critical thinking in introduction of new technologies (2), HTA - Health technology assessment (3)
10. Megatrends in digital health care	Future technologies (3), Change in health care (3)
11. Development, research and innovations	Regulation (3), From idea to markets (3)
12. Medical technology	Use of health technology in different medical specialities (3), Programming (3)

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O-7: Creating advanced virtual orientation for the nursing practice – Case Kuopio University Hospital

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Introduction: Critical care nursing requires competence that exceeds general nursing competence. During the first year of practice nurses working in critical care lack confidence in their practical skills, clinical knowledge and critical thinking abilities. The highest stress levels and lowest job satisfaction is experienced after six to nine months of experience in critical care. Usually, the period of uncertainty exceeds the period of orientation and therefore new employees should have support for at least nine months in the post-hire period. In previous cases, these challenges have been successfully encountered by developing staged orientation for the nursing practice. In this thesis, the angle was to explore the possibilities of the virtual format in creating orientation for advanced stages of critical care nursing.

The objective and aim: The objective of this work was to create advanced virtual orientation for critical care nurses with six to nine months of working experience. The aim was to help nurses face new responsibilities by providing an easily accessible way to develop their competence. Kuopio University Hospital (KUH) Intensive care Unit (ICU) participated in the SoTeVi-project, which aimed at developing virtual environments for orientation purposes. At the same time, ICU wanted to develop its orientation into a more staged form.

Resources and Methods: SoTeVi-project provided resources for the development work. Moodle was chosen to act as the platform for the orientation. Access to 360-camera, H5P, Thinglink, and Planet-e-stream was also provided. There was a possibility to consult an RDI-advisor and to use a professional team for video shoots. The development process included many phases. The focus group was interviewed to choose relevant topics. Scripts that included objectives, theoretical content, learning methods, and multimedia use were made for all modules. The theoretical contents were composed by combining local guidelines with up-to-date critical care nursing literature. Needed multimedia materials were produced as part of the development work. All of the contents were combined in Moodle to create coherent orientation modules. As a final stage, the theoretical content was validated by substance experts and orientation modules were piloted with end-users to ensure that they are ready for use.

Results and recommendations: As an outcome of the work, orientation materials for the advanced orientation are available in digital format. 360 -environments provide a possibility to familiarize themselves with places that are usually out of reach, for example, the ambulance used for critical care transports. Written materials are bound to real-life context with videos and pictures. Quizzes and tasks were included to maintain the focus of the orientee. Pictures with tags provide a possibility to gain information by exploring. The content of the advanced orientation is now uniform for all orientees and it can be easily accessed regardless of time and place. Based on experiences with this thesis, recommendations for the process of creating virtual learning modules in health care were created. 1. Authorize your actions (needed licenses & IPR). 2. Familiarize with focus group & topic. 3. Make a script. 4. Choose digital tools. 5. Collaborate with other professionals. 6. Pilot.

Conclusions: The overall user feedback from the modules has been good, but more research is needed to validate the experiences. The virtual format is a good addition to orientation but cannot fully replace traditional methods in health care. According to the feedback, focus needs to be paid into creating a simple user's interface, providing clear objectives and providing individual feedback. Future challenges might arise in updating the modules. Possibilities for interaction between orientees should be added in the future.

O-8: Co-creation for an early version of an app for primary care acute reception

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Introduction: As part of the CoHeWe project [1], co-creation was undertaken by the University of Oulu research, Health and Welfare Services of city of Oulu and Kaswe Oy to pilot and further develop an early version of an app for making use of a patient's waiting time in primary care acute reception. Kaswe Oy's "Teppo" app included five possible tasks assigned on a per-user basis: three forms fillable in the app, blood pressure measurement and pulse oximetry by Bluetooth-connected sensors. Setting tasks, viewing results, and tracking task progress was done in a web-based user interface. The aim of this co-creation pilot was to study effectiveness of the Teppo app both in the professionals' and in the patients' everyday use for 16 weeks.

Materials and methods: The app was in use at the Haukipudas acute care health clinic in Oulu, Finland 1.10.2019 – 31.1.2020. A new patient would first visit the triage-nurse, who invited adult patients whose condition warranted continuance at acute reception nurse to try the system. Other criteria for inclusion were presumed ability to use the system and give consent. The patient would then complete the tasks on a tablet computer while waiting for a meeting with the acute reception nurse, and return the tablet to the triage nurse when done. Metadata regarding the duration, completion and success of the tasks was gathered in the background. Feedback from citizen users was gathered through a questionnaire in the app. Feedback from the nurses was gathered as structured questionnaires and unstructured interviews. A 6 day intensive tracking and diary of patients moving through the triage point was performed 19.12.2019-10.1.2020. The developer gave training before start of the trial, and one of the seven nurses using the app provided on-site support and documented problems as they appear.

Results: Target number of patient users was 10 per day for a total of 770, but only 30 participated. During the intensive tracking, participation was offered to 38% of documented potential users, 48% of who accepted. Main reasons for not offering participation were the time pressures at triage service point (47%) and evaluated participant unsuitability (38%). There were attempts at an intervention to encourage participation, using intermediate feedback to find issues to fix; contact and encouragement; and a small competition. According to nurse feedback, senior citizens were more likely to decline, and only one user aged over 65 participated in the pilot. All tasks, with the exception of the blood pressure measurement, were completed without fail by all participants. The blood pressure measurement was complicated by connection difficulties and video instruction issues, and succeeded only 50% of the time. The open text fields in the surveys were largely unfilled. 21% percent of patient users thought that the system had smoothed out their healthcare service, and the rest were neutral. Professionals considered the system to be a burden for triage nurses (86% of nurse respondents) and to a lesser degree to acute care nurses (29%), without benefit to patients. However, they did not consider the system to be harmful either, and noticed no IT security or clinical risks during the pilot. The pilot also showed important improvement needs for further development of a such app use, e.g. an option to use patient's own mobile device or integration of the measurement results to a EHR systems.

Discussion: The pilot was successful in that answers to evaluation topics and feedback for subsequent development were gained. However in light of the low participation, experience of the pilot being burdensome, and lack of clear perceived benefit by both patient and professional participants, several lessons were learned for future co-creation pilots with early stage mobile software. 1. Motivation of both patients and staff cannot be overemphasized. 2. The scale and type of co-creation efforts need to be considered based on the development stage; a smaller pilot might have sufficed. 3. A less time-consuming alternative to traditional information form and signature-based consent may be needed. 4. Users don't answer open-ended questions in the app; impacts the design of both clinical and feedback forms. 5. Simultaneous uptake of other technologies should be minimized to the extent possible.

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O-9: Digi-HTA, a new process to perform health technology assessments for digital healthcare services in Finland

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Introduction: Nowadays, digital solutions are becoming commonplace in the healthcare sector. Previously, there was no dedicated health technology assessment (HTA) criteria or process in Finland for novel digital healthcare services such as mHealth, robotics and artificial intelligence. Based on this need, a new assessment framework called Digi-HTA was created in Oulu in cooperation with the Finnish Coordinating Center for Health Technology Assessment (FinCCHTA) and two units from the Faculty of Medicine at the University of Oulu [1]. The Digi-HTA criteria were published in November 2019, and the process is currently in the pilot phase [1]. The aim is to establish a new national HTA process and criteria and, with the resulting Digi-HTA recommendations, help decision makers make informed decisions. For that reason, it is important to identify decision makers' needs regarding Digi-HTA and highlight issues that prevent the use of this new process in its intended form.

Material and Methods: The evaluation of the Digi-HTA process will be performed with qualitative methods. The material for this study will be data collected from decision makers between December 2019 and April 2020 through workshops, personal interviews and surveys. The first dataset has already been collected from the Ministry of Social Affairs and Health's Hyteairo program workshop, where the Digi-HTA criteria and process were launched [2,3].

Results: The preliminary findings from the Hyteairo program workshop indicate that a more detailed level scale for Digi-HTA recommendation is needed and that the required evidence level for effectiveness should be defined more precisely. Also, workshop participants highlighted that there should be more HTA recommendations for digital healthcare products of different kinds so that this new process can gain credibility. Because this is a new process, communication about it is considered important.[3]

Discussion: A new assessment criteria called Digi-HTA has been created to support the HTA process in Finland. Initial assessments based on these new criteria and process have been conducted [4]. To better support decision makers, it is crucial that their development needs for Digi-HTA and current barriers in using Digi-HTA recommendations are identified. The preliminary findings show that Digi-HTA recommendations still need to be fine-tuned and that more visibility is needed for this new process.

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O-10: A small and easy to use sensor for measuring vital signals in children in hospital and at home

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Introduction: Respiratory rate, heart rate, and oxygen saturation (SpO₂) are important parameters for vital functions providing important information to identify a critically ill patient. However, neither in clinical nor in home use, there is continuous measurement method or sensor available that can monitor all these vital signals simultaneously and reliable. The main purpose of the study was to test and validate a measurement method for non-invasively measuring respiratory frequency, pulse rate and oxygen saturation using a single multimodal sensor placed on chest. In this work, the suitability of the measurement method was tested especially for monitoring small children. The monitoring system to be validated in this study aims to provide an easy to use method for continuous monitoring of vital signals, both in hospital and in-home environments. In future, the measurement system will be wireless and possibilities to use it combined with an electronic patient information system or the patient's electronic self-information system will be studied.

Material and Methods: The research material was collected by home measurements. The study group consisted of seven healthy children (mean 2.5 years old). Respiratory rate, heart rate, and SpO₂ were measured by an opto-mechanical sensor system placed on chest, using a recently developed technique (Myllylä et al., 2017). The quality of the raw signal and the usability of the measurement setup were evaluated in different measurement situations when measuring small children.

Results: The measurement method was found to be suitable for monitoring small children and measurements were successfully performed on children of different ages. The raw signal quality in various measurement situations was acceptable in almost all cases so that respiratory and heart rates as well as SpO₂ could be calculated. However, signal processing requires further development in order to ensure sufficiently accurate data also during movements of children which seemed to cause great deal of artefacts.

Discussion: The opto-mechanical sensor has been previously successfully used to measure vital signals from chest in adults (Myllylä et al., 2017). This was the first time when the method was tested on children. Based on this study, respiration, heart rate, and SpO₂ can be easily measured, even from small children, but there is still a need for further validation. In the follow-up study, the measurement method will be used also to monitor premature infants in hospital, as well as to explore the potential of home monitoring of small children and newborns in combination with eHealth services.

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O-11: The impact of the increasing use of e-health services – Leaders' perceptions of changes in the practice of the emergency department

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Introduction: In Finland, the reform of social and health care is being pursued by improving information management and increasing e-health services. For these reforms to take place, healthcare organisations need to have information systems and applications that support work and operational processes and which professionals are motivated to use. The aim of e-health is to improve patient care, access, quality and efficiency in the healthcare sector [1]. In addition to patient flows, effective assessment of the need and urgency of treatment can help to influence the availability and cost of emergency health care services.

Symptom assessment tools developed for the use of citizens, emergency department status information sharing/situation data applications, and technological solutions supporting communication between professionals and remote patient care [2] will change the way in which the assessment of the need and urgency of treatment is performed in specialised health care emergency departments (ED).

However, without understanding the relationship between humans, the environment and technology, deployment of new technological solutions has been found to fail in complex medical environments such as EDs [3]. The purpose of this study is to describe leaders' perceptions of the impact of the increasing use of e-health services on assessing the need and urgency of treatment in Finnish specialised health care ED.

Material and Methods: The research material is collected by interviewing leaders responsible for the operational management of specialised health care EDs in Finnish university hospital districts (a minimum of 10 interviews). Due to the geographical dispersion of the research subjects, the theme interviews utilise remote technology such as Skype for Business or Microsoft Teams. The research material will be analysed by qualitative content analysis. The socio-technical approach and good management practices identified in previous studies [4] have been chosen to guide the analysis of the results.

Results and discussion: The aim of the study is to provide information on changes in the assessment of need and urgency of treatment in specialised health care ED, as the use of e-health services is increasing. Research data can be used to anticipate changes in the functions and processes required by digitalisation of health care in the ED environment. Data can also be utilised in the planning and development of emergency and pre hospital care. In addition, the information can be used to develop e-health services and applications to better support the assessment of need and urgency of treatment in specialised health care EDs. At the time of writing, the collection of the research material is ongoing. The research material will be analysed in March 2020 and results from the study will be presented at the eHealth2020 Conference.

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O-12: Virtual clinic for oral health care (VIRSU)

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Nowadays, we are living in an information society, which can be defined briefly as a creative society that is based on interaction. In the information society, information and communication technology has a significant role, enabling access to the available information and services that aim to improve the quality of life. Although new technology has a major role in the information society, the most important thing is the way of doing things.

Oral health care services are an essential part of the ongoing social and healthcare reform. One of the main goals is to improve the citizen's ability to take care of their own health and life. The importance of digitalization in health care services needs to be strengthened. In addition, in oral healthcare, digital service models change traditional service activities and challenge the development of personnel skills and the changing of job images and work structures so that the use of technological applications becomes part of their job.

The main goal of this study was to develop and pilot virtual clinic for oral health care utilizing extended reality (XR) technologies, gamification methods and service design to support learning. Gamification is the use of game mechanics and experience design to engage and motivate people to achieve their goals digitally. Service design is a design approach that places equal value on the customer experience aiming to create quality service delivery. The developed environment provides services to students, customers, employees and companies. The starting point of the development was to enable studying regardless of time and place. The concepts of the virtual learning environment were designed taking into account the theories of learning (constructivism, behaviorism, cognitive, etc.) and the ways of learning (visual, auditory, kinesthetic).

New models for digitalization oral health care services were investigated and tested in the City of Kuopio, Finland. Further, the long-term aim is to accelerate the development of the market for digital oral health care services in Finland.

Specific Objectives: There are a few specific objectives that we are focusing on developing state-of-the-art oral healthcare services that include a novel and innovative learning strategy.

1. The learning mechanism in oral healthcare should support not only the traditional approach, but we have devised new learning strategies by deploying audio-visual and kinesthetic pathways.
2. The requirements for the student's learning conditions and the environments are reformed in several ways by enabling independent, time, and place-based study.

Employed methods and desired outcomes: The entire paradigm includes gamification with careful planning considering the theories of pedagogical principles to attain the desired knowledge goals. In this context, an innovative and virtual health clinic has been developed responding to several challenges in the learning environment. This will create a novel learning environment where self-regulation skills, student engagement, and their motivation and interests will be enhanced.

O-13: Co-creating innovations for public healthcare

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Innovation is successfully deployed solution including novelty and producing added value in its context. In order for a solution truly generate the desired benefit, the expertise that enables the development goals to be achieved must be defined besides the solution requirements. The end users of the solution is the core group whose involvement in development should be ensured throughout the whole development cycle.

In recent years, the Northern Ostrobothnia Hospital District and the Oulu University Hospital (OYS) have been involved in development projects funded by the European Commission, contributing to the development of innovative public procurement instruments. The THALEA project implemented an e-health solution extensively compatible with the intensive care unit environment using pre-commercial procurement (PCP). The ongoing EU Horizon 2020 funded inDemand project is developing a new model that will transform the identified challenges of public healthcare as a solution for small and medium-sized enterprises utilizing co-creation.

According to the inDemand model, companies will propose their solutions based on the challenges published by healthcare organizations. The most suitable solution proposals will be chosen for the co-creation path in which they are further developed in collaboration between companies and healthcare professionals. The final solution thus responds to the genuine need for public healthcare and is immediately available. The company owns the intellectual property rights to the solution and can sell it to other healthcare providers facing a similar challenge.

Pre-commercial procurement and co-creation models have a need-based approach. They identify the real need of a public organization and look for a company with a suitable knowledge profile as a development partner. When searching for a partner, the public organization does not precisely define how the solution will be implemented, but focuses on describing the problem at hand. The company can present its technological know-how and innovation potential in their solution proposal.

The conventional challenge of development projects has been that the results of long-term development work are not available in public healthcare organizations. This frustrates those involved in co-creation and poses challenges to the organization's innovation performance. The inDemand co-creation model seeks to avoid this situation by careful preparation and by guaranteeing the access of solutions to the public sector organizations involved in the co-creation.

As an example of successful co-creation, experts from Oulu University Hospital (OYS), the City of Oulu and Buddy Healthcare created an electronic breastfeeding guide to ensure, unify and improve breastfeeding guidance for families with babies. At the beginning of the process, OYS collected development needs and the most suitable were published as challenges for companies. Buddy Healthcare was chosen to address one of the challenges presented and the final solution was successfully co-created and tested with its end-users during the six-month co-creation process.

In co-creation process, OYS and the City of Oulu provided the breastfeeding guidance material, which was then implemented into the BuddyCare mobile application of Buddy Healthcare. The phases of the process were conducted in accordance with OYS innovation practices, including coordinated communication, involvement, as well as guidance and support for all stakeholders. Co-creation activities were organized in the OYS Innovation, Development and Testing Environment (OYS TestLab).

The final solution co-created is a nationally scalable e-health application that guides mothers in breastfeeding. The information and instructions included in the application are scheduled so that users receive time-appropriate instructions. At the end of the co-creation phase, the application proceeded to a user trial for customers. Customer feedback has been excellent: the app is perceived to meet the original need presented and to be easy to use. At the same time, the solution is a true example of innovation in which specialized and primary healthcare functions are integrated into a single, customer-oriented service path.

O-14: Information ergonomics in eHealth

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Implementing digital operation models in health care has made a significant impact on different aspects of health care system. Most evidently, it has affected the way services are provided and produced. Recent research has shown that information management activities as well as service via digital means has affected the work flow of all health care service personnel, yet it should be also approached from the perspective of ergonomics and especially information ergonomics. Information ergonomics is way to approach sociotechnical work environments. As stated in Franssila et al 2015, it is about how digital environments are adjusted to suit users, not how users should adapt to digital environment.

The paper presents four perspectives of information ergonomics based on taxonomy presented in Okkonen (2017). Technology related issues of information ergonomics consider interaction with different digital tools, systems and information channels, e.g. communication, information retrieval and storage and other information management related issues. Technology affects both human-computer interaction as well as human-human interaction. Themes of usability and user experience are topical in this context, yet low level of information ergonomics nor dysfunctionalities cannot be reduced to those. Conventions and habits, as well as individual skills, affect how individual positions oneself in digital environment and how the digital environment affects the performance. Moreover, the role of technology in this context too is dominant, as it defines the framework and functional boundaries.

Infrastructure related issues of information ergonomics consider socio-technological system that is somewhat manageable through applications and by instructions. Infrastructure consists of physical and digital environment, hard-ware and software, and intentions on purposeful use of those assets. Infrastructure affects ergonomics directly as technological restraint and via social factors. Social factors of information ergonomics affect vicariously as those are the products of interplay between individuals in digital environment. On the other hand, social factors can be seen as socially constructed conventions and set of explicit and implicit contracts. Social factors and infrastructure are closely of kin, but distinction should be made. Some infrastructural factors have very pre-cise role and some social factors have not. For analytical purposes it is more useful to have two categories.

Individual factors of information ergonomics are the most obscure elements and variable too. The (micro) actions and decision individuals conduct and make during their active hours are dependent on the nature of the task and the work environment. As the work is more about managing and analyzing information, the most significant factor is digital work environment. There is a two-way effect. Digital environment has effect on how individual works and how the resources are utilized. On the other hand, individual has own habits of using digital resources, thus he/she has effect on the environment.

To put above together, information ergonomics is issue of how user interacts with digital environment and by digital environment. The skills and habits are crucial factors for user experience, thus UX issues explain the functionality of human-computer apparatus. As the nature of knowledge work is about gathering, analyzing and disseminating information and knowledge, digital environments are also tool for cooperation and communication. Communication structure and mutual exchanges between different actors within the digital environment form other set of interaction schemes.

The characterizations exemplify an information appliance, application and service oriented perspective on information ergonomics. To elaborate that viewpoint further information ergonomics is approached as a sub-field of ergonomics focusing on informational, organizational and cognitive aspects of information-intensive work processes and observable behavior in the digital work environment and overall behavior in the digital work environment. From the informational point of view, the main attention is directed to the information resources and ICT tools available in the work environment, as well as the ways in which individuals manage information, information processes, information load and orient themselves while performing tasks supported by such resources and tools. The organizational viewpoint focuses on norm and rule-based factors affecting the ways in which tasks are performed in the work community and how the workers communicate with each other. Finally, the cognitive viewpoint concentrates on the ways in which an individual's cognitive resources and abilities such as memory, tolerance for interruptions and juggling multiple tasks affect the information-intensive work processes. Understood this way, information ergonomics is a legitimate and autonomous application domain of ergonomics. Okkonen et al (2018) discusses the theme of digitalization in health care

service by the enablers and restraints of work. The implication to providing services is straightforward as in real world, yet there are some information management and information technology related issues (Okkonen et al 2019). Key issues are related to those presented above.

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O-15: Sustainability of healthcare innovations: an ecosystem perspective Yueqiang Xu¹, PhD, Minna Pikkarainen, Professor of Connected Health, PhD^{2,3}

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Innovations in the healthcare sector can take multiple forms, for example, ranging from artificial intelligence-enabled diagnostics, adaptive interventions, to the digitalized user interface for care pathways. While there have been significant theoretical and empirical contributions made towards the development and implementation of innovations in healthcare, there has been less attention paid to their sustainability. Sustainability in healthcare means the continuation or the integration of new practice within an organization whereby it has become a routine part of care delivery and continues to deliver desired outcomes. Healthcare literature further suggests that of healthcare innovations including appropriation, continuation, confirmation, durability, embedding, incorporation, integration, maintenance, normalization, persistence, resilience and stabilization. Majority of the research suggests that the sustainability of the innovation is often regarded as generally positive. This paper shows that the sustainability of innovation is more complicated than the conventional wisdom. Especially, many desired healthcare innovations are not sustained over the long term. There is a clear need to increase clarity around the concept of innovation sustainability to guide the advancement of knowledge in this area within healthcare research domain.

In this paper, we utilize a multiple case study approach using the Indemand (<https://www.indemandhealth.eu>) H2020 project ecosystem (in which 20 innovations were co-created between 2017-2019) as a unit of analysis to explore the role of innovation sustainability in healthcare ecosystems. We identify the tradeoff problems associated with innovation, and we challenge practitioners, organizations and institutions to recognize and confront the sustainability issues of innovation.

In general, the authors identify three challenging situations regarding the sustainability of innovation in healthcare. First of all, certain innovations diffuse rapidly, however, they have limited proven value, or pose risks, while other innovations that could potentially deliver benefits to patients remain slow to achieve large scale adoption. Second, participatory, cooperative approaches may be the effective way of achieving sustainable, positive innovation, however, how to achieve such a result for innovation at scale remains a mystery. Third, improvement of the solutions clearly depend upon change, but change always generates new challenges. Therefore, the dyadic relationship between stability and change is another challenge for the sustainability of healthcare innovations.

The key finding of this research is that the sustainability of healthcare innovation remains a multi-dimensional, multi-factorial notion that is used inconsistently or ambiguously and takes on different meanings at different times in different contexts in the literature. In the ecosystem context, we propose a broad conceptualization that consists of three characteristics: user-centric value and benefits, the process of co-creation and co-development, and the governance through orchestration. The key contribution of the paper is to suggest that the sustainability of healthcare innovations are influenced by a variety of factors, which are related to innovation, context, governance and process.

This study addresses and highlights the importance of the interaction between organizational context, nature of the innovation and strategies deployed in achieving sustainability, particular in the ecosystem setting. Our study offers new insights into the process of sustainability of healthcare innovation and elucidates the complement of strategies needed to make an ecosystemic change to ensure the sustainability of healthcare innovations.

O-16: Constructing big data: the case of Kanta services 2010–2019 in Finland

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Introduction: Kanta is the name of the comprehensive Finnish national centralized integrated and shared data system services for healthcare and social welfare services, community pharmacies and citizens. The Kanta services form a unique statutory nationwide service concept, which has been introduced in phases since May 2010. Legislation became effective 1 April 2007 and 1 July 2007.

Material and Methods: Our data are provided by Kela Kanta services. We describe the accumulation of data in the national Kanta services by number of persons, visitors, visits, sign-ins, e-prescriptions, dispensations, documents, service events, organ donation documents and living wills from May 2010 to the end of December 2019.

Results: Visitors at the kanta.fi web pages 2015–2019. The number of visitors at the kanta.fi web pages has increased from 6.4 million in 2015 to over 20 million in 2019. Market share of the end-user equipment to access the kanta.fi web pages in 2019 were 55% for desktop, 36% for mobile and 9% for tablet devices, whereas the figures were 79%, 12% and 9% in 2015, respectively.

Persons who signed into My Kanta Pages 2010–2019. My Kanta Pages were launched in May 2010. Annual number of persons who signed into the nationally patient accessible electronic health records (patient portal), the My Kanta Pages, rose from 683 in 2010 to 2.381 million in 2019. The cumulative number of persons rose from 683 in 2010 to 3.143 million in 2019. Number of annual visitors rose from 712 in 2010 to 8.718 million in 2019, and the annual number of sign-ins rose from 996 in 2010 to a total of 20.924 million in 2019. Annual number of e-prescription renewal requests rose from 101,350 in 2015 to 2.780 million in 2019. Annual number of acting on behalf of children under 10-year-old rose from 138,972 in 2016 to 1.597 million in 2019. Cumulative number of dependents under 18-year-olds rose from 22,844 in 2017 to 61,898 in 2019.

Persons who had e-prescriptions 2010–2019. Prescription Centre was launched in May 2010. Annual number of persons who were prescribed an e-prescription rose from 5,285 in 2010 to 4.379 million in 2019. The cumulative number of persons rose from 5,285 in 2010 to 5.700 million in 2019. Number of annual e-prescriptions rose from 11,733 in 2010 to 29.307 million in 2019, and the annual number of dispensations at the community pharmacies in Finland rose from 9,343 in 2010 to a total of 67.015 million in 2019. Number of e-prescription dispensations abroad was 6,834 in 2019 (in Estonia).

Persons who have documents in the Patient Data Repository 2014–2019. Patient Data Repository (PDR) was launched in November 2013. The cumulative number of persons who had health data in the PDR rose from 2.715 million in 2014 to 6.106 million in 2019. Number of annual service events rose from 19,737 in 2011 to 194.911 million in 2019, and the annual number of documents recorded into the PDR rose from 51,407 in 2011 to a total of 410.375 million in 2019.

Informings, consents and consent restrictions, organ donation documents and living wills in the Data Management Service 2014–2019. Data Management Service (DMS) is part of the PDR launched in November 2013. Cumulative numbers of informings rose from 2.242 million in 2014 to 6.804 million in 2019, whereas cumulative numbers were 0.694 million in 2014 and 3.742 million for consents, and 9,847 in 2014 and 108,576 in 2019 for consent restrictions, respectively. Cumulative numbers of organ donation testament in the DMS rose from 149,031 in 2016 to 611,218 in 2019, and those of living wills from 33,983 in 2016 to 136,344 in 2019.

Conclusion: Since 10 years of the first launches, the national comprehensive centralized integrated and shared Kanta services have shown an exponential access and use of services to fit needs of various customers from 2010 to 2019, and in corollary, generating flows of accumulating healthcare big data in Finland also for various secondary use cases.

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Scientific poster abstracts

P-1: Open learning environment to increase competences in digital eHealth and social services in multidisciplinary collaboration

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Digital health and social services are increasing all over the world. Finland is one of the most advanced countries to use digital services in ehealth and social care. In EU Finnish citizens are using most actively digital services, which are playing important role in improving care and increasing citizens' participating in their own care. Future customers will increasingly produce information about their holistic wellbeing while using digital health and social care services, but customers' abilities to utilize digital tools vary significantly. To develop digital services, there needs to be worldwide changes to coordinate quality health services with universal access [1] as well as strong guidelines from national policy makers [2]. Multidisciplinary cooperation is required to develop digital health and welfare services. Professionals need to update their competences so they can guide and support customers. Services need to be developed, accounting for the needs of health and social care sector users, and customers are therefore at the center of this digital, customer-oriented reform [2].

The SotePeda 24/7 project (2018–2020) aims to improve the future digital and co-creation skills and competences of multidisciplinary developers of health and social care services. It offers open learning environment and open learning material to all to share. The pedagogical solutions based on 12 competence and content of those competences. The content is built on small micro's which includes example learning assignment's, video's, or quiz. Based on these micro elements the teachers in the project has built the massive open online courses (MOOC), to give the professionals and students possibility to study as 24/7 in online courses. These mooc's are all one ects, which takes a proximately 27 hours time to study. All this content of the open learning environment are in national level. The purpose of this poster presentation is to describe the pedagogical solution of SotePeda 24/7 and explain what kinds of digital solutions and pedagogical tools it will offer to meet health and social care sector reforms for educators, students, and working life representatives.

The mission of the project is "From 2020, with the SotePeda24 / 7 project, an open learning environment will provide collaborative cross-curricula learning produced by collaborative learning and implementing a dialogical learning perspective. Knowledge of health and social care digitalization and the development of human-centered services will increase among university teachers, students and professionals. "

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P-2: Challenges in information flow in the healthcare supply chain

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Introduction: Aging population and increasing health care needs are extending demand for different health care services on what current healthcare system has not been planned. (Saranto & Korpela, 1999) Health care process is very complex containing different operators from private, public and of course patients (Alkio, 2011), not to mention city and state decision making at the background (Lammi-Taskula 2011). The whole healthcare can be seen as an information and decision-making system depending quality data (Winter et al., 2011). Even excellent information systems (IS) are only enabling or supporting not replacing the expertise required in health care. During recent decades great amount of different systems aiming on helping the process

have been introduced. However, there are resulting problems e.g. in organization of IS, data quality and availability, and IS itself.

Materials and Methods: Our research questions are: 1) What factors impact on information integration and usability during different stages of value chains? 2) What is the current state of medical information in Finnish health care process according to different investigations? 3) What are the most urgent development needs of health care process from information management perspective? We use qualitative approach based on existing research reports, combining theoretical and conceptual research. At first, we identify the factors influencing on integration and usability of knowledge in the value chain and to analyze, based on the results of recent years, the current situation of these factors in the Finnish healthcare system. Finally, the aim was to outline ways in which these challenges should be approached in order to develop operations in a positive way.

Results: At first the central factor for smooth information flow is integration (Laihonen, 2009). Typically IS is to blame, but the key is in the organization and especially in processes (Saranto & Korpela, 1999). The flow of processes need be planned according to "core processes", no matter what are the organizational interfaces and these processes need to be constantly improved (Virtanen & Wennberg, 2005). Here the macro level understanding will be emphasized to see the big picture. The overall impact of health care process impacts through patients into the society with costs and benefits (Lillrank et al., 2004). According to Schein (2001) this needs to be communicated into the health care organization and rooted into organizational culture.

Secondly, we analyzed several studies on IS in health care (Kivinen, 2008; Kuusisto, 2016), usability of information systems (Heponiemi et al., 2017; Reponen et al., 2018; Walldén 2009; Viitanen & Nieminen, 2009) management in health care (Laihonen, 2009; Lehto & Neittaanmäki, 2017; Viitanen et al., 2007) and perspectives of integration (Virtanen et al., 2017; Wangler & Paheerathan, 2000). Health care is information intensive process. IS in health care have "evolved" over time and new features and modules have been introduced on top of existing ones omitting the entity (Uusitalo, 2012). One guilty to blame is legislation, defining quite accurately what needs to be documented and defined by different authorities in different laws (Kuusisto, 2016). Not to mention health care division on private and public level (Taipale et al., 1997). Different health care units (private/city/state) have also different service levels and patients need to be operated in several units during the same care process. One significant effort is "kanta -service" enabling information sharing at the national level. (Jokinen & Virkkunen, 2018; Vuokko et al., 2016) However, usability of kantaservice has not been good and information does not seem to follow the patient properly. Still data needs to be "mined" from different subsystems and according usability studies work load has actually increased. We need to define the health care and for information flow processes parallel. IS is only enabler and planning always begins from the management, but has to start from patient process perspective. (Kivinen, 2008; Hellström et al., 2010)

Thirdly, the main development approach is the entity itself. Inside the entity the areas of development are organization, management, processes and information systems (Fig. 1.). The solutions proposals include implementation of an enterprise architecture model, process management, utilizing concepts of flow efficiency and total cost to measure operational efficiency, and master data management to simplify data management.

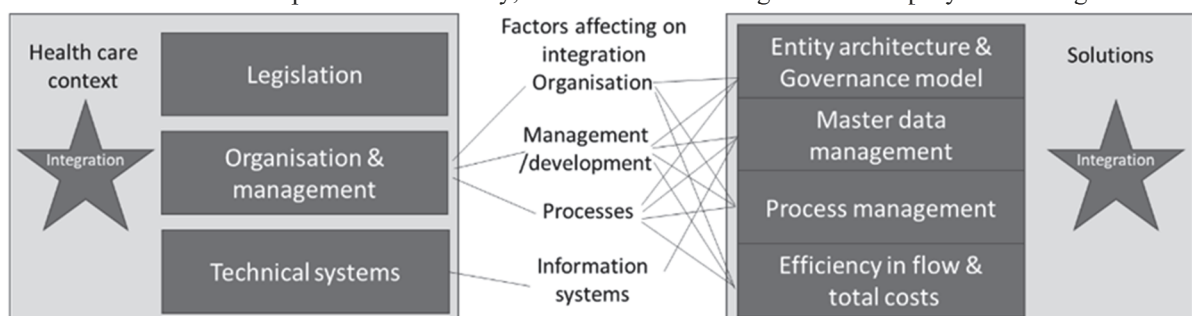


Figure 1. The main development area inside the entity from information management perspective.

Discussion: The biggest problem seems to be the entity itself. Different subsystems are complex, because different diseases cause variety for health care needs. Complexity arises also from the different organizations having different responsibilities - then architecture and governance are important. Integration is then in the key role. IT is key enabler but the development should be done from perspective of process not as an IT project.

References: A list a references is available from the corresponding author (e-mail: harri.haapasalo@oulu.fi)

P-3: Initial settings to assess the effectiveness of digital care pathways in clinical work

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Background: A digital care pathway (DCP) is a secure digital service channel for patients in a care relationship with a specialized health care hospital in Finland. It is part of the Health Village portal built in co-operation within the Virtual Hospital (VH) project by five Finnish university hospitals led by Helsinki University Hospital. [1] Health Village emphasizes the active role and equality of citizens in promoting their own wellbeing by implementing online and digital self-care services as part of the care process. Citizens' feedback on eHealth services has been positive [2]. Digital services are expected to improve patients' access to care and facilitate the workflow of healthcare professionals. Expectations for the cost-effectiveness and impact of digital transactions are high [3]. New digital healthcare solutions must provide evidence-based benefits and be safe to use, and their impacts on patients and organizations need to be clarified and evaluated [4]. In the VH project, an evaluation matrix for eHealth services was produced [1]. The matrix provides tools to assess financial viability, customer and health benefits, interoperability and feasibility at national, organizational, service provider and customer levels. The aim is to demonstrate what benefit goals have been set for each DCP and how benefit is measured in clinical work.

Methods: By the end of 2019, seven DCPs had been implemented in Oulu University Hospital for patients with coronary artery disease, diabetes, spinal cord injury, need of neuromodulation care, sleep apnea, acne, and rheumatoid arthritis. The goals and metrics have been defined for each DCP to monitor its outcome. As of January 2020, a researcher will investigate the development plans for each of those DCPs to determine what goals and measures of change have been set. Furthermore, the researcher will contact each unit that has published a DCP to reach the actual data used to measure the changes in the clinical actions. Different kinds of data from the OUH data warehouse will be used.

Results: Different goals were stated in the development plans of DCPs. Each DCP aims to reduce the number of calls with patients; for example, one goal is that 90% of all follow-up controls are performed in the DCP. In the actual presentation, we will discuss the observed differences in measures between the different DCP models and the initial results of experienced changes in clinical activities.

Discussion: In all five Finnish university hospitals, over 100 different DCPs have been produced and new ones are in the pipeline [5]. The effort in their design has been substantial and multiprofessional teams have learned to produce digital services for citizens. For the health care system, it is essential that the resources targeted at digital services can release resources from other activities. Otherwise, the digital services are not self-sustainable in the long run. Successful implementation of DCPs requires that there are measurable changes in clinical activities and mutual communication between professionals and patients. Monitoring the changes in real-life situations of DCP usage is included in every new DCP. This study produces important assessment material that can be used to guide the contents and further development of DCPs.

Conclusion: Continuous real word assessment of DCPs is needed to monitor their usefulness. This study explains the current measures and initial results. Obviously, a longer period of time is needed to verify real changes in clinical practices and economic benefits. The immediate human aspects and better quality of care are also worth monitoring, as it will take longer for the other monitored effects to accumulate.

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P-4: General purpose computations on graphics processing unit (gpgpu) computation routines for high-performance data visualization in medical and other applications

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Background: Data visualization is an integral part of computing which grows over the years exponentially in both in complexity and demand of computing resources. Modern visualization techniques demand more and more resources from the device they run on. This problem is exaggerated by the advent of new portable and ultraportable devices with low power consumption and low processing power. Mobile phones, IoT devices, embedded devices are entering the world of Telemedicine and patient-central healthcare and become the central focus for the new era of Digital health.

JavaScript is the most commonly used programming language for web applications that can run in a variety of devices that are most commonly used in the modern patient-oriented medical solutions. Notable examples are visualizing information and patient statistics on Telemedicine applications, creating charts for understanding Big Data in epidemiological studies and in real-time machine assisted surgery and operations.

Arction Oy's LightningChart JS visualization library is designed to offer an easy but robust visualization solution for JavaScript based applications, including Android and iOS apps. It allows developers to add a complex visualization element to their application, without having to spend copious amounts of time and energy to build a graphical solution from scratch, and instead enables them to focus more on the functionality of their application.

Aim: Due to the nature of JavaScript, which is inherently single core, an effort to gain multithreaded performance is made by using General Purpose Computations on Graphics Processing Unit (GPGPU) Technologies. Since there is no viable official GPGPU support for JavaScript, the aim is to choose between the existing 3rd party libraries that offer GPGPU and then implement it to the existing LightningChart JS Library to provide a performance boost.

Method: The gpu.js was chosen and used to create a GPGPU acceleration module for LightningChart JS. The Iterative Waterfall model was used throughout the development process. All the routines that were requested to be accelerated by gpu.js were written both for the Central Processing Unit (CPU) and Graphics Processing Unit (GPU) and then thoroughly benchmarked. Numerous optimization techniques were used for writing the GPU accelerated code.

Results: According to the results, on most routines GPU showed a significant overhead over the CPU and the GPU usually overcame the CPU only for computations larger than 1 Million points and higher, but around the 10 Million point mark most browsers run into memory allocation issues thus negating the acceleration. The platform and the code complexity highly affected the result with some browsers performing better than others. Best results were seen when drawing the results directly to the Canvas element, negating a second memory copy back to the CPU.

Conclusions and Future Implementations:

While this implementation shows great potential, the fact that it is so highly platform dependent passes the burden of GPGPU acceleration choice to the end user who might not be equipped to make such a decision. Nevertheless gpu.js offers great results on server-side data preparation and manipulation. Future development aspects can include further optimization solutions to make the code more stable and the results more constant between platforms and making sure that the code keeps in pace with the technological advancements like taking advantage of new emerging Graphical Application Programming Interfaces (API's) and embedded solutions. Further research is already undertaken by Savonia AMK and Arction Oy on implementing 3D accelerated charts (useful in visualizing real time 3D data, like MRIs) and server side rendering (where a powerful infrastructure is used to complement a less powerful device, for example using AI to enhance visibility in images or identify patterns) to provide a greater array of capabilities and performance improvements to the visualization solutions.

P-5: Integrating academic studies in innovation and validation processes of future health care products and services

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ProVaHealth Eu-project 2017-2020 (ERF, Baltic Sea Region BSR) tackles challenges with enlarging the opportunities for future health care services. The 14 participants (Living Labs, LLs) of the project are test labs, higher education institutes and partners and clients from service systems altogether from eight BSR countries. Oulu University of Applied Sciences (OUAS) and its SimLab is the partner in the project.

OUAS are joining OuluHealth ecosystem and OUAS SimLab is one of the three of OuluHealth Labs. The aim of OUAS SimLab is to integrate interprofessional co-creation in curricula preparing graduates to the future digitalized service system. Students from different under- and post-graduate programs, teachers and professionals have possibly to participate in the testing and validation processes of new products. For the companies' UAS will provide a safe testing and validation environment with SimLab facilities.

The partnership with OuluHealth ecosystem helps OUAS to connect the companies and market the SimLab products and services. OUAS has organized breakfast meetings to get end-users, companies and different stakeholders to meet, network and share ideas. A new optional study course has launched to foster this new type of collaboration. Together with the University of Oulu OUAS has organized "eHealth day" to get the students from different study programs familiar to the companies and new health care technology products and services. Innovation workshops are developed and organized students to solving real life problems of the companies.

This kind of triple helix co-creation will promote the companies to commercialize their products faster, to develop the future services to answer to the users needs as well as to prepare students better to the future digitalizing working life.

P-6: Training together to tackle tomorrow's health challenges in project HARKKA

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Rapidly developing science and technology provide new and exciting possibilities and knowledge for health promotion and service development. Collaboration between the higher education institutes and rapidly changing service system is vitally important. The aim of the project HARKKA (funded by ESF and Ministry of Education and Culture) is to develop nationwide action model for training clinical and interprofessional competencies in authentic, simulated and digital training environments.

Primary services and digital environments will take a bigger role in people's care in the near future. On the other hand, patients' own responsibility of their health and lifestyle is increasing and simultaneously health and wellbeing needs are changing when people are getting older. The common challenge to the universities and the service system is to provide quality education and to ensure adequate learning and training possibilities.

According to the present state analysis 70% of students are training today in simulation environments, 17% have possibility to train distance care and about 8% in digital or game environments. HARKKA investigated also the state of interprofessional training and learning possibilities. Altogether 9 universities reported interprofessional learning activities. During the project, new training pilots have started to improve interprofessional learning in real life and digital environments. Collaboration with the service system has expanded to work with companies and integrate students to innovation processes of the future care.

P-7: MEDigi: systematic implementation of digitalization to undergraduate medical and dental education in Finland

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Introduction: MEDigi is a nationwide Finnish project that aims to develop and implement digital teaching, learning and assessment solutions and to provide possibilities for national harmonization of undergraduate medical and dental education in Finland [1]. MEDigi project is financed by the Finnish Ministry of Culture and Education and its total budget is over 4 million euros.

Materials and methods: Based on the national priorities, the current state of the use of digital tools in medical and dental education was investigated via surveys, as well as the current competencies in eHealth. Then national collaborative workgroups in various fields of medical and dental education were formed. altogether 49 working groups, including working groups for various preclinical and clinical education topics but also for promoting pedagogic skills and eHealth competencies. Separate project tasks consider the technical and legal issues. All the universities in Finland that offer the Licentiate Degree in Medicine and Dentist programmes are now involved, in collaboration with the Finnish Medical Society Duodecim and the Finnish Dental Society Apollonia. The project lifespan is until the end of May 2021.

Results: The ongoing MEDigi project supports the harmonization of medical education in Finland. One of the major results will be a variety of digital study material based on core content analysis and digital evaluation tools. Furthermore, MEDigi is creating a common online service for the undergraduate medical and dental education. A specific task is to support the development of student's competence in using digital health care tools (eHealth, digital health) in medical and dental practice. In order to enable these aims, MEDigi will also create online tools and support system for digital pedagogy training. The products of this project will be piloted in participating universities during the 2020-2021 teaching term.

Discussion: The current digitalization effort will not only produce new teaching materials and create new skills. The major outcome of the MEDigi project is the extensive national collaboration that will significantly facilitate the development of medical and dental education. The project will create invaluable opportunities to modernize teaching methods and to support not only the medical and dental teachers and students, but also the future workforce from their basic education level to lifelong learning. MEDigi project will enhance the abilities of future medical doctors and dentists to face the challenges of digitalized healthcare. More information at <https://www.medigi.fi/en/home-page.html>

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P-8: Modus operandi for ethical action

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Introduction: SotePeda 24/7 is a development project funded by the Finnish Ministry of Education and Culture. Altogether 24 Finnish universities create and develop new models and practices for higher education and continuing education of health and social care. The project has started in 2018 and is running until end of 2020.

The main purposes of the total project are to develop the expertise of educators, students, and working life representatives in digital services and pedagogy, to define what kind of competences are needed in future transdisciplinary health and social care and to implement the competences in curriculum, to create new online courses and pedagogical approaches that will ensure fluent, year-round digital learning paths for students and to create a transdisciplinary community for digital learning and development in health and social care services.

Project has been arranged into seven work packages. In this presentation our aim is to depict how in the working package number 6 we created an ethical action model (or *modus operandi* for ethical action) for rapidly changing health and social care sector and its digital services.

Description of the ethical action model

The ethical action model begins from definitions of ethics and ethical behavior and gives some ethical principles for changing circumstances, changes in the working life very much because of digitalization. Especially the values and cooperation and professional ethics are taken into consideration.

Digitalization and its challenges for ethical action are emphasized most. The document asks for special issues in social and health care and ethical issues of the future from the perspective of understanding the ethics of digitalization. Such are future technologies and the ethics of artificial intelligence.

This kind of ethical action model is in constant change. Also, the ethical competence must progress all the time. Therefore, as the model has been planned for a tool for education, it must be under continuous evaluation, development and application process.

P-9: Developing a new web-based patient education material with heart failure patients

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Objective: Heart failure (HF) is a long-term and severe disease. HF leads to human suffering as well as significant costs. Effective treatment requires “seamless” system of health care and patient self-care. The aim was to produce new web-based education material for Finnish HF patients to increase the possibilities of self-care.

Methods: This paper summarizes a development work which was done as a part of studying in Master's Degree Programme in Digital Health in Savonia University of Applied Sciences in Kuopio, in Finland during Finnish national Virtual Hospital 2.0 project. Development work of Heart failure web service is based on a theoretical framework and clinical expertise. HF patients were involved in planning, production and evaluating of the web service.

Results: Heart failure web service provides information about the causes and symptoms of heart failure, treatment and self-care. We used videos, peer stories, quiz and several exercises to demonstrate the ways to deal with severe heart disease.

Conclusion: Producing sustainable web service requires both long-term project work and a plan to maintain and update the service and those practices and technologies which promote accessibility. The development also requires active involvement of end-users.

Practical implications: Heart failure web service provides wide range of information and learning opportunities and may increase empowerment of patients with heart failure and thus improve their quality of life. Involving patients in web service design is meaningful and improves usability.

P-10: Safety first: Legislation and regulations in a living lab testing in Finnish healthcare settings

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Introduction: According to Healthtech Finland association, in 2018, the health technology exports from Finland totaled 2.3 billion euros and the health technology is one of Finland's fastest growing high-tech export sectors [1]. The living labs [2] are essential part of economic growth since they enable testing, co-creation and validation of the medical devices before medical device manufacturers can bring their products to the markets.

The purpose of this abstract is to clarify what needs to be considered when testing medical devices in a living lab. In the living lab environment companies can test their products in authentic customer and expert surroundings. In the context of health and wellness, living lab services are provided in the basic health care, specialized health care and learning institutions. Testing in living labs are also guided by the legislation and regulations. When the testing is performed in the real life setting it is important that the process is executed according to the requirements.

There are several things that need to be clarified before living lab testing can begin. Healthcare providers are responsible for collecting, protecting and managing the patient data. In a digitalizing world technology is a growing part of healthcare and it is estimated that the medical knowledge doubles every few months [3]. National legislation, guided by EU General Data Protection Regulation (GDPR) [4], sets boundaries for the information management.

Medical devices have their own regulatory demands such as the Medical Device Regulation (MDR, 2017/745), which entered into force in May 2017. The MDR has a transitional period until May 2020 and it replaces the former Medical Devices Directive (MDD, 93/42/EEC). These regulations and directives are legal acts of the European Union. [5, 6.] Due to the safety issues medical devices cannot be tested in living labs before they have a CE marking, excluding clinical trials for medical devices. In addition, the living lab can organize workshops where professionals give valuable feedback for the companies how to improve their products even before they have a CE marking.

Results: Regulations and directives bring challenges to the processes of the living labs. Processes are time-consuming for both living lab actors and companies. The testing includes complex issues that need expertise and multi-professional work. When living lab testing is conducted according to the requirements, there are several positive outcomes. Patient safety is assured when technologies have been proven safe. It is also beneficial for the healthcare staff because they will learn the latest trends in the health technology and have a chance to develop their work processes.

Conclusion: It can be stated that the healthcare professionals and companies could benefit from additional training. In Finland, the training regarding medical devices is offered mostly by privately owned companies rather than the learning institutions. The amount of training should be increased by offering training for students and health care professionals in different fields. However, the living labs that follow the best practices provides the necessary information about legislation and regulations for the healthcare professionals and companies.

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P-11: How to increase knowledge of available wellbeing technology to support nurses' everyday work

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The health and social care sector is undergoing major changes. Efficiency is being sought, which demands the modernization of working methods and more wellbeing technology to be used in daily practice. Employees need to absorb a lot of new knowledge, use new equipment and consider, for example, customer safety. Adapting the use of new technologies requires new and efficient methods both in education and in the workplace.

Survey made by Savonia University of Applied Sciences for nurses in the field, indicated that they need new methods to learn, fast prototypes and solutions, without limitation to time and place. Education has a great role in transforming future nurses into innovation creators, experts for validating technology been developed now and staying at the edge of the future. Technology should solve everyday problems and should be easy to use from the customers or nurses' point of view. Workshops and testing the available technology are ways to lower the prejudices and inspire to use it.

By offering Savonia University of Applied Sciences as a Living Lab platform, future nurses are introduced to new technology; they learn how to validate new services created to their field and give valuable feedback to companies. This win-win opportunity supports customer centric solutions and encourages the nurse to use technology.

P-12: Fingerprinting diabetes mellitus by intestinal gas samples

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Intestinal gases can be used as a powerful tool for monitoring glucose metabolism of an individual. A number of breath odors are traditionally associated with specific pathological states. For instance, renal failure is associated with a ‘fishy’ smell and diabetes with a ‘fruity’ smell. In the 19th century, acetone was found in the breath of diabetics by Nebelthau, and that exhaled ethanol was a byproduct of alcohol metabolism was discovered by Anstie. The apparent complexity of out-gassed substance composition was largely undefined until 1971, when Linus Pauling exploited gas chromatography to list some 250 gas components in human breath [1]. By now, more than 3000 different Volatile Organic Compounds (VOCs) and other aerosolized particles have been identified in exhaled breath gases [2]. Diabetes and its related dysmetabolic states now greatly benefit from these non-invasive tests in diagnostic, prevention and monitoring using intestinal gases and correlations between the gas based and other analysis methods. A ten-sensor gas analyzer is here developed, and a pilot test is carried out for validating the system in identifying Diabetes Mellitus (DM) patients among groups of volunteers. A deep computing algorithm, constructed for the data analysis, allows to ‘fingerprint’ the likely DM cases among the tested individuals.

In order to validate the performance of a six-sensor system was constructed and tested by a group of 30 volunteers for potential early stages of Type 1 and 2 Diabetes Mellitus. Intestinal gas samples were collected by a HALAX toilet system [] together with samples of exhaled gas and measured by using an advanced sensor arrangement and used as inputs to a deep computing (DC) based algorithm that identifies the specific condition, or its absence, in question.

For validating the results, earlier studies and sensor technologies used in analysis of exhaled breath air are reviewed. Different sensor technologies have their dedicated installation, operation control and calibration requirements. In data analysis, different sensor characteristics such as their sensitivity, resolution and timing are considered. For the initial sensor array, four sensor technologies are used.

The sensors are connected to a processor, i.e. a microcontroller system with the necessary control functions of the sensor system. The microcontroller also contains the on-line analysis software used for initial recognition of type 1 and 2 diabetes mellitus.

In using the microcontroller for data analysis, a large amount of the system functionality is focussed in a single device. This includes the necessary updates on the system. As a potential drawback in this approach is that updating the processor system may become a challenge, especially in case the users are not physically able to access the processor. A limited amount of processing power and memory, would limit processor’s analytical capabilities.

By using a PC or an Android-application for the analysis, no limitations in analysis power and easy updates are facilitated. Depending on the number of tasks given to the processor (for example, light up a certain red light if the analysis indicates presence of disease), the sensor output values need to be sent to a separate device, which in turn sends the outcome back to the processor.

Independently of the analysis tasks, there is a definite need for a separate user application (PC, portable phone etc.) to receive and save measurement data. With measurements being saved and made accessible wherever necessary, they can be used in the creation and adjustment of statistical models to further refine the system’s analytical capabilities.

Another option is to set up a neural network inside the system: all collected data is then collected and turned into training data for a deep learning network, subsequently ported over to the system. This can also be realised on analytics processor-side, as long as the actual deep learning process itself is handled by a computer, the neural network it outputs as a result could be sent over to the processor code as an update.

For a convenient analysis, the system is to communicate between the processor and a user device. The link between the sensor system and a user device, such as a mobile phone can be arranged via internet, Bluetooth etc.

P-13: Virtual stress management group for university students: a pilot study by Finnish Student Health Services

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Background and aims: Psychological problems faced by university students have become more and more common in past few years. One of the most common reasons for students to seek help for is stress and stress management. For this need a stress management group based on Acceptance and Commitment Therapy (ACT) has been organized since 2015 by Finnish Student Health Services (FSHS). The group aims at increasing the psychological flexibility of the students which correlates with better psychological wellbeing.

Because many students live in smaller cities or in areas where groups can't be organized for some reason, a virtual group was piloted in autumn 2019. The aim was to find out, whether a virtual group is as effective as live groups, how students accept virtual interventions and could this be a way to make group interventions even more accessible for all Finnish students.

Methods: The virtual group consisted of eight group meetings which were held on a virtual platform called solki.live. Group meetings were held weekly and the duration of one meeting was 75 minutes. Eight students were included in the group, seven of them finishing the whole group. Students participated the group with their first name and a thumbnail picture of their face. The group leaders were seen in a bigger screen and they were able to show presentations and make recordings during the group meetings. In addition students received homework to be completed between the group meetings.

The group intervention was based on the principles of ACT: Mindfulness, taking distance to difficult thoughts and feelings, acceptance and values. The methods used in the group were psychoeducation, group conversations, mindfulness exercises, metaphors and homework. The effectiveness of the group was measured by two questionnaires (AAQ-7 and Core-10), which the students filled before the first and the last meeting. AAQ-7 is a seven-item questionnaire measuring psychological flexibility and Core-10 consists of 10 questions measuring general psychological wellbeing. Additionally students replied to a feedback questionnaire after the group.

Results: The results of the group show that the psychological flexibility and general psychological wellbeing of the students increased during the group. In average the scores of AAQ-7 dropped 14 % and the scores of Core-10 dropped 36 %. The feedback from the students was highly positive: they benefited from the group, they got practical stress management skills to be utilized in their daily life and they felt that the virtual group format worked well. Some students even said that it was easier to participate in the group because it was held on-line.

Conclusion: According to the experience gained from this pilot study, we can state that this kind of preventive group intervention is feasible and effective in virtual format. The interaction with the group members was fluent, they were able to internalize the main components of the group and they benefited from the exercises done during and between the group meetings. To make the group even more effective and to be able to bring up the group size, a more diverse platform would be needed. For example a possibility to divide the group into smaller groups for discussions, more functional chat and a possibility to save the group materials in the same platform would be desirable functions in the future.

P-14: Supporting the uptake of open service platforms for the development of innovative solutions in the active and healthy ageing domain

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Ageing presents one of the greatest socio-economic challenges of the 21st century. According to estimates, more than 20% of Europeans will be 65 or older by 2025. Reacting to related puzzlements of demographic shifts and ageing in general, and guaranteeing the availability of the required structure to help Europe utilise the active and healthy ageing (AHA) sector's opportunities, the EU has devoted a high level of resources to ICT projects in the field of active and healthy ageing. As such a considerable number of open source platforms for the development of innovative solutions in the AHA domain have been created (such as universAAL, FIWARE and others).

PlatformUptake.eu assesses the societal impact of these existing platforms, creates monitoring and evaluation toolkits, collects successful user stories and best practices, promotes interoperability and defines guidelines for a common evolution of such platforms within existing policy frameworks and initiatives.

PlatformUptake.eu specifically seeks to support the large-scale uptake of open service platforms in the AHA domain, by acquiring evidence on their benefits and impact, creating support materials for platform hosts/providers and users and raising awareness on the benefits and value of using these platforms for the development of innovative and suitable solutions that can support older people in living active and healthy lives.



This project has received funding from the European Union's Horizon 2020 Research and Innovation Action under Grant Agreement No 875452

P-15: The educational reform – learning goes virtual

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Introduction: The project has been developing ubiquitous learning environments for social and health care workers and students, work guidance, learning and recruitment. Additionally we have made educational games to enrich the learning process and to make studying a bit more fun. Our solutions have been under hard piloting, with good results. These are further being improved and taken into use later this year.

Material and Methods: We have developed our education with digital environments to be used independently, anywhere, anytime. Some of the environments are 360-degree real life spaces with additional content about equipment, instructions, protocol, safety issues and general guidance. Students are able to move in the laboratory, hospital environments or check how the ambulance equipment works. They can check places and learn a lot in advance, before they actually go into the lab or go practice in the hospital. All the needed study content and practical exercises can be built inside the virtual environments.

Additionally we have created two games for our students. One for learning the process of how to take blood samples from a patient correctly, step by step. The other gamified solution addresses a huge problem, medical treatment. In hospitals, false medical treatment is a major factor in patient malpractice. As an educational organization, we are responsible in producing high quality employees to the labor market, in this case nurses who do their medical calculations right. This game is currently available for free in the app stores.

We are also creating 360-videos of real healthcare situations to be used as part of recruitment process. This will replace the old text-on-paper method. All of these cases, environments and tools will be further utilized, taken as part of the daily education. Moreover, once we get good user experience, these solutions will be expanded and developed for other areas as well.

Results: We have gotten new tools for the students and employees to train and study. The response has been mostly good. The materials are interesting, high quality, the environment has enabled faster learning, and the learning results have been good. The new way of learning has been motivating and created essential value to the traditional learning methods. The students have hoped these kind of environments to expand into other subjects as well.



Discussion: This project has been an excellent pilot in the modernization of education. We have tested a variety of software tools as well as hardware, which suites us best. There are many digital tools available and often their usage is not that simple for an ordinary teacher. The same goes to hardware. There are often technical issues to be solved and thinking about a wide usability, the newest XR-technologies are usually not the best approach. This will be a great start for answering the challenges of education, lack of resources and personalized study paths. With the help of these tools we will get efficiency into the educational system and more prepared employees into the market.

Finnish National eHealth Awards

The Board of Finnish Society of Telemedicine and eHealth delivers annually national eHealth award. The award is based on significant accomplishments in the field of telemedicine and eHealth. The required activity can be for example a doctoral thesis in this area or some other important activity in the national or international level supporting the society's goals. The award is delivered during annual Finnish national conference on telemedicine and eHealth. In the year 2020, Finnish national eHealth award is delivered 17th time.

eHealth award


The Board of Finnish Society of Telemedicine and eHealth decided to deliver two Finnish National eHealth Awards at the 25th Finnish National Telemedicine and eHealth Conference emphasizing both life-long work for the benefit of eHealth and novel eHealth research.

-  MD Anne Kallio has made a major contribution to the Finnish national digital health infrastructure as it is available today. After a clinical career as an ear, nose and throat specialist she acted as a project manager, when regional digital services were taken into use in South-Eastern Finland. Then she moved into the Finnish Ministry of Health and Social Affairs and with her medical background knowledge strongly influenced to the strategies, legislation and financial resources that were needed to establish the current Kanta-system, the Finnish Health Information Exchange. Moreover, she recognized the importance of continuous impact analysis and research based evaluation in this area. She also served many years in the board of Finnish Society of Telemedicine and eHealth. The board of our society recognizes Anne Kallio's life-long work with this reward.
-  PhD Minna Mykkänen's doctoral dissertation entitled "*Data structures in clinical data processing and secondary use of patient data*" in the field of Health and Human Services Informatics at the Faculty of Social Sciences and Business Studies was held on 4th of November 2019 at University of Eastern Finland. This study developed a nursing information model for primary and secondary use of structured data, describes how structured information is produced and used. The structuring of clinical information enables its use in monitoring, evaluating, developing and researching activities. The model can be used to enhance national and international co-operation, encourage the use of unified data structures, compile comparative data, promote evidence-based nursing, and support leadership. Both Kuopio University Hospital and University of Eastern Finland proposed Minna's rewarding

Reference: <http://urn.fi/URN:ISBN:978-952-61-3181->

Honorary membership of FSTeH

According to the rules of the Finnish Society of Telemedicine and eHealth, the general assembly of the society can give an honorary membership to those members or collaborators that have acted for the benefit of the society in an extraordinary manner. The honorary memberships are not given every year, and they have to be prepared in the board.

-  MSc (engineering) Seppo Savikurki has been working since 2004, with only a small break, as a board member of Finnish Society of Telemedicine and eHealth, that is altogether 13 years. Most of the time he acted as a responsible person for the society's enterprise relations. His knowledge and connections to the Finnish and international digital health industry were established during the years when he served as the director of medical technology at the Helsinki and Uusimaa hospital district. Seppo Savikurki defined the format how the famous cruising eHealth seminars are planned even today. According to the recommendation of the FSTeH board, and because of his services to the society, the FSTeH general assembly nominated Seppo Savikurki as a honorary member on the 21st of April, 2020.

FSTeH honorary members

- Joseph N. Gitlin, USA, 1997
- Hon. Arthur Maxwell House, Canada, 1997
- Kenichiko Kajiwara, Japan, 1997
- Richard Wootton, UK, 1997
- Mårten Kvist, Finland, 2005
- Antero Rahtu, Finland, 2009
- Raino Saarela, Finland, 2019
- Seppo Savikurki, Finland, 2020

Finnish special competence for healthcare information technology

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Background: Healthcare information and communication technology has become an everyday companion for physicians, dentists and veterinarians. In Finland, the current availability of electronic medical record systems is 100% both in public and private care (1). Telemedicine and eHealth solutions are an inheritant part of digital transformation. They extend from professional consultation services to mHealth and self care solutions targeted to citizens (2). Digitalization is playing a major role in the Finnish social and health care strategy, and the expected outcomes depend on the success of digital services (3). However, the education process has not been well prepared to these needs.

Therefore, in 2012 Finland was to our knowledge the first country in Europe to establish a special competence for healthcare information technology to physicians and extend that since 2015 to dentists and since 2018 to veterinarians. The vision is that medical doctors, dentists and veterinarians could use their clinical expertise in the development of novel eHealth and mHealth solutions (4). The experienced network of experts could then collaborate with enterprises, research institutes and other actors in the field. The formalized special competence is providing a motivating professional career path to the individuals, too.

Methods: In order to qualify for the special competence program, one has to become first a medical specialist consultant. A five years experience in clinical work without specialization after a licenciate degree is enough for dentists and veterinarians. The special competence requires then two years practical service and theoretical studies. The practical service in the information technology domain can consist of e.g. developmental, educational or research duties. One can also serve in an enterprise or make own research. According to rules, the duties should be versatile, it is not enough to work with only one information system. The theoretical studies are collected from courses in universities and universities of applied sciences, from eHealth conferences and seminars. It is mandatory to participate international eHealth events. (5)

There are no formal exams, but the applicants have to fill a competence portfolio under a supervision of their mentor. Two external reviewers then give their opinions. After reading those opinions, the special competence committee organized by the Finnish Society of Telemedicine and eHealth makes its recommendation and the final degree of special competence is given by the Finnish Medical Association or the Finnish Dental Association or The Finnish Veterinarians Association, respectively. (5)

Results: In September 2020 already 136 applicants have been enrolled to the program. There were 120 physicians, 13 dentists and 1 veterinarian among them. Of those enrolled, 81 physicians and 13 dentists have achieved the full competence. Those still in process have received guidance for their studies from the special competence committee. Those graduated have found positions as leading healthcare information technology experts or in administrative tasks in regional or national health information technology projects.

Conclusions: This new special competence gives already graduated doctors and dentists an ability to utilize their knowledge about healthcare processes for the benefit of the new eHealth and mHealth services. However, it is necessary to bring these skills in the future as a module to the basic medical education. Therefore University of Oulu has since 2016 produced a specific eHealth course for medical students (6).

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The International Society for Telemedicine & eHealth (ISfTeH)



Mission Statement

The International Society for Telemedicine & eHealth (ISfTeH) facilitates the international dissemination of knowledge and experience in Telemedicine and eHealth and providing access to recognized experts in the field worldwide.

The ISfTeH is THE international federation of national associations who represent their country's Telemedicine and eHealth stakeholders. ISfTeH represents globally countries (103 countries and territories). The ISfTeH is also open to additional associations, institutions, companies and individuals with a keen interest in the subject of Telemedicine and eHealth, or with activities that are relevant to this field.

The ISfTeH fosters the sharing of knowledge and experiences across organizations and across borders and aims to promote, coordinate and support of telemedicine projects and activities throughout the world. Furthermore, ISfTeH cares for the widespread use of ICT tools and solutions in health and social care in order to:

- improve access to healthcare services
- improve quality of care
- improve prevention
- reduce medical errors
- integrate care pathways
- share and exchange information with citizens/patients
- reduce costs

ISfTeH was founded in 1997. Since 2008, the ISfTeH has also been awarded the status of "NGO in Official Relation with the World Health Organization", making it the international reference in Telemedicine and eHealth for health policy makers from around the world. Through its national member associations and through courses and conferences, the ISfTeH does participate in the establishment of eHealth training and implementation plans, and provides assistance and education where needed.

Join our network of member organizations or working group. The ISfTeH is your door to the global Telemedicine and eHealth community, and global partner in digital health. Through its various activities and members, the ISfTeH can assist you in the promotion and dissemination of your research and development work; help you to enhance your healthcare services with new ICT tools and technologies; provide ideas to broaden your educational programs and courses; and widen your international business network.

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Finnish Journal of eHealth and eWelfare



Finnish Journal of eHealth and eWelfare

<http://www.finjehew.fi>

Finnish Journal of eHealth and eWelfare (FinJeHeW) is a scientific journal established by the Finnish Society of Telemedicine and eHealth (FSTeH) and the Finnish Social and Health Informatics Association (FinnSHIA), and it also serves as the official journal for the members of the establishers.

The Journal was established in 2009. The aim of the Journal is to promote scientific research, communication and education in the fields of information and communication technology relating to social and health care, telemedicine, eHealth and eWelbeing.

Financial assistance has been granted to the journal by the Federation of Finnish Learned Societies since 2010. FinJeHeW benefits the members of the associations further by functioning as an information channel, multidisciplinary publication forum, and supporter for the international network.

The Journal welcomes articles on information and communication technology of social and health care, telemedicine, eHealth, and eWelbeing. Instructions for authors can be found on the Journal website. FinJeHeW is mainly a Finnish language journal, but also includes articles, abstracts and other material in English. All submitted manuscripts are evaluated by the editor. Manuscripts that are considered suitable for publication in the Journal are sent to two referees for assessment. The contents of this journal will be available in an open access format starting from autumn 2017. The Journal is published in electronic form and includes four issues per year.

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Integrating the Healthcare Enterprise (IHE) Finland

IHE (Integrating the Healthcare Enterprise) is an international non-profit organization that works to improve the way healthcare systems share information electronically. IHE encourages the use of established interoperability standards such as HL7 and DICOM and strives to solve specific integration problems faced by its members in the real world through Integration Profiles. IHE Finland is a member of IHE International and IHE Europe.



Integrating
the Healthcare
Enterprise

BENEFITS OF USING IHE

- Optimize clinical workflow and strengthen the information link between different departments
- Streamline the flow of clinical information, reduce errors and improve efficiency
- Simpler integration and implementation
- IHE profiles fill the gap between standards and systems integration
- Clear path toward acquiring integrated systems
- Common framework and better communication for vendors and purchasers
- Flexibility while ensuring that key integration needs are met
- Provides common workflow and reduces the need for tailoring
- International development and publication of IHE Technical Frameworks

WHAT'S NEW

- IHE Europe Connectathon is organized first time as an online event, 2-6.11.2020
- Project for analysing the IHE profiles available currently for their applicability in Finland continues
- IHE support project going on to regularize IHE activities in Finland continues

WAYS OF WORKING

- **Integration Profile Specification:** technical specifications for implementing standards
- **Connectathon:** opportunity for vendors to test the interoperability of their products with peer vendors
- **Projectathon:** tests your project specific configurations (vocabulary, document types, workflows, etc) in the context of the IHE profiles working together
- Preferences for established, complete standards
- Forum for collecting integration requirements, developing profiles and testing, for both vendor and user organizations

JOIN US

- IHE activities directed to the needs of Finnish organizations
- Workshops organized to define focus points
- Support for concrete development projects
- IHE Finland workshops are open to IHE Finland members
- Attend training events organized by IHE Finland
- Profiles and reports are free for evaluation and use
- To follow and participate
<http://www.hl7.fi/hl7-finland-liity-yhdistykseen>
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- Join our mailing list and LinkedIn group!

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