Closing conference of the project

DELIVER

Healthcare professionals at the centre of digital transformation in healthcare

24 November 2023 | Ljubljana, Slovenia

Co-founded by the Erasmus+ Programme of the European Union

13th CONFERENCE

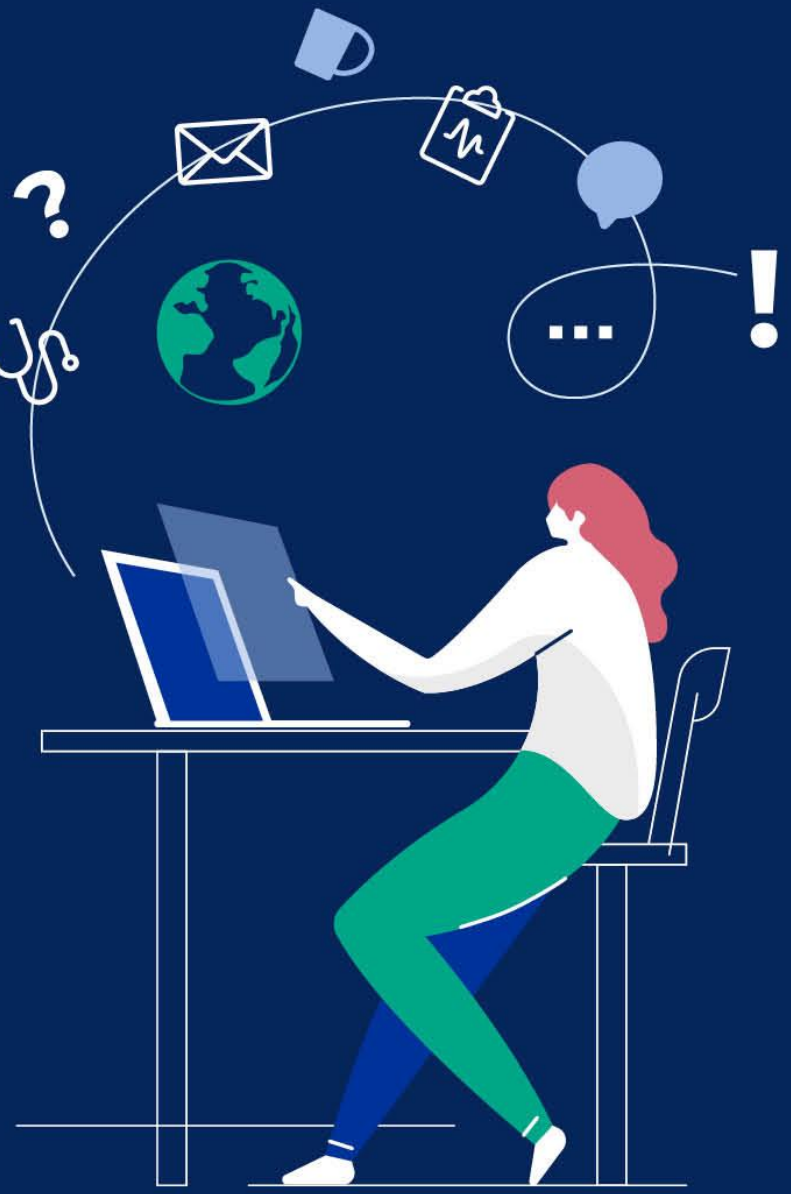
'MY CAREER – QUO VADIS'

DELIVER

DELIVER Closing conference

24 November 2023

Radisson Blu Hotel, Ljubljana



Erasmus+

Why do we need digital competencies ?

"We need to overcome the dualisms between digital and paper, digital and analogue...“

Manager, Italy

DELIVER

Erasmus+

DELIVER

Digital **E**ducationa**L** programme **I**nvo**V**ing h**E**alth p**R**ofessionals

- Digital competence development of healthcare professionals and managers across 4 countries in Europe
- Category: Strategic partnerships for adult education
- Grant: €300,650
- Project period: 3 years
- Period: 31 December 2020 – 30 December 2023

DELIVER Erasmus+

UNIVERSITÀ DEGLI STUDI DI UDINE

hic sunt futura

TIC | Salut Social

Tecnologia, innovació i transformació digital.

Fakulteta za zdravstvo Angele Boškin

Region Syddanmark

DELIVER

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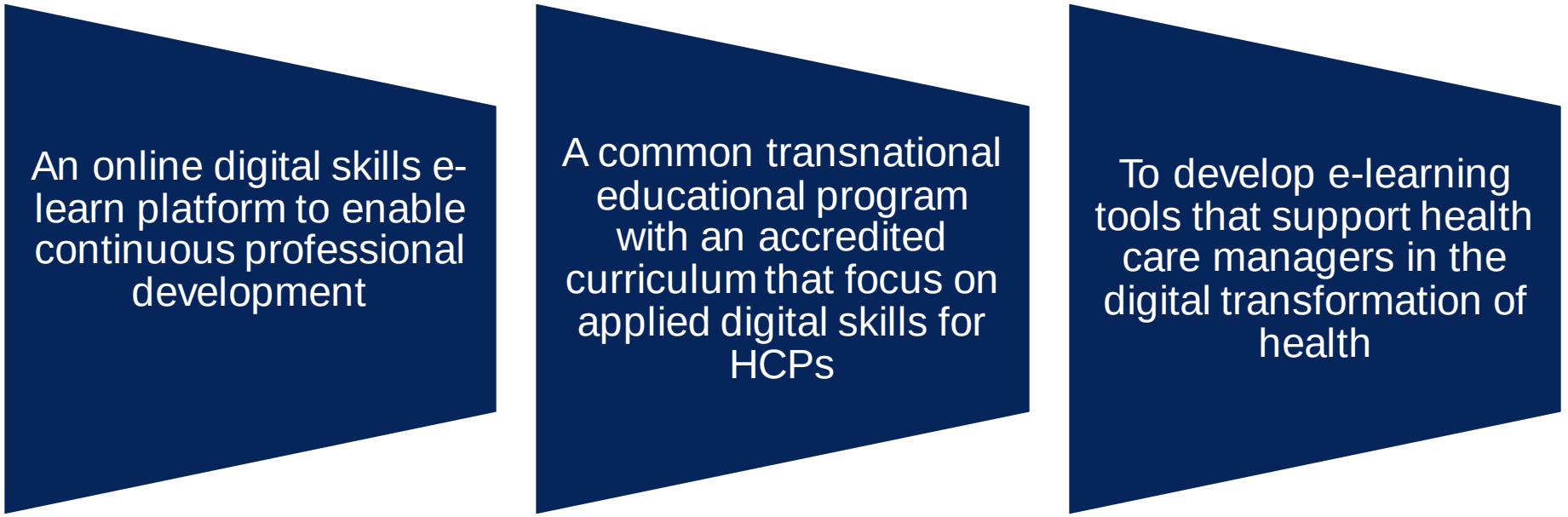
Main goal and aims

DELIVER's overall goal is to **enhance the digital skills of HCPs and supporting health care managers in digital transformation**

To achieve the overall goal DELIVERS aims to develop:



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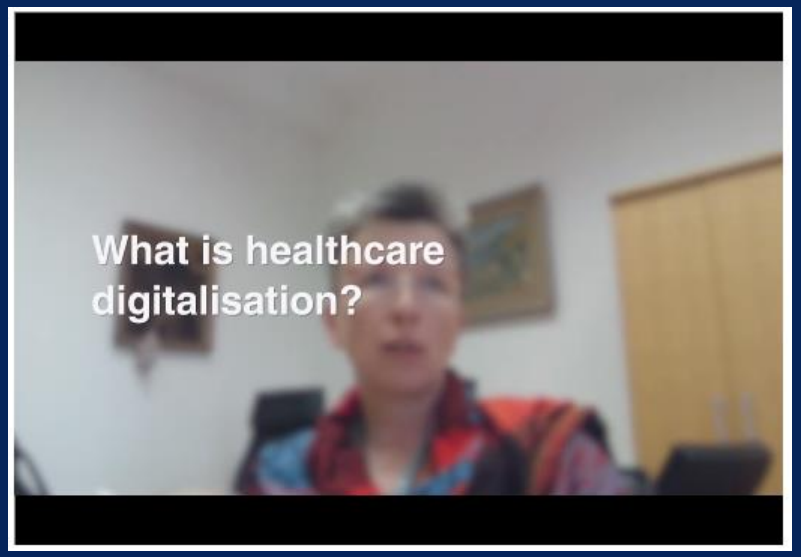
Where to start?



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• Attitude and mind-set
• Reflections
• Skills
• Training
• Technological understanding

UPCYCLE

+

DELIVER

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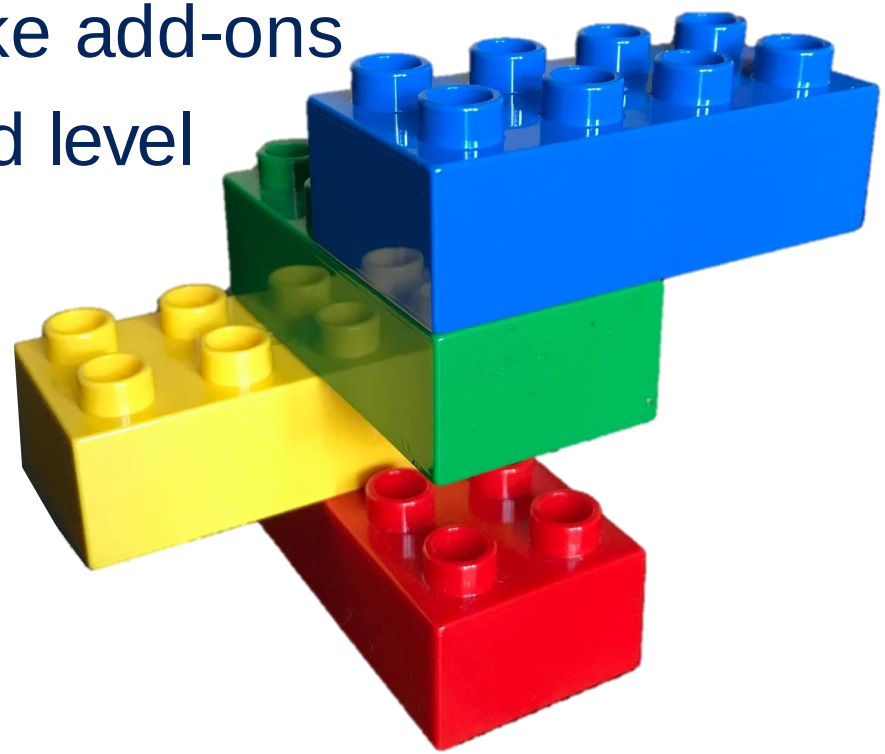
The DELIVER e-learning platform

- E-learning platform contains approx. 60 micro-modules
- Six overall themes
- By using smaller modules, you can make add-ons
- Greater flexibility in terms of context and level



DELIVER

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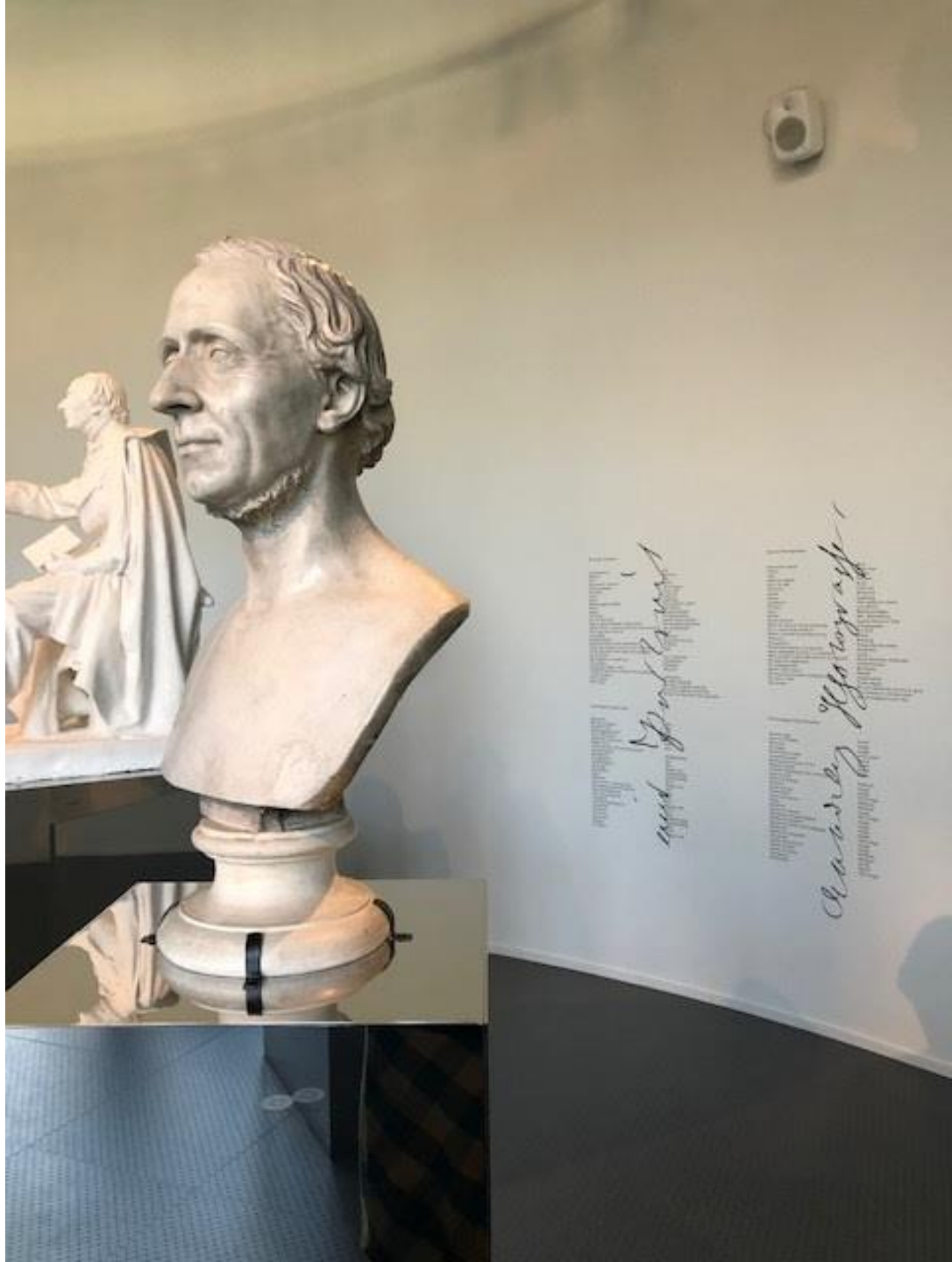
Digital competencies: Stay Curious!

“Everything you look at can become a fairy tale and you can get a story from everything you touch.”

— **Hans Christian Andersen**



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Thank you!

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Thank you for listening

www.project-deliver.eu

Linda Justi
Project Manager
Linda.justi@rsyd.dk

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PLENARY SESSION

About the importance of digitalization at healthcare

Moderators:

Dr Alvisa Palese and Dr Katja Pesjak

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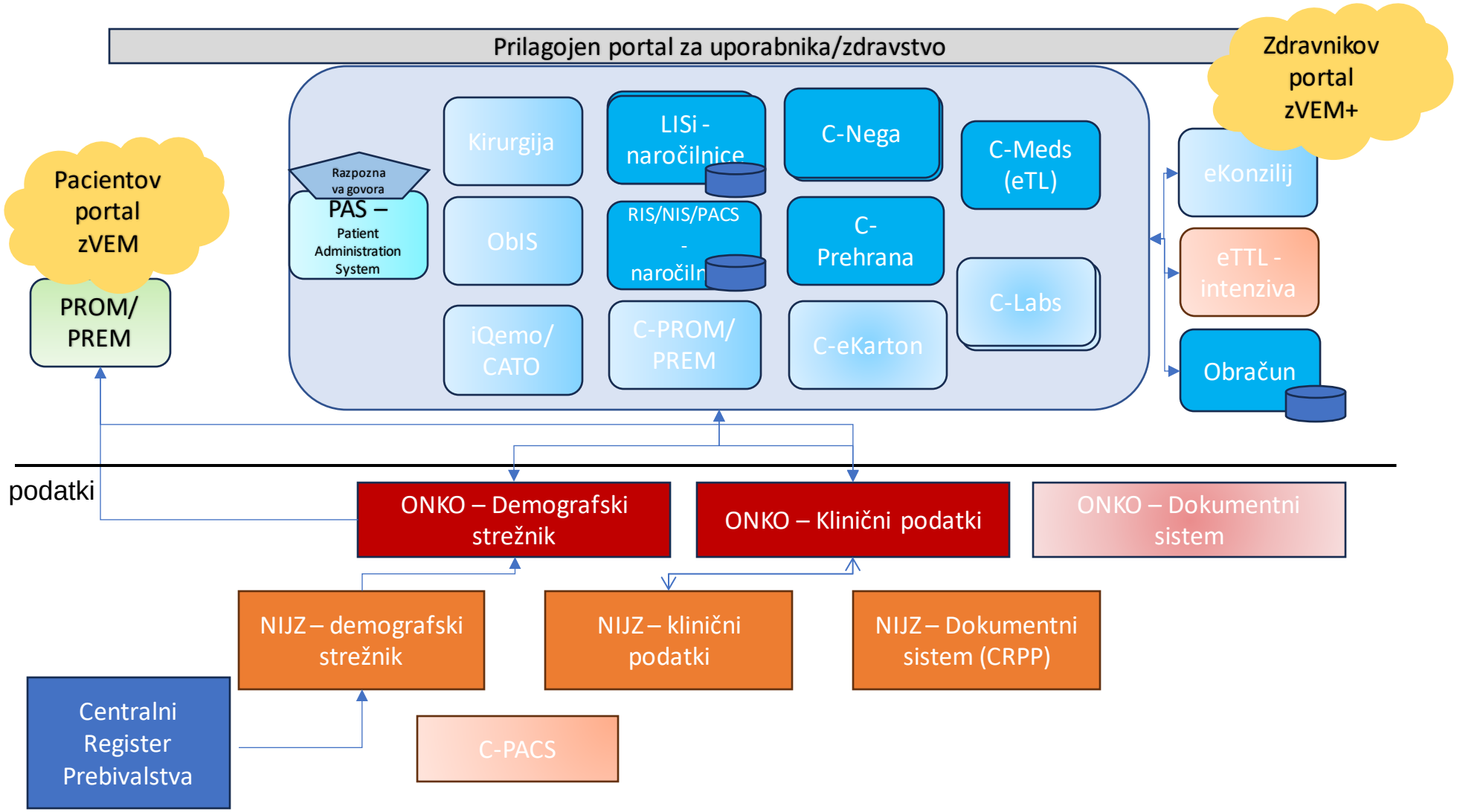
REPUBLIKA SLOVENIJA
MINISTRSTVO ZA ZDRAVJE

The big WHY

Why we do need Health Digitalisation Act?

Alenka KOLAR
Direktorat za digitalizacijo v zdravstvu

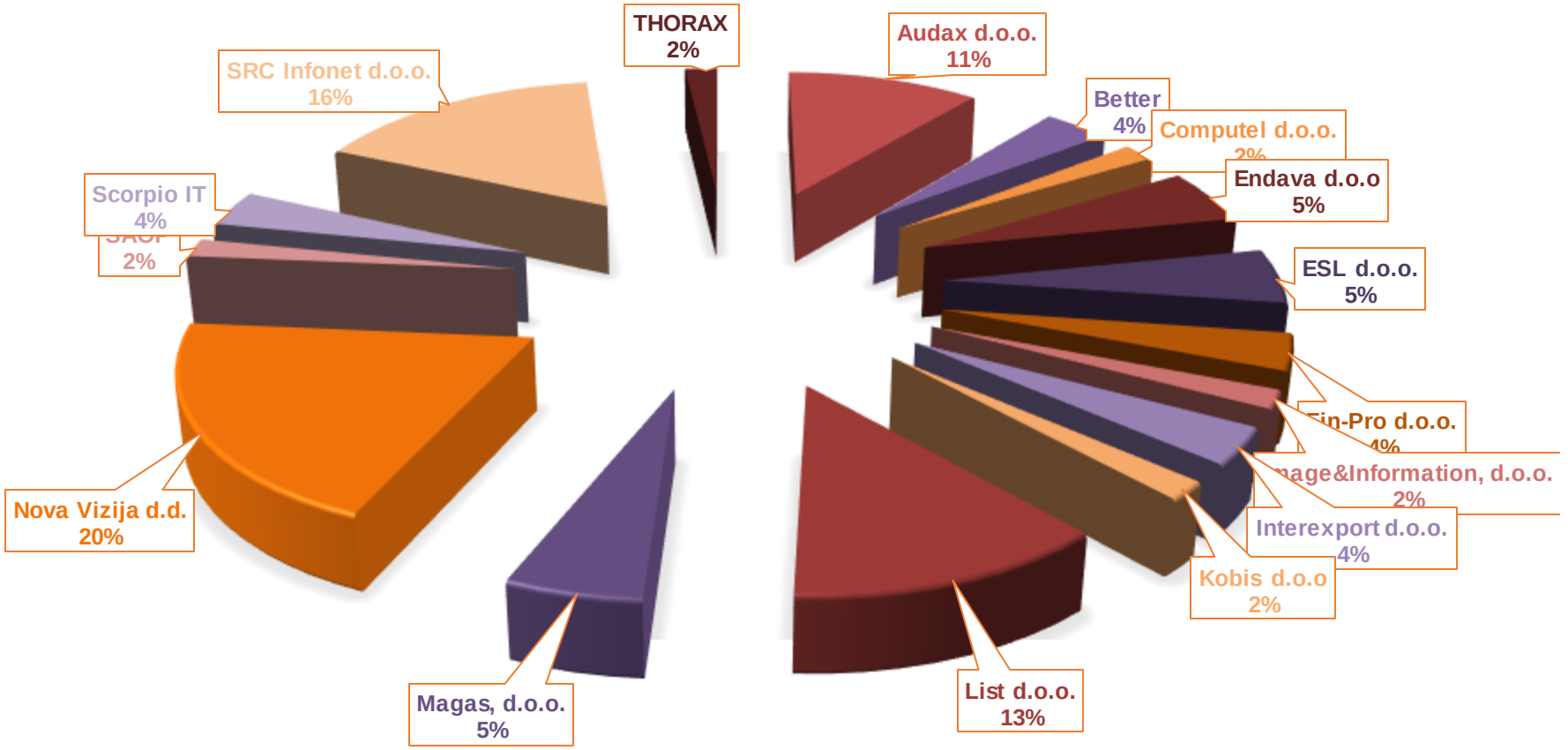
Patients do not have all their medical data in one place!


Prilagojen portal za uporabnika/zdravstvo
Zdravnikov portal zVEM+
Pacientov portal zVEM
PROM/ PREM
Razpozna va govora
PAS – Patient Administration System
Kirurgija
LISi - naročilnice
C-Nega
C-Meds (eTL)
ObIS
RIS/NIS/PACS - naročiln
C-Prehrana
C-Labs
iQemo/ CATO
C-PROM/ PREM
C-eKarton
eKonzilij
eTTL - intenziva
Obračun
podatki
ONKO – Demografski strežnik
ONKO – Klinični podatki
ONKO – Dokumentni sistem
NIJZ – demografski strežnik
NIJZ – klinični podatki
NIJZ – Dokumentni sistem (CRPP)
Centralni Register Prebivalstva
C-PACS

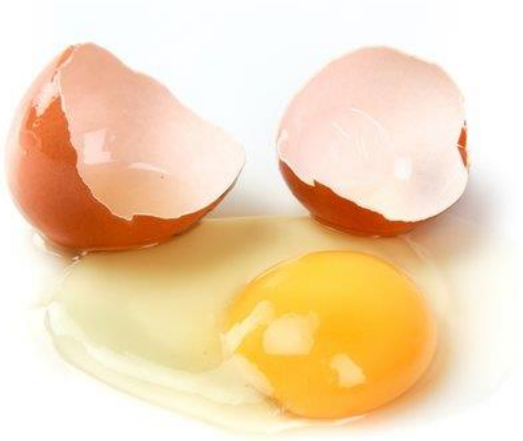
Healthcare workers are over-burdened with data input!


LISTEN VERY CAREFULLY, I SHALL SAY THIS ONLY ONCE.
MICHELLE DUBOIS
MAGICALQUOTE

Finance are not secured for Health digitalization


THORAX
2%
Audax d.o.o.
11%
SRC Infonet d.o.o.
16%
Better
4%
Computel d.o.o.
2%
Endava d.o.o
5%
Scorpio IT
4%
ESL d.o.o.
5%
Nova Vizija d.d.
20%
Magas, d.o.o.
5%
List d.o.o.
13%
Kobis d.o.o
2%
Interexport d.o.o.
4%
2%

Digital = Transparent

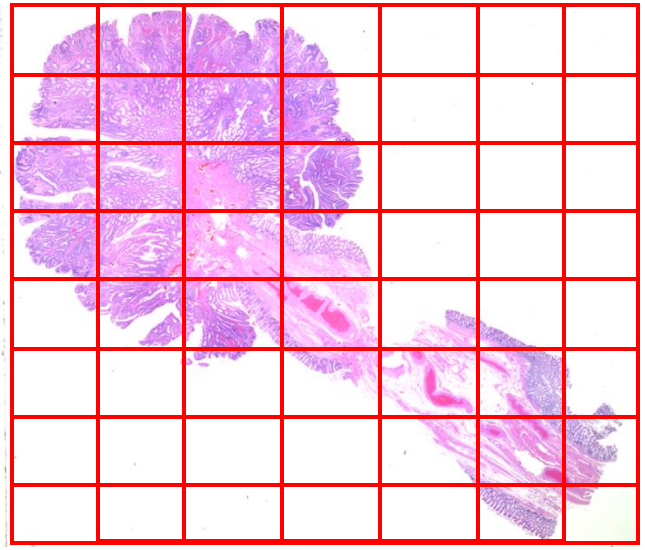


UNIVERSITÀ DEGLI STUDI DI UDINE

Learning emerging digital skills: a case study

Vincenzo Della Mea

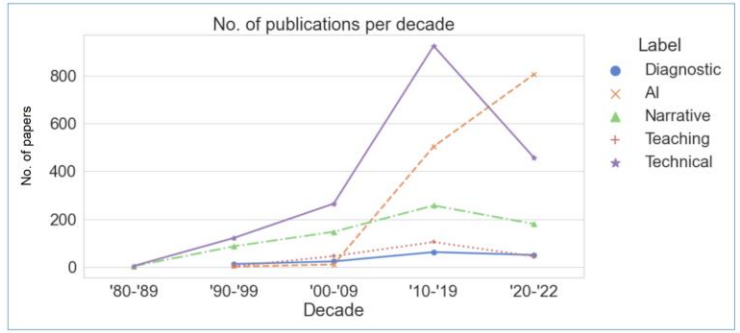
Medical Informatics, Telemedicine & eHealth Lab
Dept. of Mathematics, Computer Science and Physics
University of Udine, Italy
https://mitel.dimi.uniud.it

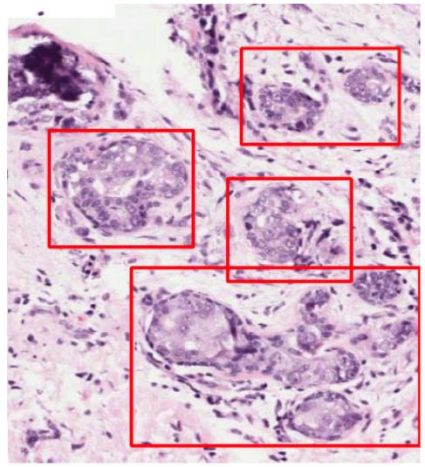


Pathology labs: a major disruption is happening…

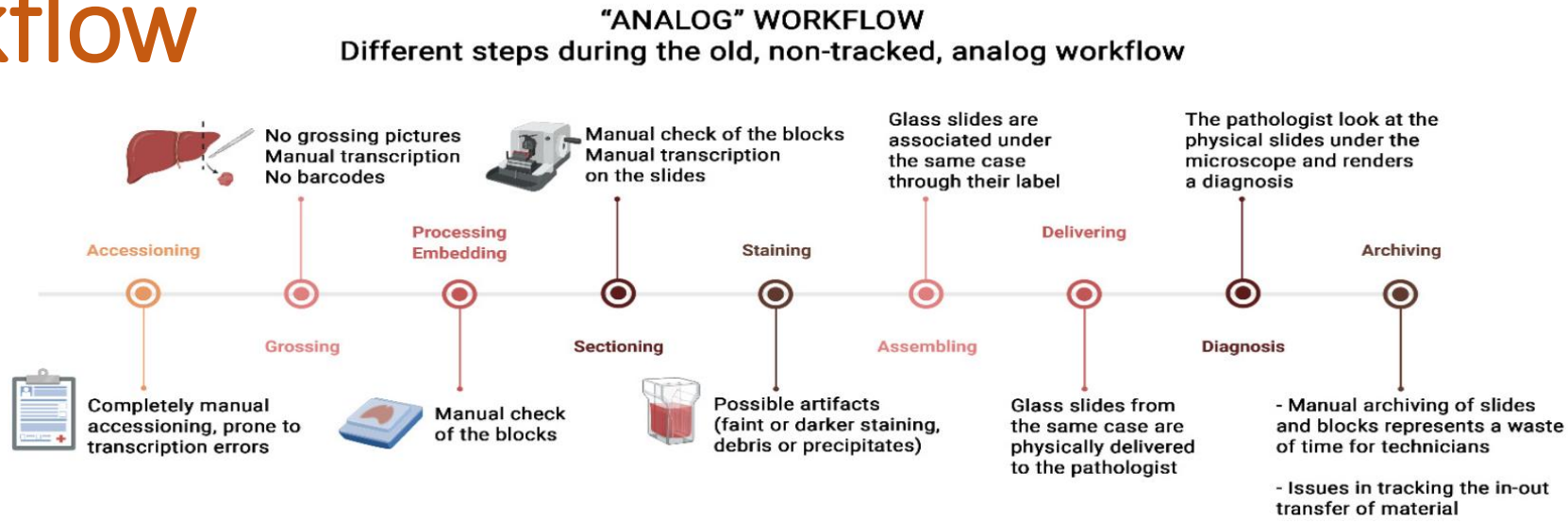
from Pathology to Digital Pathology

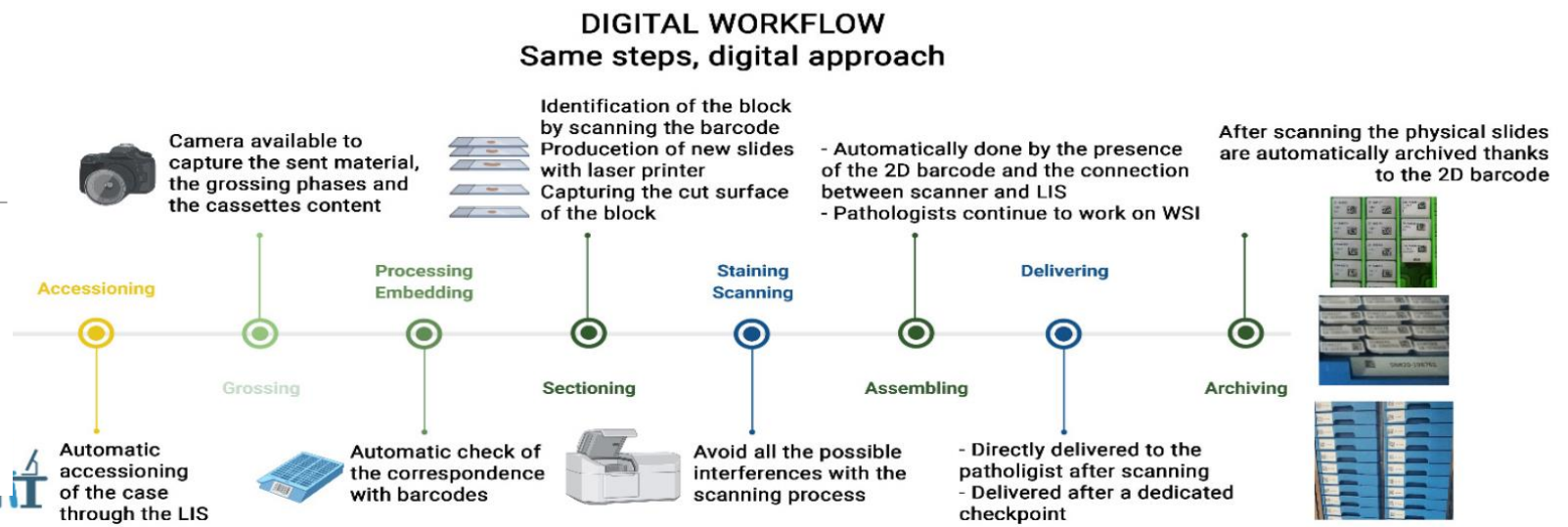
- development and diffusion of **slide scanners**, able to digitize a Whole Slide into a extremely big image (~ GPixels)
- this enables a digital workflow in the lab, with the final output being accessed by pathologists through a computer instead of a microscope
- … plus, this enables **AI applications**
  - tumor detection
  - immunohistochemistry quantification
  - rare events (e.g., mitosis)
  - …





Pathology labs: the digital lab workflow *not only slides!*





Guidelines

Best Practice Recommendations for the Implementation of a Digital Pathology Workflow in the Anatomic Pathology Laboratory by the European Society of Digital and Integrative Pathology (ESDIP)

Filippo Fraggetta [1,2], Vincenzo L'Imperio [1,3], David Ameisen [1,4], Rita Carvalho [1,5], Sabine Leh [1,6,7], Tim-Rasmus Kiehl [1,5], Mircea Serbanescu [1,8], Daniel Racoceanu [1,9], Vincenzo Della Mea [1,10], Antonio Polonia [1,11,12], Norman Zerbe [1,5] and Catarina Eloy [1,11,12,*]

Diagnostics **2021**, *11*, 2167. https://doi.org/10.3390/diagnostics11112167

Technicians role in the workflow

6.5. Sectioning Checkpoints

The sectioning workstation is a time-consuming phase of the laboratory flow where errors are frequent. Here, the automation can facilitate the technician's work bringing increased control, fewer errors, and resulting in less time spent. The sectioning workstation is complex and requires the rapid manipulation of specimens and instruments in a consecutive way. The introduction of a slide printer, a code reader, a desktop interface, and similar devices can be initially perceived as a further complication of this step. Checkpoints

and could be affected by more digitization issues. On the other hand, a minority of the "routine" slides (about 10%) could still be affected by scanning issues, stressing the need to adopt alternative protocols to obtain WSI from these challenging samples. This is based mainly on the assessment of focus quality, which can be partly assisted by the automated metric implemented in some available scan systems but should be performed on every slide to decide whether to rescan the sample. This can be done systematically by the lab personnel (e.g., technicians) for every scanning set before assigning the case to a pathologist.

Guidelines

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Filippo Fraggetta [1,2], Vincenzo L'Imperio [1,3], David Ameisen [1,4], Rita Carvalho [1,5], Sabine Leh [1,6,7], Tim-Rasmus Kiehl [1,5], Mircea Serbanescu [1,8], Daniel Racoceanu [1,9], Vincenzo Della Mea [1,10], Antonio Polonia [1,11,12], Norman Zerbe [1,5] and Catarina Eloy [1,11,12,*]

Diagnostics **2021**, *11*, 2167. https://doi.org/10.3390/diagnostics11112167

2. Involvement of the Team in the Digital Pathology Transformation of the Laboratory

The implementation of digital pathology requires a multidisciplinary approach from the very beginning. The leading team should involve in-house participants (pathologists, laboratory technicians, administrative staff) and the hospital's IT and technical services [6].

Among the determinants of success of Digital Pathology implementation...

... and the need for professional development

Jensen, CL , Kjær, LEHT , Johnsen, S., Zeuthen, MC, Thomsen, LK, & Smith, J. (2022). *Biomedical laboratory scientists in the implementation of digital pathology – a need for professional development* . Manuscript submitted for publication.

JOURNAL OF HISTOTECHNOLOGY
https://doi.org/10.1080/01478885.2023.2268297

Taylor & Francis
Taylor & Francis Group

Check for updates

Invisible for a few but essential for many: the role of Histotechnologists in the establishment of digital pathology

Gisela Magalhães [a,b], Rita Calisto [b,c], Catarina Freire [b,c], Regina Silva [b,d], Diana Montezuma [e,f], Sule Canberk [g,h,i] and Fernando Schmitt [j,k]

[a]Histopathology Department, Portsmouth Hospital University NHS Trust, Portsmouth, UK; [b]Department of Pathological Anatomy, School of Health Polytechnic of Porto (ESS|P.PORTO), Porto, Portugal; [c]Department of Pathological Anatomy, Hospital do Divino Espírito Santo, Ponta Delgada, Portugal; [d]Centro de Investigação em Saúde e Ambiente, ESS,P.PORTO, Porto, Portugal; [e]Research & Development Unit, IMP Diagnostics, Porto, Portugal; [f]School of Medicine and Biomedical Sciences, University of Porto (ICBAS-UP), Porto, Portugal; [g]Institute for Research and Innovation in Health (i3S), University of Porto, Porto, Portugal; [h]Cancer Signalling & Metabolism, Institute of Molecular Pathology and Immunology of the University of Porto (Ipatimup), Porto, Portugal; [i]Faculty of Medicine of the University of Porto (FMUP), Porto, Portugal; [j]Department of Pathology, Faculty of Medicine of University of Porto, Porto, Portugal; [k]CINTESIS@RISE, Health Research Network, Alameda Prof. Hernâni Monteiro, Portugal

ABSTRACT

Digital pathology (DP) is indisputably the future for histopathology laboratories. The process of digital implementation requires deep workflow reorganisation which involves an interdisciplinary team. This transformation may have the greatest impact on the Histotechnologist (HTL) profession. Our review of the literature has clearly revealed that the role of HTLs in the establishment of DP is being unnoticed and guidance is limited. This article aims to bring HTLs from behind-the-scenes into the spotlight. Our objective is to provide them guidance and practical recommendations to successfully contribute to the implementation of a new digital workflow. Furthermore, it also intends to contribute for improvement of study programs, ensuring the role of HTL in DP is addressed as part of graduate and post-graduate education. In our review, we report on the differences encountered between workflow schemes and the limitations observed in this process. The authors propose a digital workflow to achieve its limitless potential, focusing on the HTL's role. This article explores the novel responsibilities of HTLs during specimen gross dissection, embedding, microtomy, staining, digital scanning, and whole slide image quality control. Furthermore, we highlight the benefits and challenges that DP implementation might bring the HTLs career. HTLs have an important role in the digital workflow: the responsibility of achieving the perfect glass slide.

ARTICLE HISTORY
Received 23 March 2023
Accepted 3 October 2023

KEYWORDS
Biomedical scientists; pre-analytical phase; digital pathology; quality control; implementation; digital workflow; laboratory fully digital

Emerging digital skills

- **properly digital:**
  - digital pathology workflow
  - image quality assurance
  - systems management
  - basic annotations
- **transversal skills:**
  - awareness of the link between traditional lab work with digital pathology images – their quality, the peculiarities needed for better digital images
  - awareness of the consequences of traditional lab work on AI applications
  - …

Educating new digital lab technicians

The baseline situation

In the Bachelor Degree in Biomedical Laboratory Techniques (BLT), two modules were traditionally taught with informatics contents:

- **Computer Science basics** at first year, 1 ECTS credit;
- **Information processing systems** at third year, 2 ECTS credits.

Within the measures foreseen in the University Strategic Plan 2015-2019, one was aimed at improving digital pathology teaching in the Biomedical Laboratory Techniques (BLT) degree

The interventions

- The third-year module was modified in two modules, with one entitled "**Digital Pathology**". The other one, "**Data Management and Analysis**", was devoted to non-imaging data.
- an introductory seminar with optional practical activities on digital pathology has been initially set at the second year, during which students take a short seminar on digital slides and scanning, followed by practical activities with the scanner.
- In 2023, the **practical stage on scanner activities** was moved to the third year to make it closer to the teaching modules.
- Optionally, students could also gain an extra credit by preparing a report.

Current status

From the beginning of the project, 55 students attended the seminar, with the opportunity to theoretically and practically know the emerging field of digital pathology; and 28 did also the practical stage by scanning slides, checking results, etc. In 2023, 5 of them also decided to develop further their experience by cooperating in an interdisciplinary project about laboratory artifacts in glass slides, that were acquired for further online teaching activities.

Della Mea V, Lirussi L, Galai T, Pegolo E, Di Loreto C. *Teaching Digital Pathology to future Laboratory Technicians: the Udine experience*. In: Proc. of ECDP 2023, Budapest, June 2023

Teaching digital skills to "old" lab technicians

- In 2016 a Summer School aimed at all professionals involved in digital pathology was organised within the MSCA AIDPATH project
  - a syllabus was published
  - Della Mea V, Carbone A, Di Loreto C, Bueno G, De Paoli P, García-Rojo M, de Mena D, Gloghini A, Ilyas M, Laurinavicius A, Rasmusson A, Milione M, Dolcetti R, Pagani M, Stoppini A, Sulfaro S, Bartolo M, Mazzon E, Soyer HP, Pantanowitz L. *Teaching Digital Pathology: The International School of Digital Pathology and Proposed Syllabus.* J Pathol Inform. 2017 Jul 25;8:27.
- ... however, in the meantime AI arrived!

J Pathol Inform 2017, 1:27 http://www.jpathinformatics.org/content/8/1/27

Table 2: Applicability of the digital pathology school syllabus for different students

Syllabus topic*	Pathologist	Laboratory technician	Biological scientist	Computer scientist	Systems manager	Health-care administrator
1.1	Yes	Yes	Yes	Yes	Partly	Partly
1.2	Yes	Yes	Yes	No	No	No
1.3	Yes	Yes	Yes	Yes	Yes	Yes
1.4	Yes	Yes	Partly	Yes	Yes	Yes
1.5	Yes	Yes	Yes	Yes	No	No
1.6	Yes	Yes	Yes	Yes	Yes	Yes
2.1	Yes	Yes	Yes	No	No	No
2.2	Yes	Yes	Yes	Yes	Yes	No
2.3	Yes	Yes	Yes	Yes	Yes	Yes
2.4	Yes	Yes	Yes	Yes	Yes	No
2.5	Yes	Yes	Yes	Partly	Yes	No
2.6	Yes	Yes	No	No	Yes	Yes
3.1	Yes	Yes	Yes	Yes	Yes	No
3.2	Yes	Yes	Yes	Yes	Yes	No
3.3	Partly	Partly	Partly	Yes	Yes	Partly
3.4	Partly	Partly	No	Yes	Yes	Yes
3.5	Yes	Yes	Yes	Yes	Yes	Yes
4.1	Yes	Yes	Yes	No	No	No
4.2	Yes	No	Yes	Yes	No	No
4.3	Yes	Partly	Partly	Yes	Partly	No
4.4	Yes	Yes	Yes	Yes	Yes	Partly
4.5	Yes	Partly	Yes	Yes	No	No
5.1	Partly	Partly	Yes	Yes	No	No
5.2	Yes	Partly	Yes	Yes	No	No
5.3	Yes	Partly	Yes	Yes	No	No
5.4	Yes	Partly	Yes	Yes	No	No
5.5	Yes	Yes	Partly	Yes	Yes	No

*Refer to Table 1 for syllabus topics

Future developments

- the European Society of Digital and Integrative Pathology (ESDIP) will soon announce its ESDIP Academy: online courses aimed at pathologists, computers scientists and technicians
  - successfully taking the courses will allow to access the ESDIP fellowships,i.e., financial supports to visit digital pathology labs

ESDIP
EUROPEAN SOCIETY OF DIGITAL AND INTEGRATIVE PATHOLOGY

Thanks

Thanks to the Biomedical Lab Techniques Degree Tiziana Galai and Laura Lirussi
To the Degree Coordinator prof. Carla Di Loreto
And to the students participating in this first attempt.

The need for digitalization in Healthcare

Monika Ažman, president of Nurses and Midwives association of Slovenia

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Zbornica Zveza

The Digital Health Centre

Patient Empowerment

Anna-Britt Krog
Programme manager
Health Innovation Centre of Southern Denmark

Partnership
The Digital Health Center

- 20 municipalities
- 4 patient associations
- Region of Southern Denmark

- Assens
- Ballerup
- Billund
- Egedal
- Esbjerg
- Fanø
- Fredericia
- Faaborg-Midtfyn
- Halsnæs
- Kerteminde
- Kolding
- Nordfyns
- Nyborg
- Odense
- Randers
- Svendborg
- Varde
- Vejen
- Ærø
- Aarhus

Diabetes association
Heart association
Lung association
Danish Rheumatism association

- Syddansk Sundhedsinnovation (The Health Innovation Center)
- Steno Diabetes Center Odense
- Tværsektorielt Samarbejde (cross-sectional cooperation)

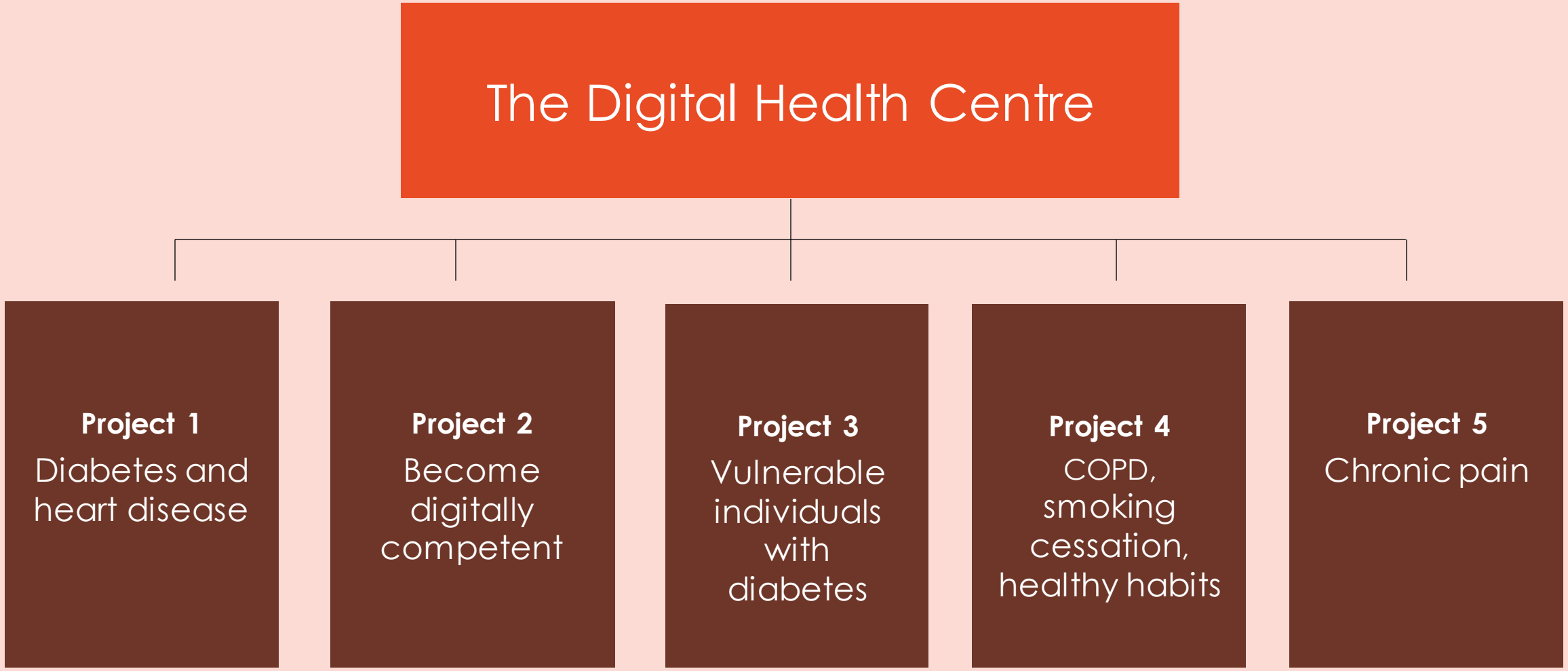
The vision of
The Digital Health Centre

- Enhance accessibility
- Flexible solutions for the citizen
- Create and maintain motivation
- Individualize services

- Prioritize ressources
- Ressource utilization across municipal lines

The Digital Health Centre

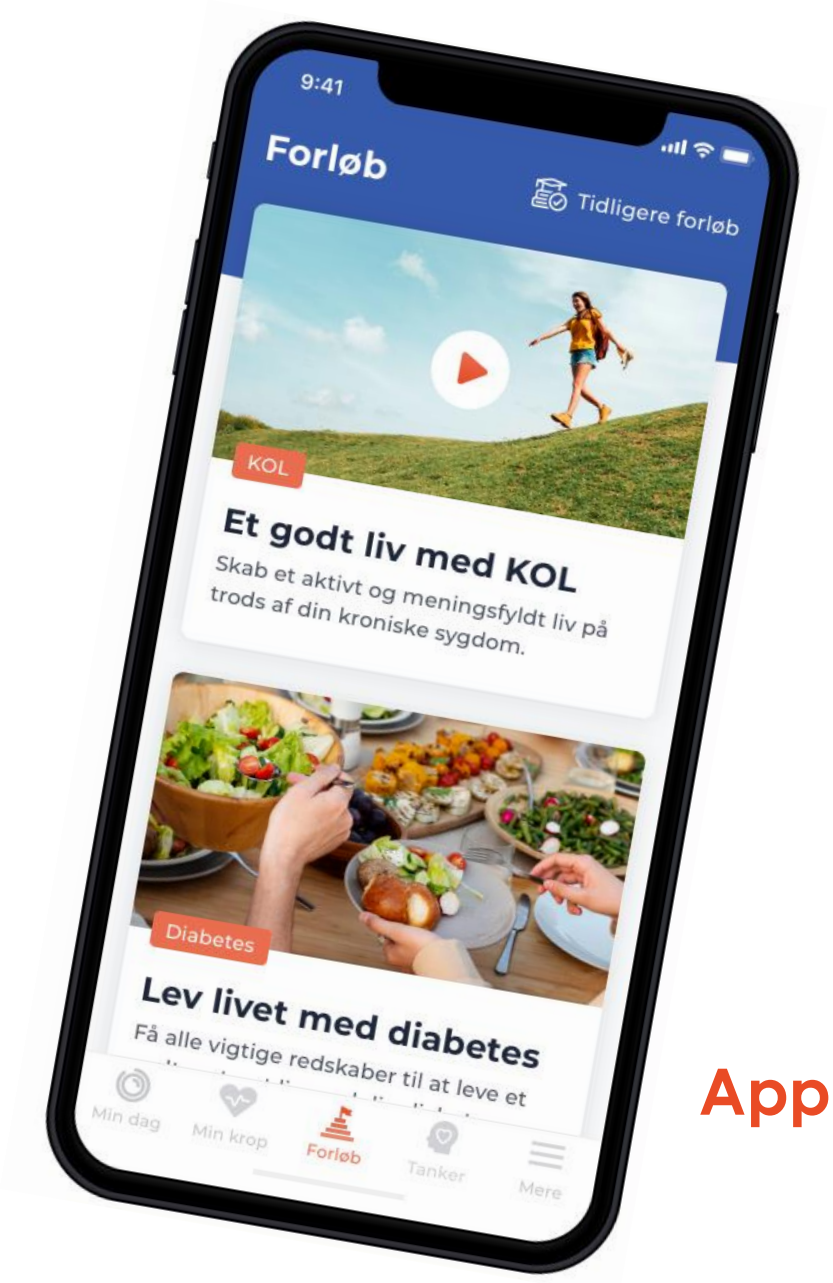
– One vision, several projects



User involvement

- Needs?
- Knowledge?
- Digital competencies?

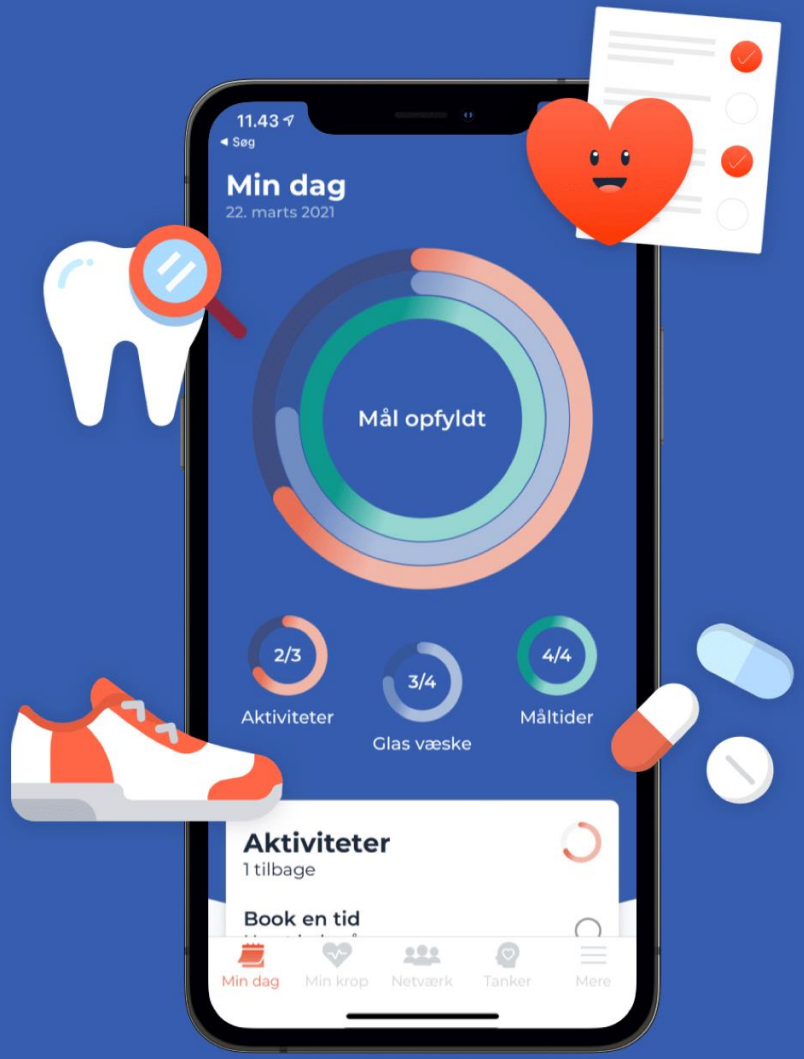
Platforms



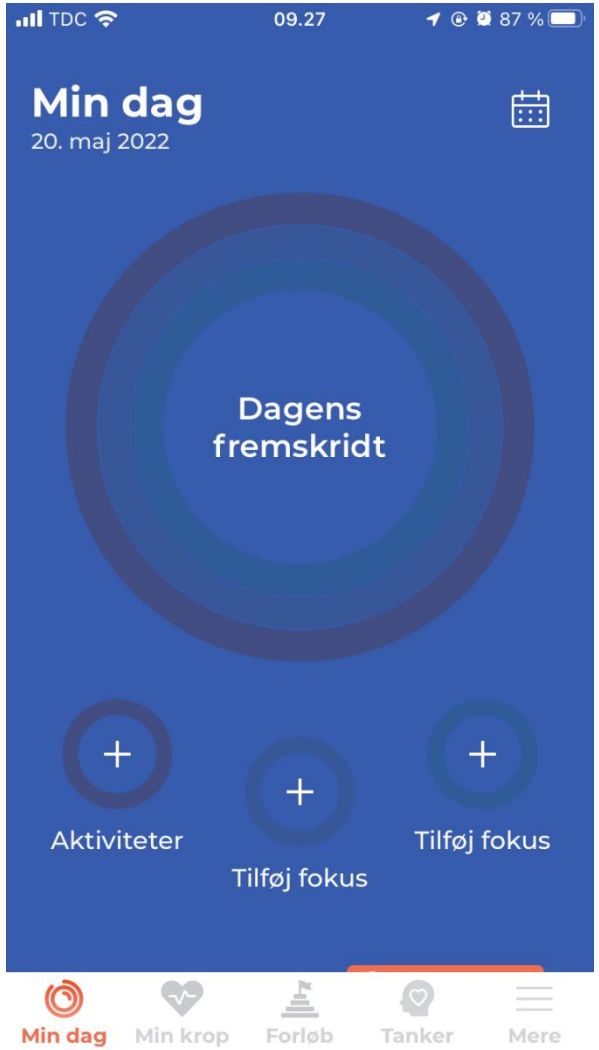
App

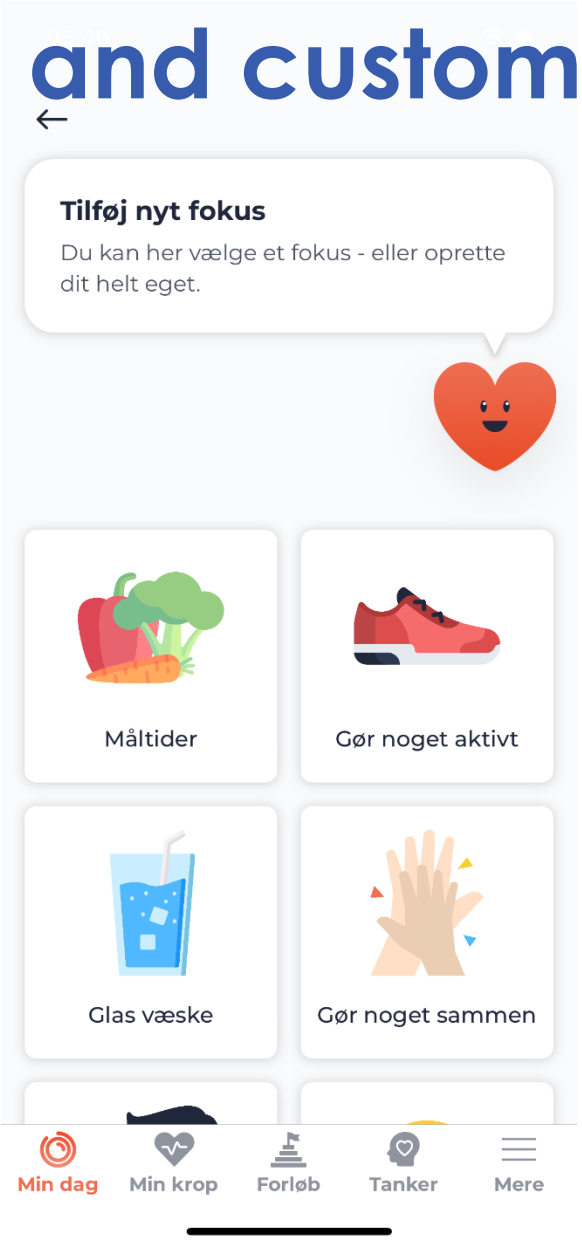
My life – my health

Core concept

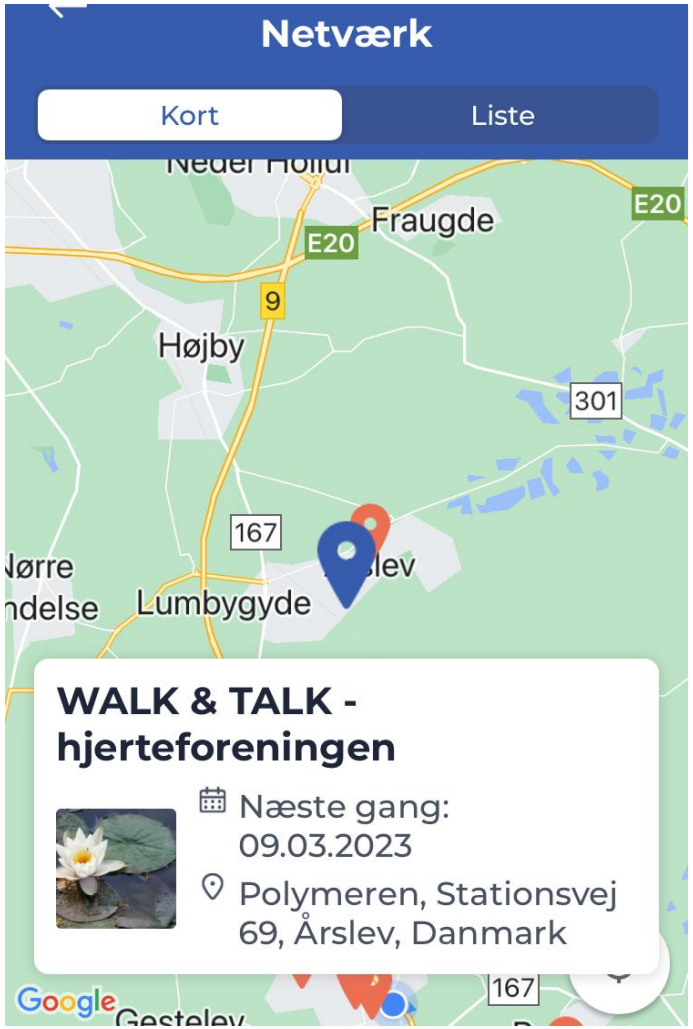


Overview, activities, focus, and customize course

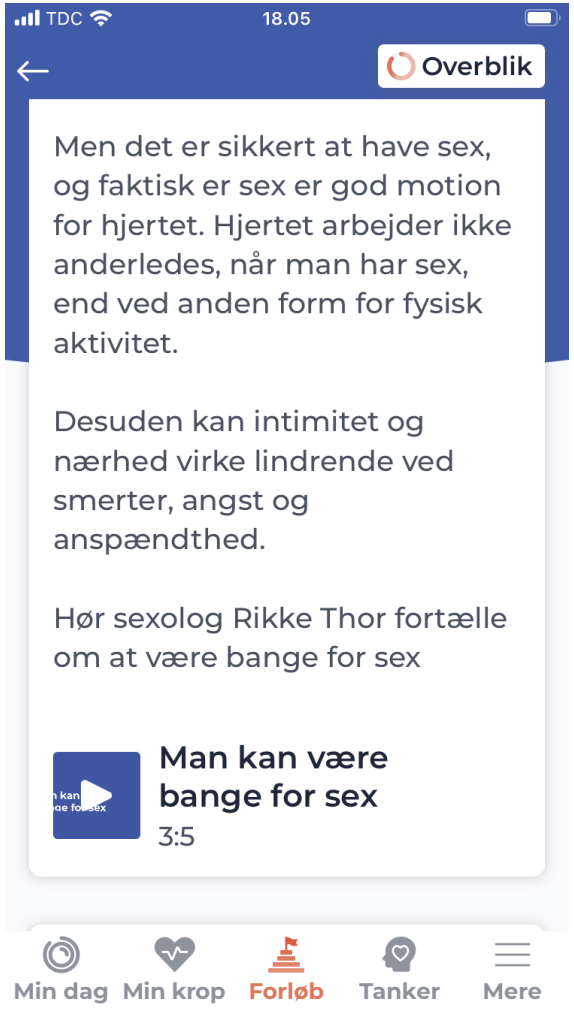


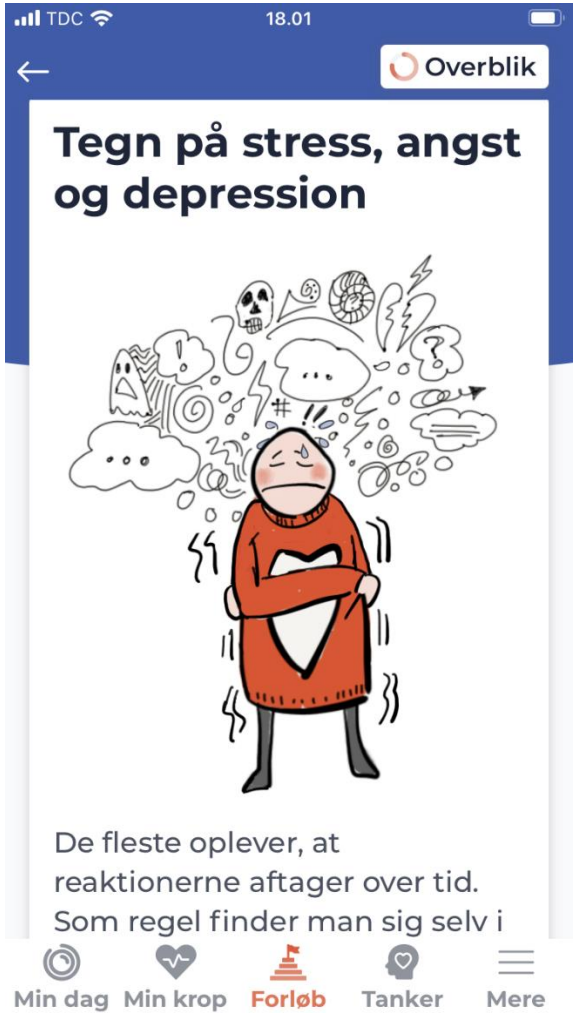


More - diary, network, and customize the app



Text, drawings, films, and tools

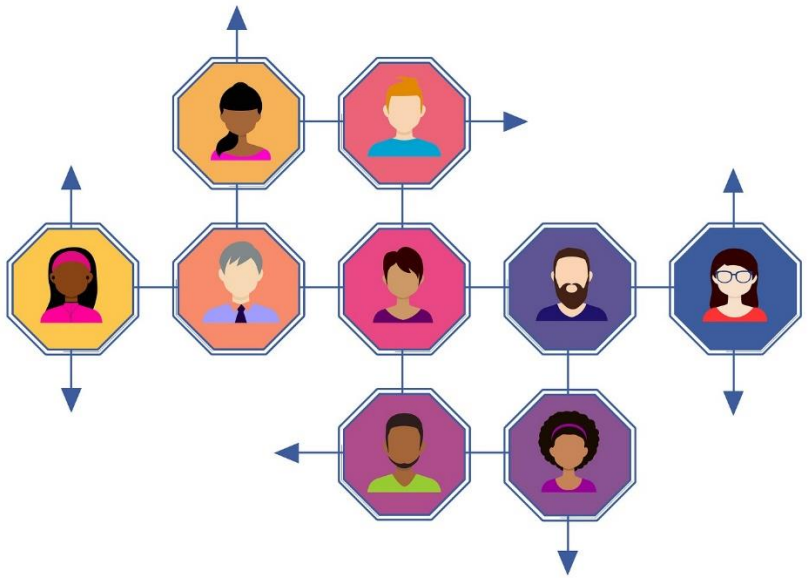




Steps for implementation

Successful implementation of the concept requires…

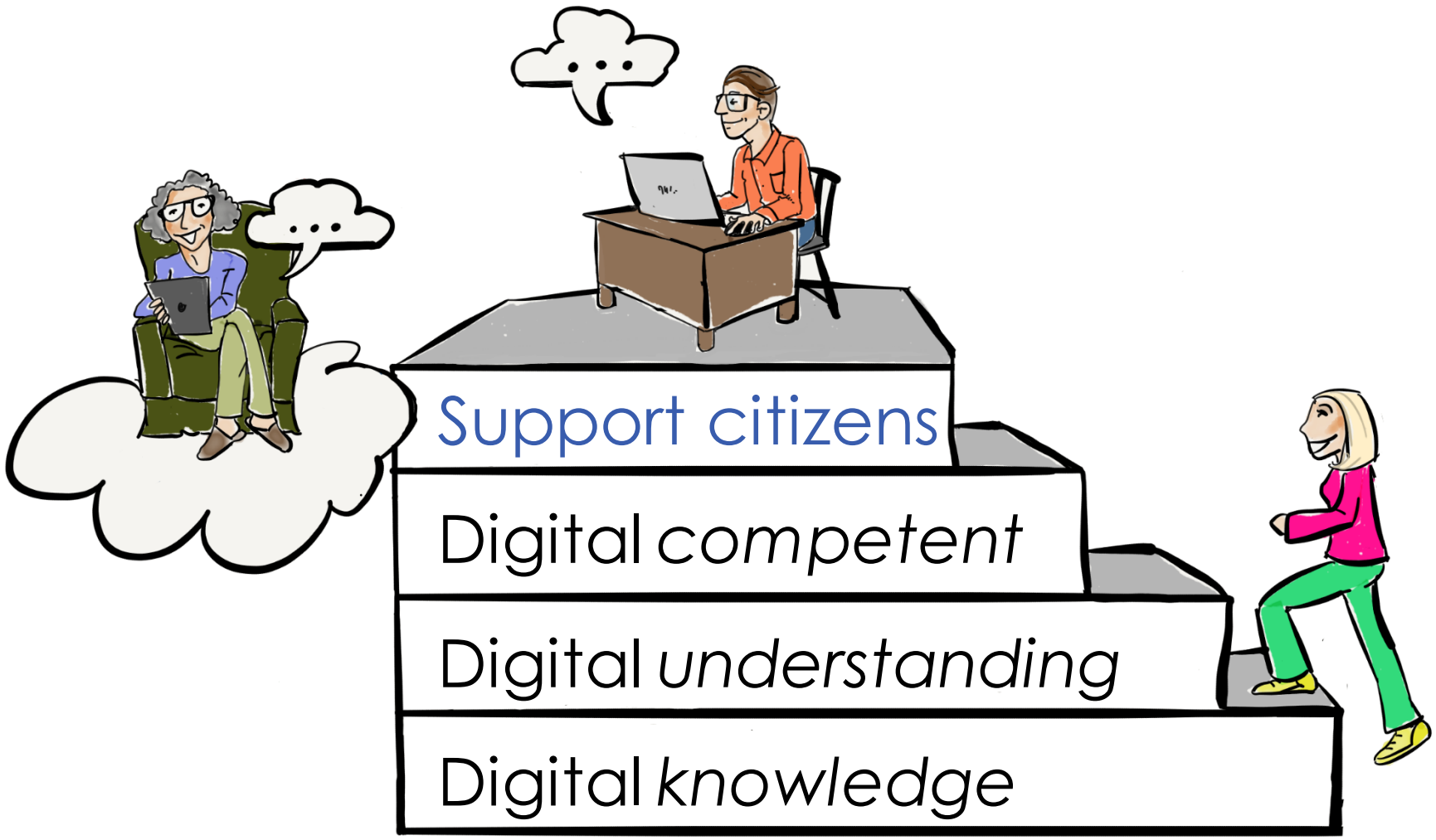
- Competences of health professionals
- Cooperation across municipalities as well as cross sectoral corporation
- Involvement of the users as active co-creators
- Leadership
- Resources



ONBOARDING the Health Professionals

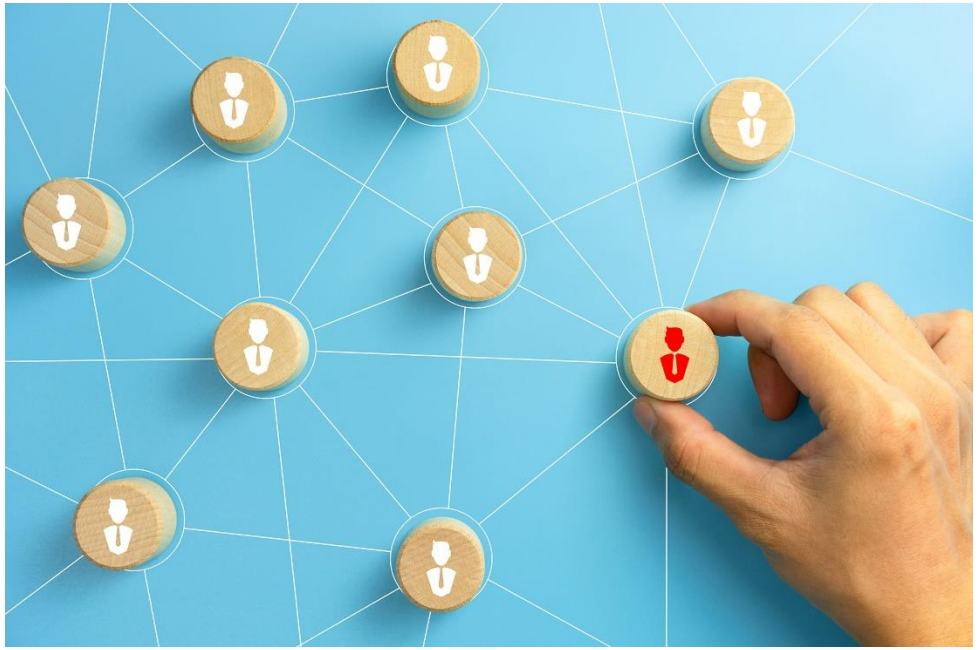
- Introduction (online or face-to-face)
- Implementations guides
- Common PR material
- ERFA-groups (exchange of experience)
- News letters

A DIGITAL COMPETENCE COURCE



Local implemetentation coordinators

- Introduces the concept to colleagues
- Shares information with the programme manager
- Participate in cross-sectoral ERFA-groups




Patient
empowerment

- **Tailored Health Programs:** The app offers users the opportunity to follow a program tailored to their individual needs. This provides a personalized approach to health promotion, crucial for empowering patients to feel in control of their health situation and make informed decisions.
- **Access to Information and Support:** The app serves as a source of health information, also offering support from municipal professionals. This helps patients feel supported and informed in their health journey.
- **Flexibility and Accessibility:** The concept focuses on accessibility for all and tailored flexibility. This is important to ensure that health services are available to everyone.
- **Motivation and Collaboration:** The principles of motivation and collaboration are central to the concept. By creating programs that keep users engaged and involved, as well as promoting collaboration across regions and patient associations, it encourages a holistic approach to health promotion.
- **User-Centered Innovation:** By involving users as co-creators, the concept ensures that solutions are grounded in real needs. This helps create more meaningful and effective solutions that directly address patients' challenges and preferences.

RESULTS

- User satisfaction at 80% based on a survey.
- Cost-effectiveness demonstrated in the business case
- Self-reported health and behavior impacts include:
- Better symptom management and lifestyle changes (44%),
- Positive changes in eating habits (59%)
- Improved exercise routines for 81% of heart patients.
- Service reaches a diverse demographic, including various ages, genders, and social backgrounds, with users generally more technologically adept than anticipated


The Digital
Health Centre
Questions?
E-mail: Anna-Britt.Krog@rsyd.dk

NEXT SESSION

Moderators:

- Randi Lehmann Boesen
- Mateja Bahun

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Digital health policies – multiple case study

Federico Fonda, Alessandro Galazzi, Stefania Chiappinotto, Linda Justi, Morten Sønderskov Frydensberg, Randi Lehmann Boesen, Mirna Macur, Erik Andrés Reig, Elisenda Reixach Espaulella, Alvisa Palese

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Alvisa Palese, PhD, RN

Agenda

- The digital transformation and the need of policies
- The digital health policies of the DELIVER partners
- Implication for the future

The digital transformation

- Digital health transformation is affecting the whole health care systems and their actors **worldwide**.

- Digital health = the use of information and communications technology in support of health and health-related fields (umbrella term).

- In the last years digitalisation of all aspects of life, **private** (e.g., smartphone, domotics applications) and **professional** (e.g., electronic medical records, remote robotic surgery).

- This process which was already evolving **rapidly**, accelerated during COVID-19 pandemic, changing the rules of communication (e.g., videocall in hospitas, distance learning).

Meister et al. 2016; Odone et al. 2019; WHO 2019

The digital health policies

- = **written formal documents** which are aimed at guiding and regulating the digital transformation of healthcare.

- Digital health policies may target
  (a) citizens (e.g., health promotion initiatives) and patients (e.g., services),
  (b) healthcare providers (e.g., working with electronic devices),
  (c) healthcare services (e.g., adoption of electronic shift rostering),
  (d) whole data services (e.g. collection, management, use, and exchange of data), including those involved in research.

Dalglish et al. 2021

There are no studies in the literature comparing the healthcare policy documents of European countries.

Digital health policies – multiple case study

This study **aimed** to **describe and compare the digital health policies**, their implementation in practice, and the digital competences of HCPs, across three European countries (Denmark, Italy, and Slovenia) and one region (Catalonia, an autonomous region of Spain) → members of DELIVER.

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Methods (1)

- Study design: case study *Crowe et al. 2021*
- The units of analysis were the policy documents and their implementation in practice in different countries (DELIVER members)

	Denmark	Italy	Slovenia	Spain	Europe
Population on January 1st in 2021 (number)	5,840,045	59,257,566	2,108,977	47,394,223	447,007,596
Life expectancy at birth in 2019 (years)	79.5	81.4	78.7	81.1	78.5
Healthy life years expectancy at birth in 2019 (years)	58.9	68.3	60.9	69.9	64.6
People at risk of poverty or social exclusion in 2019 (%)	16.3	25.6	14.4	25.3	20.9
Internet use by all individuals in the last 3 months - 2020 (%)	99	78	87	93	88
Internet usage of individuals working in public administration, defence, education, human health or social work activities in 2019 (%)	99	91	96	99	97
Individuals who have basic or above basic overall digital skills in 2019 (%)	70	42	55	57	56
Individuals using the internet for seeking health-related information in 2020 (%)	72	46	67	58	56

Eurostat 2021

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Methods (2)

- Two sources of data collection:

(a) inside of the research group, the research group member (key informants) as individuals who answered the questions. *Kim et al, 2020*

- 15 open-ended questions about: policies on digital health transformation of the countries involved, digital health implementation in the practice and digital health expected competences of HCPs (June - November 2021).

- Data were extracted in a grid to summarise the main findings and to ensure their comparability.

- Second round of data collection by sending all members the extracted data (May 2022).

(a) outside of the research group, by performing a policy document data collection and analysis.

Each member identified the most relevant policy document addressing the digital health transformation in his/her country.

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Methods (3)

The policy documents selected were the following:

- For Denmark: *Digital Health Strategy 2018–2022*
  developed by the Danish Government (88 pages, 17,375 words)

- For Italy: *The National Recovery and Resilience Plan* section “Mission 6: Health”
  developed by Italian Government (13 pages, 5,092 words)

- For Slovenia: *Digital Slovenia 2020*
  developed by Slovenian Government (88 pages, 39,192 words)

- For Catalonia (Spain): *The Catalan Information Systems Master Plan*
  developed by Ministry of Health of Catalonia (145 pages, 48,735 words)

Methods (4)

Policy documents were **translated** using an automated translating software,

then checked by each partner.

Data were **summarised** according to the Textual Narrative Synthesis framework.

Words of each translated policy document were extracted.

The first 100 selected words were visually displayed in a **word cloud**.

Rigor:

sharing results in multiple rounds (mounthly online meetings and one in person).

Barnett-Page et al. 2009; Dalglish et al. 2021

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Results (1): Digital health transformation policies

- All countries had an established program published in the last five years (government level).
- Catalonia → focused on structuring **mechanisms for** the **exchange of health information**. To enhance digital health skills among citizens and HCPs.
- Slovenia → to **efficiently manage** complex **data** and information about health (for reducing administrative costs). The policy has introduced effective and user-friendly digital solutions serving patients, healthcare providers and managers.
- Denmark → to **boost digital healthcare collaboration**, targeting all citizens. Patients should experience the healthcare system as a coherent and trustworthy network: HCPs are supported in connecting patient pathways.
- Italy → to focus on the **modernisation of technologies**. The goal is to strengthen the technological infrastructure and the tools for the collection, processing, analysis, and simulation of data. To enhance the digital skills of the HCPs.

Results (2): Word policy-document analysis

Denmark	Italy	Slovenia	Spain-Catalonia
			

Words	n	Words	n	Words	n	Words	n
health	309	health	56	development	497	data	570
patient	255	services	27	digital	478	system	523
system	163	national	26	internet	307	information	482
care	114	care	24	society	270	care	471
data	109	project	19	information	268	health	455
digital	108	hospital	18	service	239	service	394
solution	87	investment	17	ICT	236	healthcare	374
treatment	81	community	16	public	212	model	333
better	67	research	15	use	208	plan	271
national	66	telemedicine	15	data	196	management	241

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Results (3): HCP competency development

- Countries have from 19 (Denmark) to 31 (Slovenia and Catalonia, Spain) HCPs.
- Slovenia, Denmark, and Italy → **not have**.
- Catalonia adopted in 2020 a specific program to provide digital **skills framework** and specific **accreditation** for HCPs.
- University programs usually offer basic digital skills training in all included countries.
- HCP competencies are not evaluated in a systematic manner.
- When applying for a job position → in Slovenia, Catalonia, and Denmark, digital competencies **may be evaluated**. In Italy basic digital skills are evaluatedin in public sector.

Discussion

- **Different baseline** in digital transformation across countries → may influence the **attitudes** of HCPs and the digital health transformation processes.
- **Different priority** and words chosen in the documents → countries have different digital transformation achievements and needs in action.
- Except for the Italian National Recovery and Resilience Plan, the analysed policy-documents were published **before** the **COVID-19** pandemic.
- There are **no structured plans** regarding the development of **HCP competences**, although it was a recurrent theme in the reported aims of the analysed policy-documents.

Limitations

- Data **collection** and **analisis** was performed by the **same** research **team**.
- **Only one policy document** was analysed par each country, with no historical or trend analysis.
- Since the identification and analysis of policies, **new documents** may have been approved **or** previous ones **updated**.
- The counting technique was used to provide an overview of the main trends of the policy documents.

Conclusion

- The EU countries participating in the DELIVER project have **all established recent policies** at the **national** level to address the digital health transition.
- Specific governmental bodies are addressing the implementation of the digital transformation at the regional and local levels.
- The **HCP** competences expected are **not** clearly **delineated**, and there is no formal plan for their development at the undergraduate, postgraduate, and continuing education levels.

Implication for the future

- **Healthcare managers** should **know the policies** of their own country but also that of other countries → to effectively manage foreign HCPs and digital transformation process.
- Each policy should be accompanied by specific **educational strategies**.
- Researchers should support HCPs to provide **new digital solutions**, to facilitate a critical evaluation of their effectiveness, and to **disseminate experiences**/best practices.
- **Further studies** are recommended to compare health digitisation across Europe (wider manner by adopting a systematic approach).

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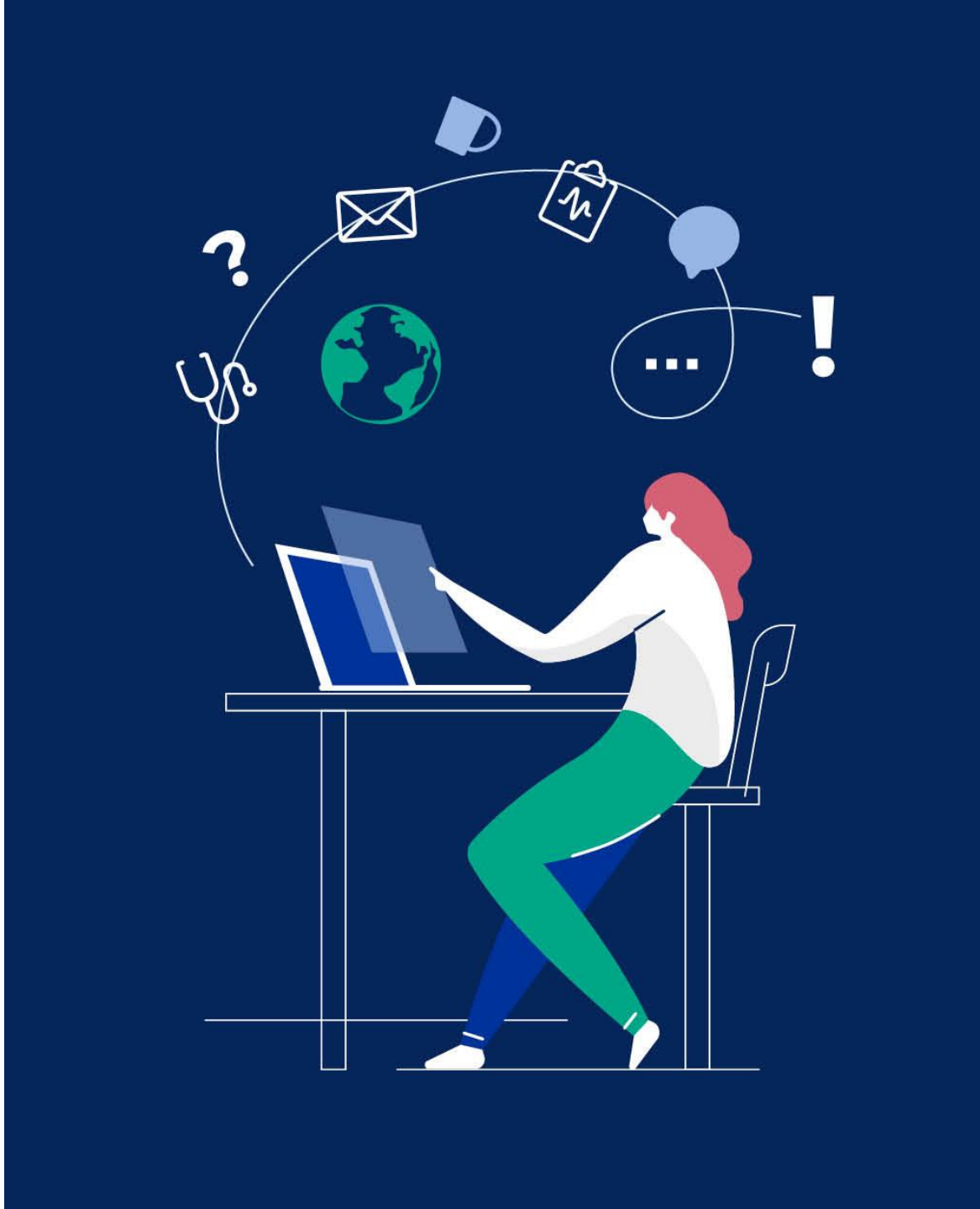
- Need analysis



Need analysis

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What we wanted to know

- **Level of digital competences** of healthcare professionals and managers
- **Attitudes** towards digital solutions and digitization
- **Framework and practice for introduction and training** of digital competences + ICT support structure
- **Improvement potentials** in relation to digital competences and implementation of digital solutions

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Mixed methods

Survey

- Self-assessment of competencies
- **395 respondents** across 3 countries (Denmark, Italy & Slovenia)

Qualitative interviews

- Individual and focus group interviews
- **74 respondents** across 4 countries + 4 ICT specialists (+ Catalonia)

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Digital competences - definitions

1. **Instrumental skills** to use digital tools and media.
2. **Knowledge, theories and principles** related to technology.
3. **Attitudes** towards strategic use, openness, critical understanding, creativity, responsibility and independence.

Not just the skill to work with a specific ICT or digital healthcare solution, also

- an **awareness of the development** in digital technologies.
- a **readiness to adapt.**
- the necessary **skills to implement.**
- the ability to **communicate and disseminate** knowledge of digital technology.

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An overview

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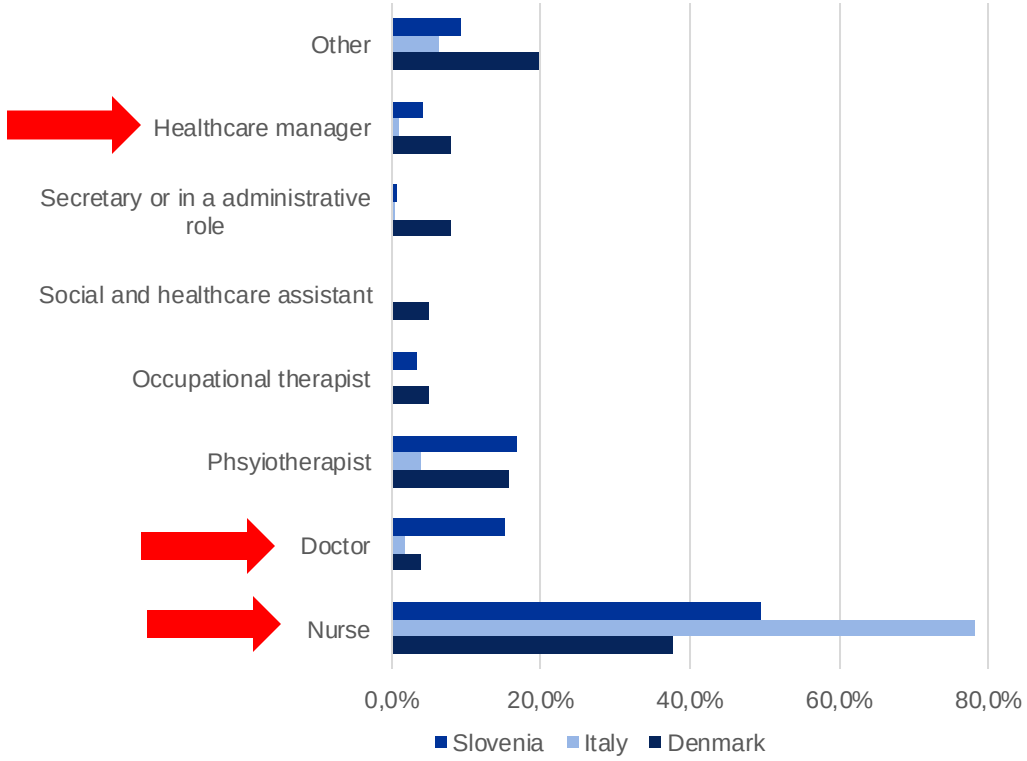
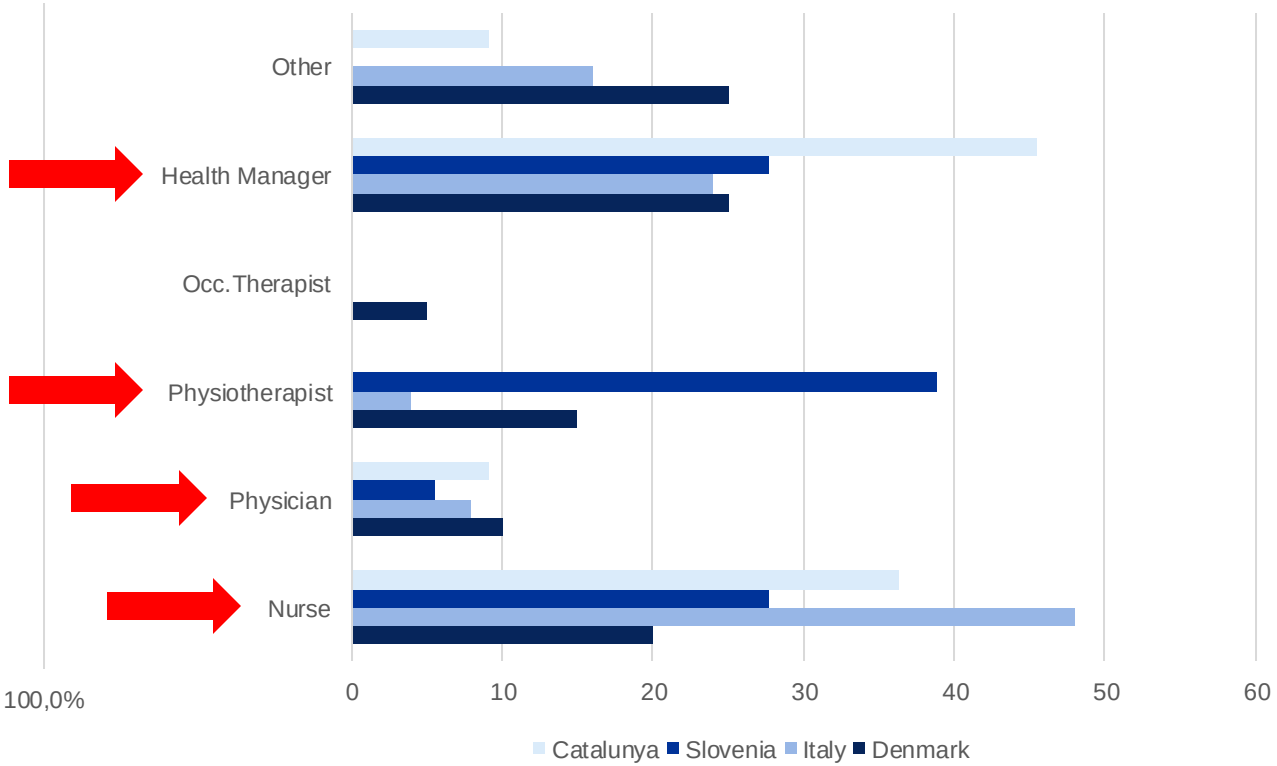
Professions of respondents

Survey



Qualitative interviews



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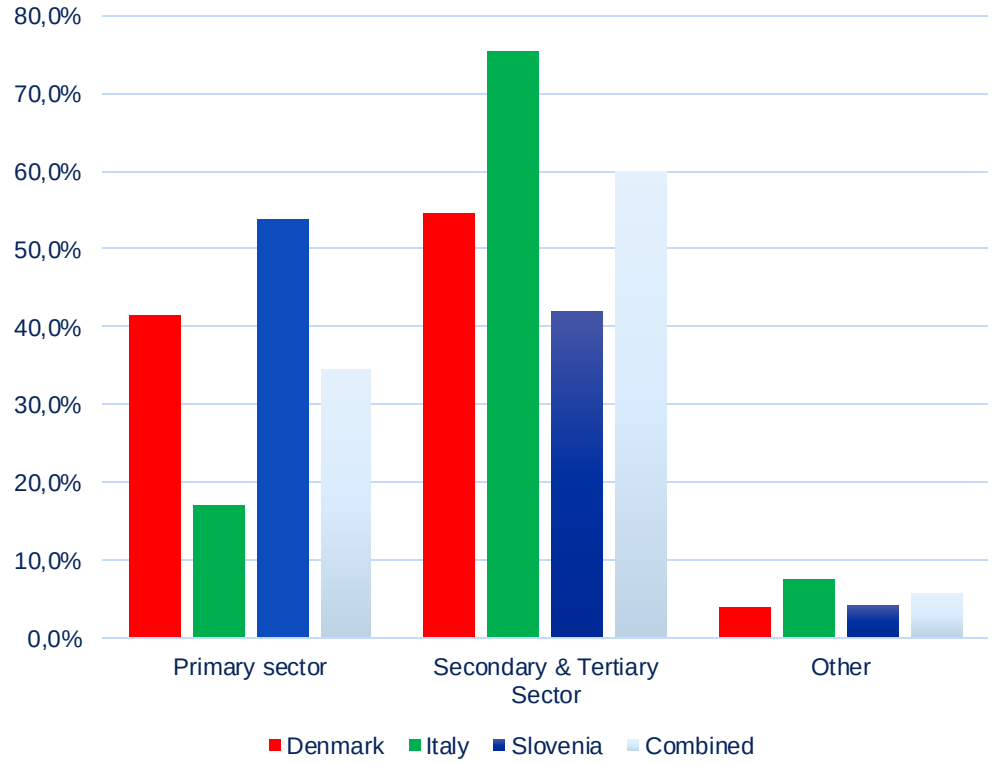
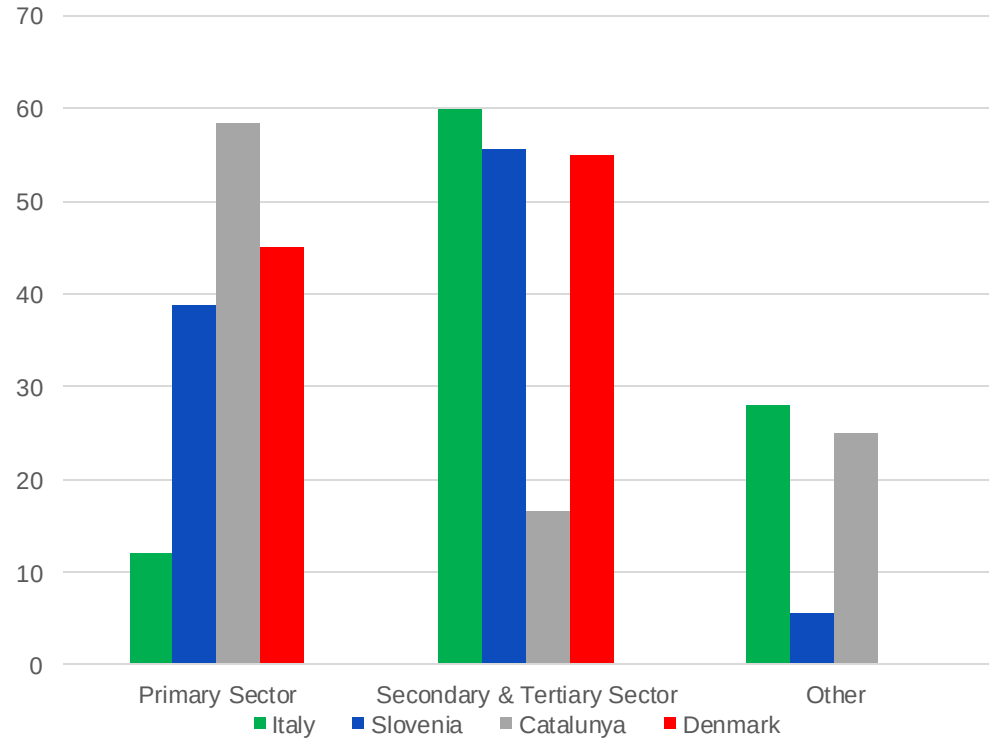
Work sector of respondents

Survey



Qualitative interviews



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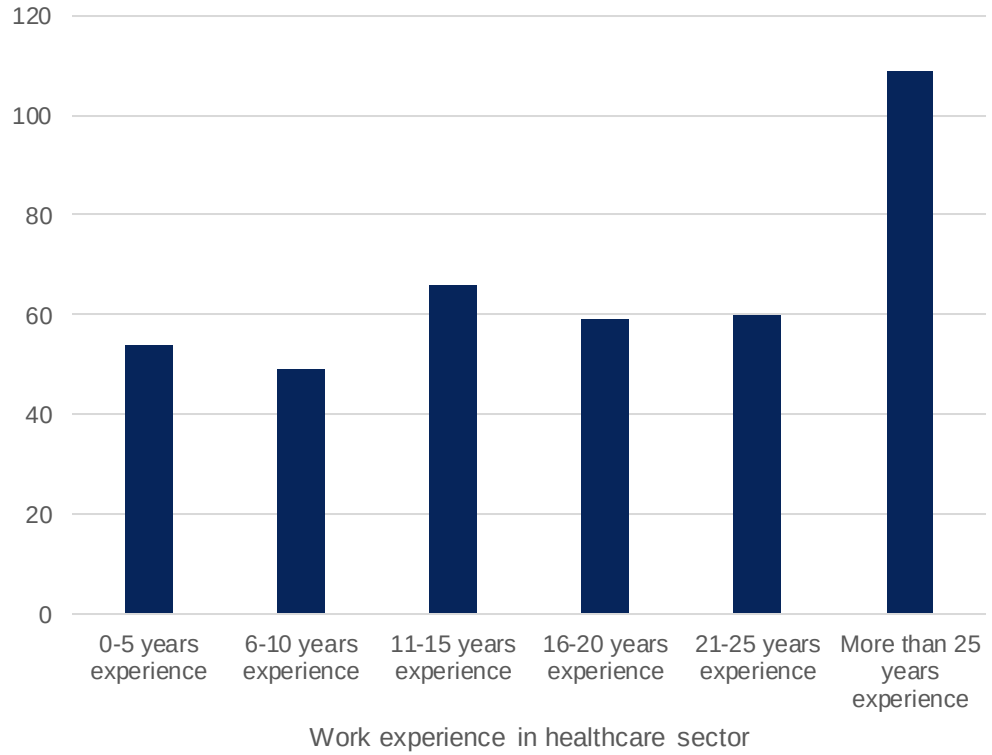
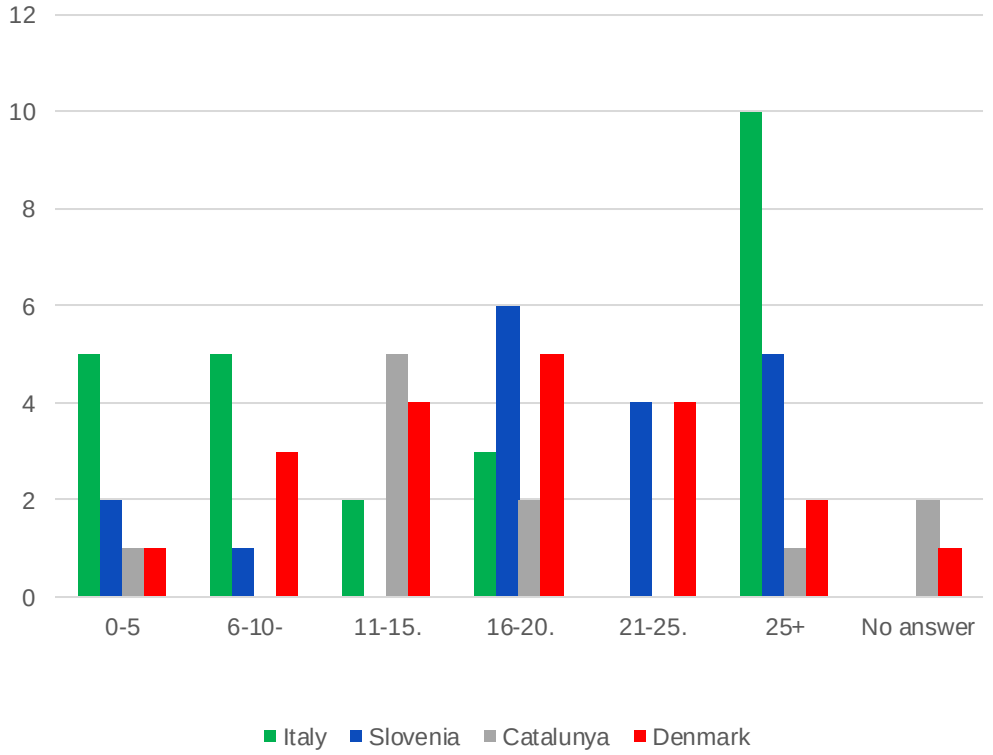
Work experience of respondents in health care sector

Survey



Qualitative interviews



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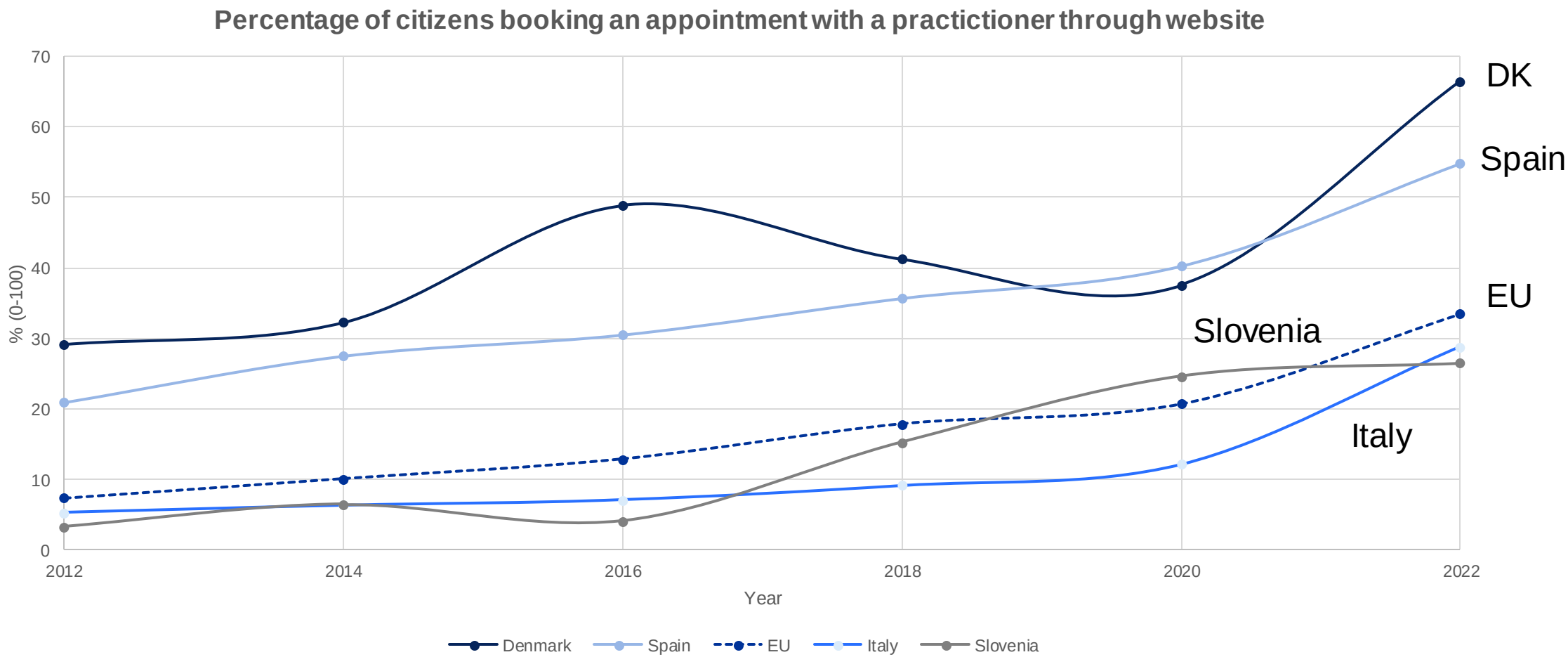
Digitization of healthcare systems



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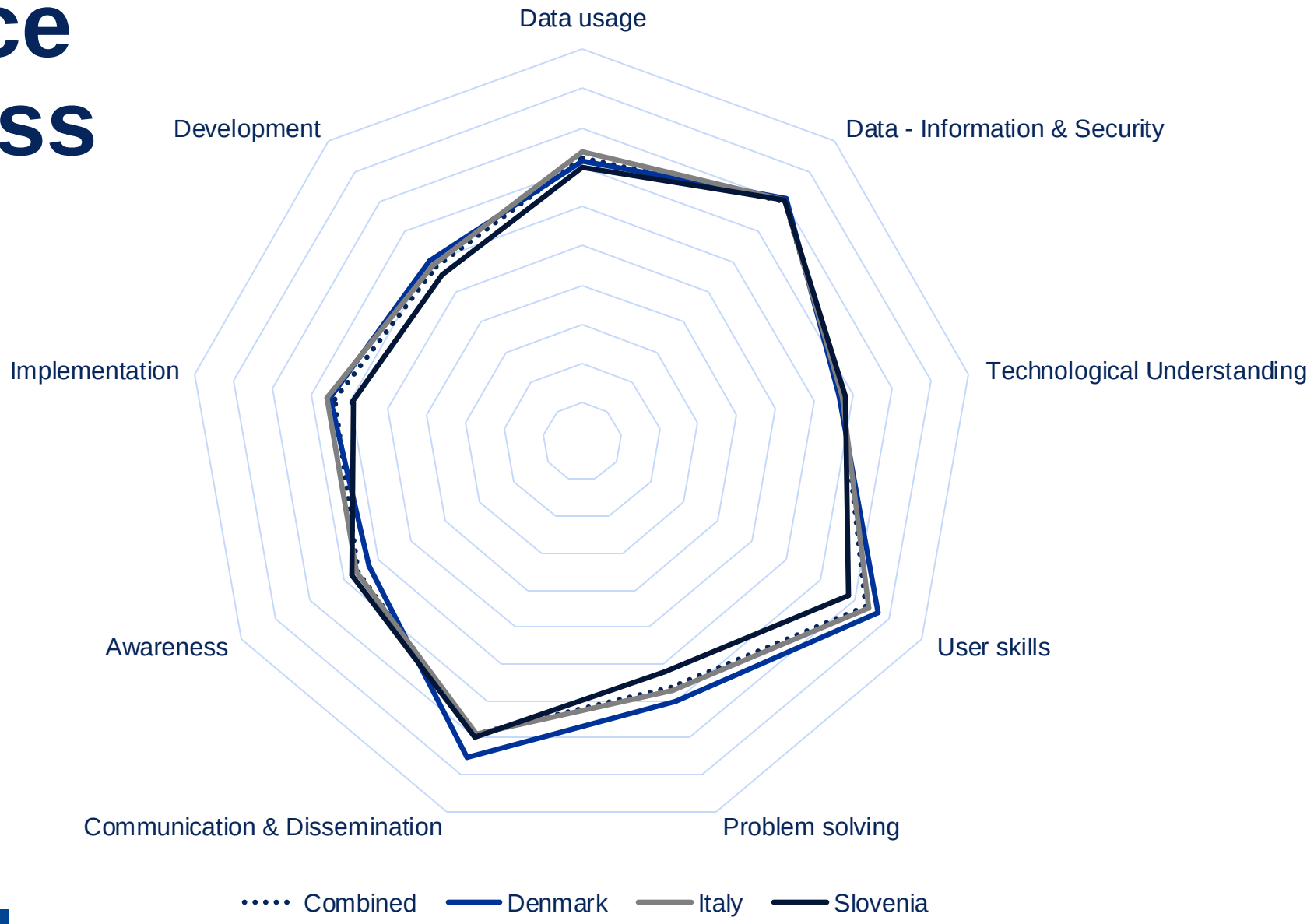
Source:
https://digital-decade-desi.digital-strategy.ec.europa.eu/datasets/key-indicators/charts/see-the-evolution-of-an-indicator-and-compare-countries?indicator=i_iumapp&breakdown=ind_total&country=EU,IT,DK,SI,ES&unit=pc_ind

Competence levels across countries



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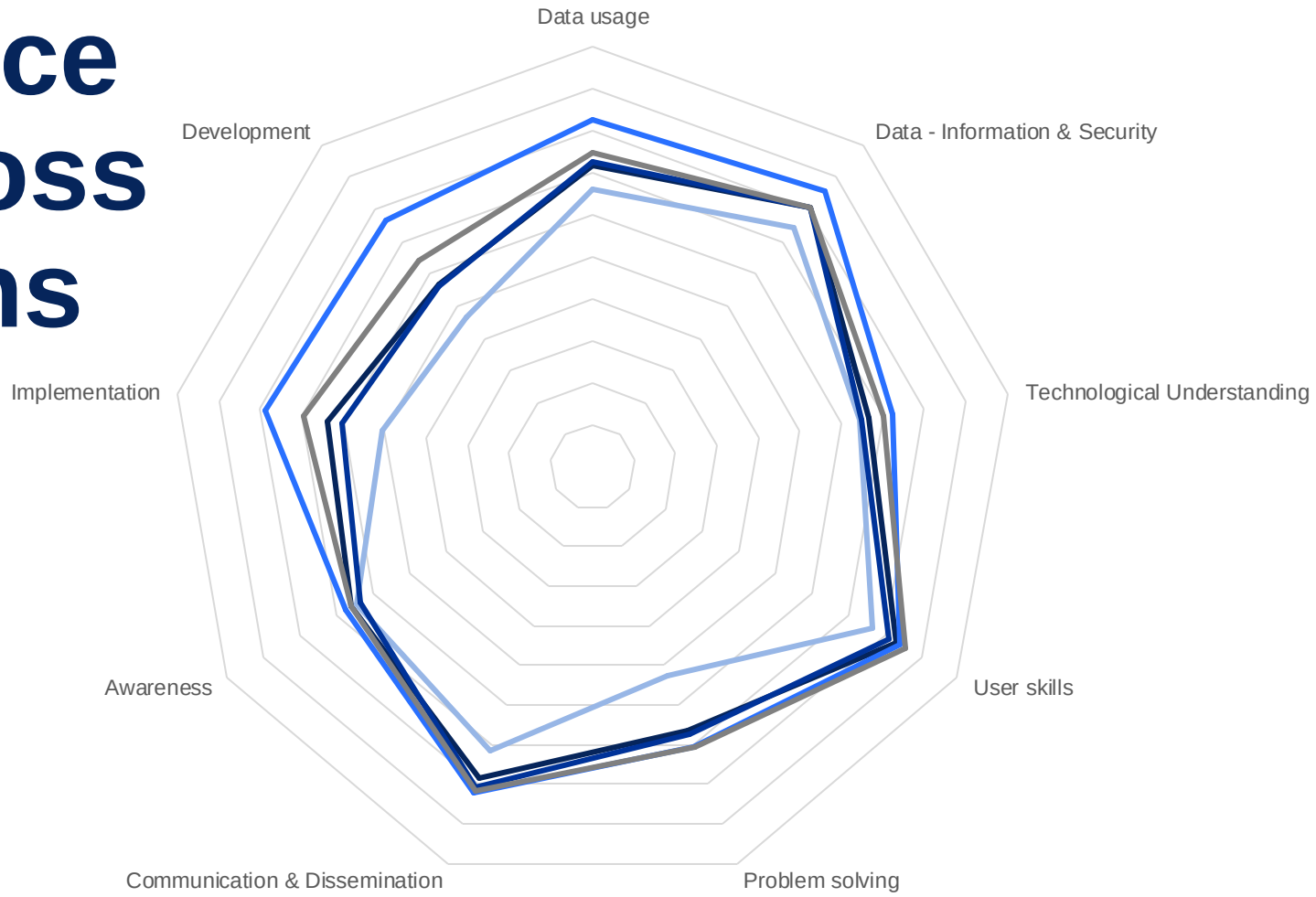
Competence levels across professions



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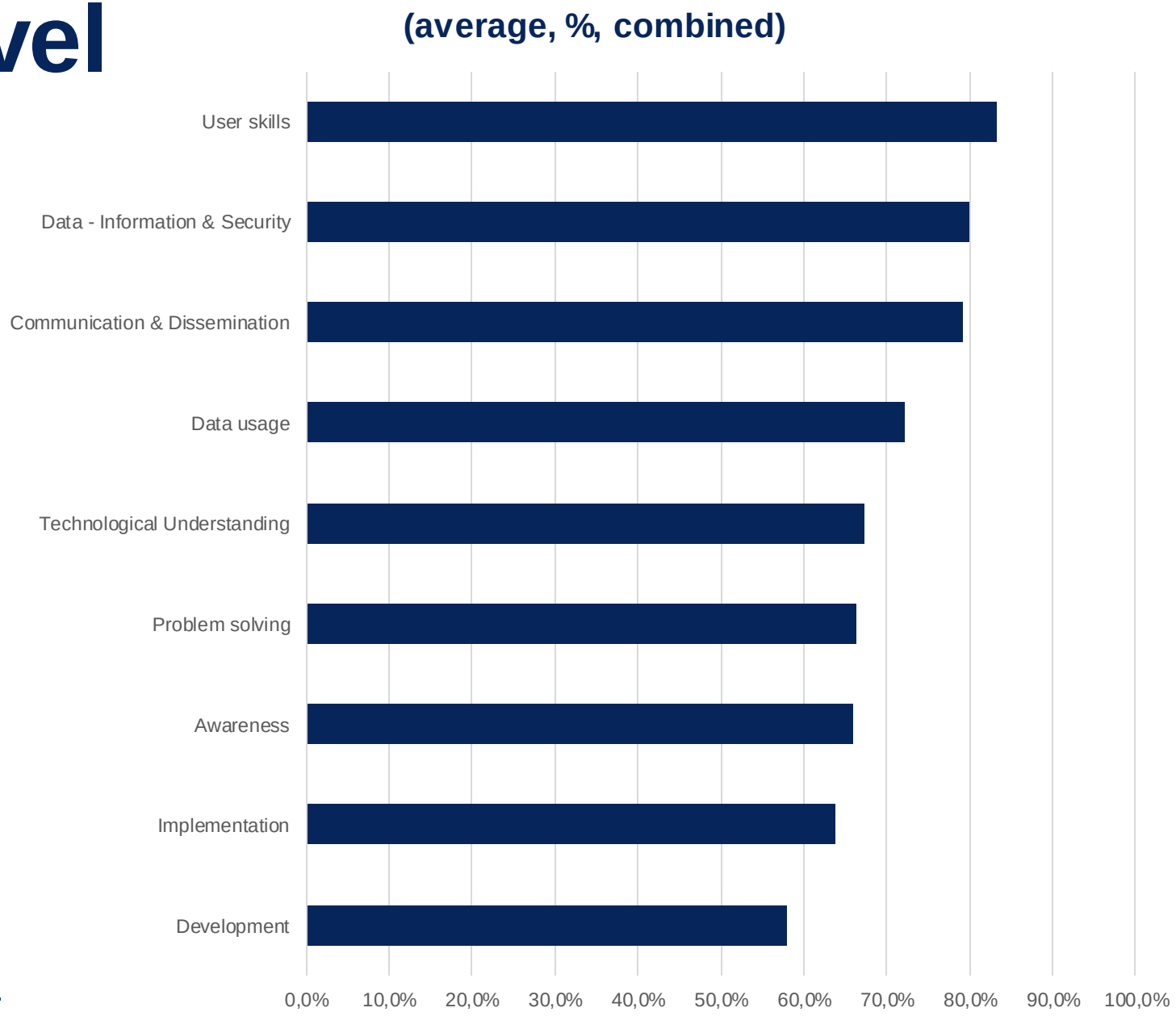
Competence level

Highest within
- **User skills**

Lowest within
- **'Awareness'** – Are you able to reflect on your own digital skills?
- **Implementation** – Do you see yourself as a first mover when new technology is to be implemented?
- **Development** – Are you aware of trends and technological developments in your field ?



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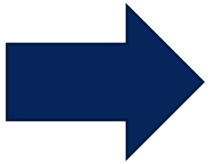
Positive attitudes to digitization

- **All see potentials**
- Faster and **easier access to updated information** due to uniform and centralized digital documentation.
- Easier to **share information across** through shared systems and integrate data for a better overview.
- **Systematic** collection of data available for **research**.
- **Automating** routine tasks for smarter resource use and fewer human errors.
- **Order, transparency** as well as **improved legal compliance** (Slovenia).



Optimization of time and faster patient treatment of improved quality and with higher data security.

"I feel more competent in managing my unit"
(Manager, Catalonia)

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Negative attitudes and problems related to digitization

Digital competencies = user skills

Digital technology not top of mind

Negative EFFECTS of digital technologies:

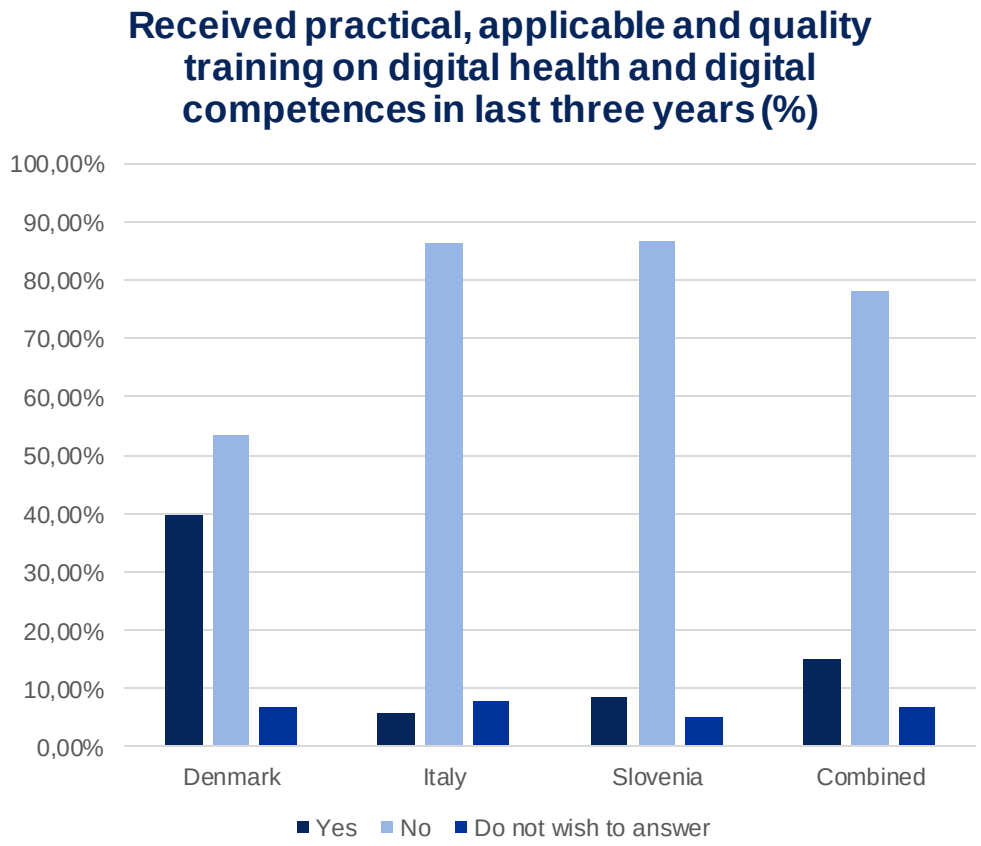
- More administration and registration takes **time away from the patient**.
- Creates difficulties and **resistance**, as many HCPs experience a **greater burden** with new technologies, **changing work** processes etc.

Issues with IMPLEMENTATION:

- The majority of HCPs do **not exploit all the potentials** of their digital systems.
- **Insufficient training**
- **Fear** for new technologies and **reluctance** to replace close contact with the patient with digital technologies.
- **Lack of adequate technological equipment**.
- **Organizational structures** that do not facilitate implementation:
  - Different information systems/ electronic health records
  - Paper/ digital – coexisting paradigms
  - Pilot projects
  - Insufficient ICT support

Training of digital competences

- Generally **no clear structures for training** of HPCs: **Self-training** and learning by doing, often with peer support.
- Training generally **designed internally/locally** either by 'super users' or IT staff.
- Training considered **inadequate** (lack of time and resources). Least significant in Denmark.
- Wish for **ongoing online and physical training and time to practice**.



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Improvement potentials

Change of mind-set and attitude seen as most important factors in relation to the use of digital technologies across the countries:

- **Open-mindedness, interest, curiosity, patience and courage.**
- **Focus on age** as important factor.

- **Use** existing technologies.
- **Communicate** better digitally as well as training patients and colleagues.
- Technology understanding and ability to **trouble shoot**.

“Employees must dare to embark on digital technologies.
If you have the will and the interest you will acquire the necessary competences.”
(Manager, Denmark)

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In summary – what did we find out?

The needs turned out to be quite similar across the countries, where almost 500 healthcare professionals and managers expressed the following wishes:

- **Better training and ability to practice**
- **Focus on mind-set**

The role of management and the organization is to facilitate **WHY digital technologies make sense** and creates **better conditions for getting to** know the new technologies and **reflecting** on the use of them.

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Insights were processed…

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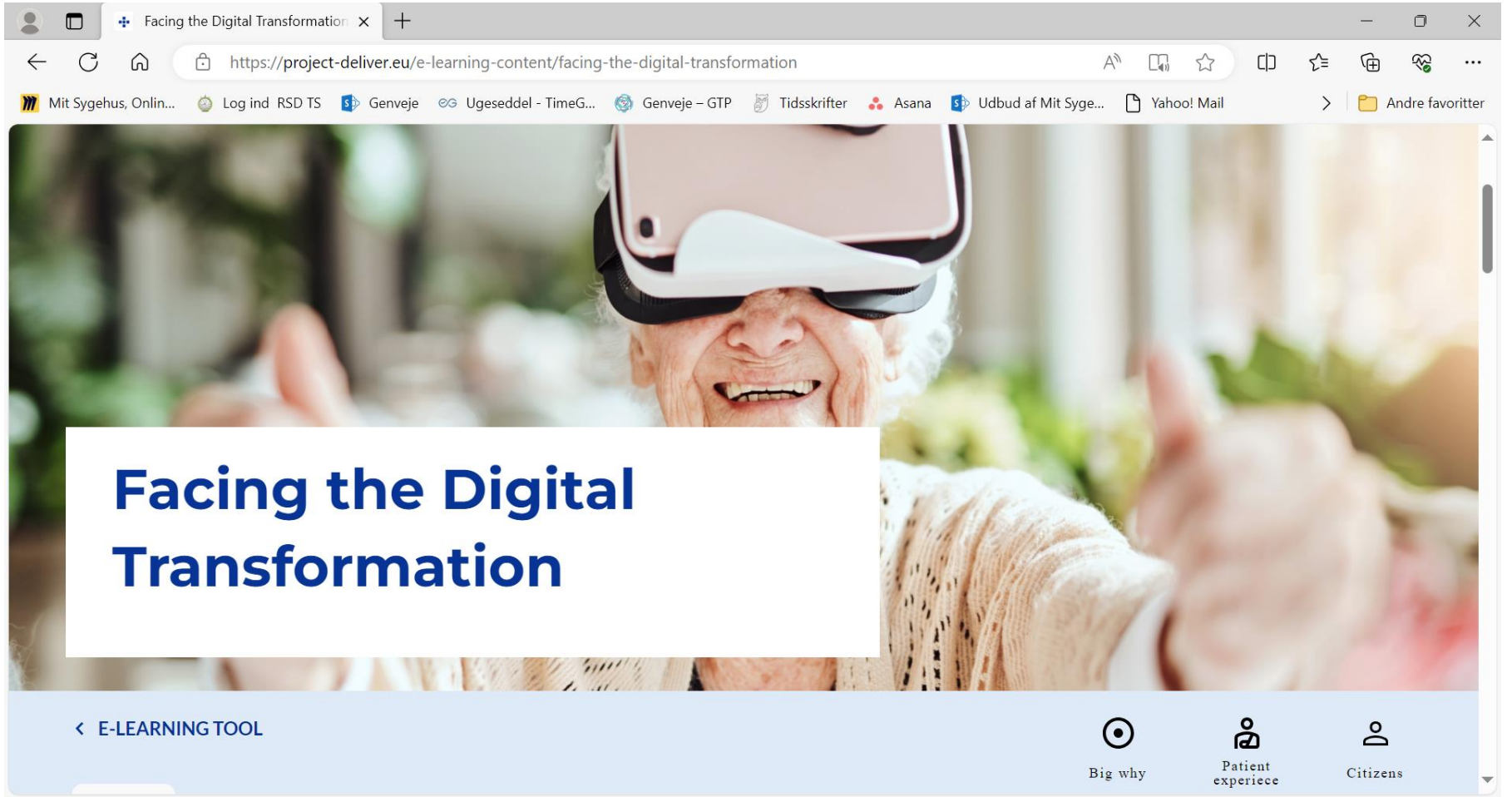
…and resulted in an e-learning platform



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Region Syddanmark

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TIC Salut Social

Fakulteta za zdravstvo Angele Boškin
Angela Boškin Faculty of Health Care

Digital EducationaL programme InvolVing hEalth pRofessionals (DELIVER):

Organisational analysis of digital transformation

Final conference of the project

Dr. Mirna Macur

November, 24 2023, Ljubljana

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Angela Boškin Faculty of Health Care

Aim of the analysis

Intellectual output IO2

The organisational readiness for digitization

- **Organisational readiness** for digitization, including strategies for digitization and equipment/organisational structures for adaption of digital technologies.

- **Organisational attitude** towards digitization and management support in using digital technologies.

- Description of **organizational factors** that pose barriers and facilitators to the digitization and implementation of educational programme

Aim of the analysis

The organisational readiness for digitization

Intellectual output IO2

- Assessment of level of digitization and technical support available
- Description of organizational factors that need to be in place to ensure digitization and implementation of educational programme
- Mind-set on organisational readiness and organisational support within digitization

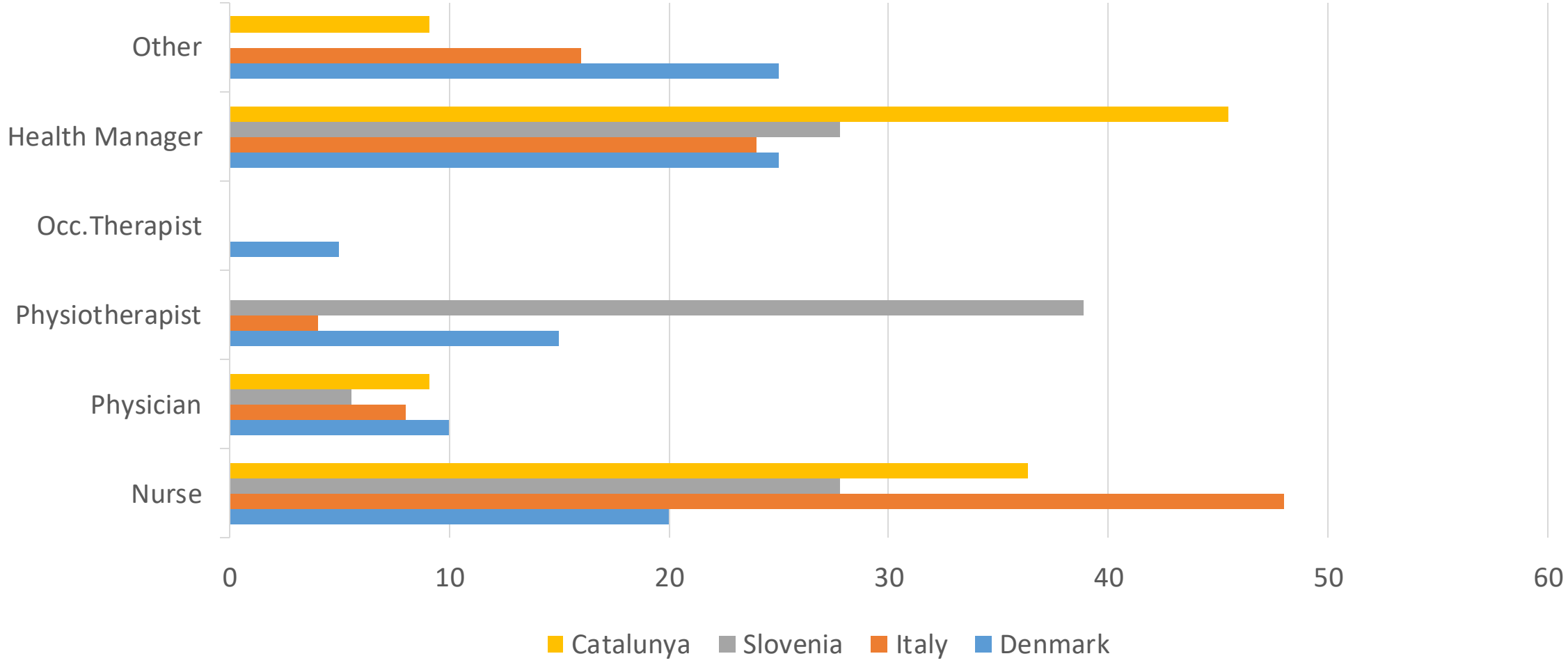
Methodology

Qualitative approach

- Individual and focus group interviews with Healthcare Professionals (HCP): doctors, nurses, physiotherapists, other and Healthcare Managers (HCM). They were recruited from primary, secondary and tertiray healthcare level

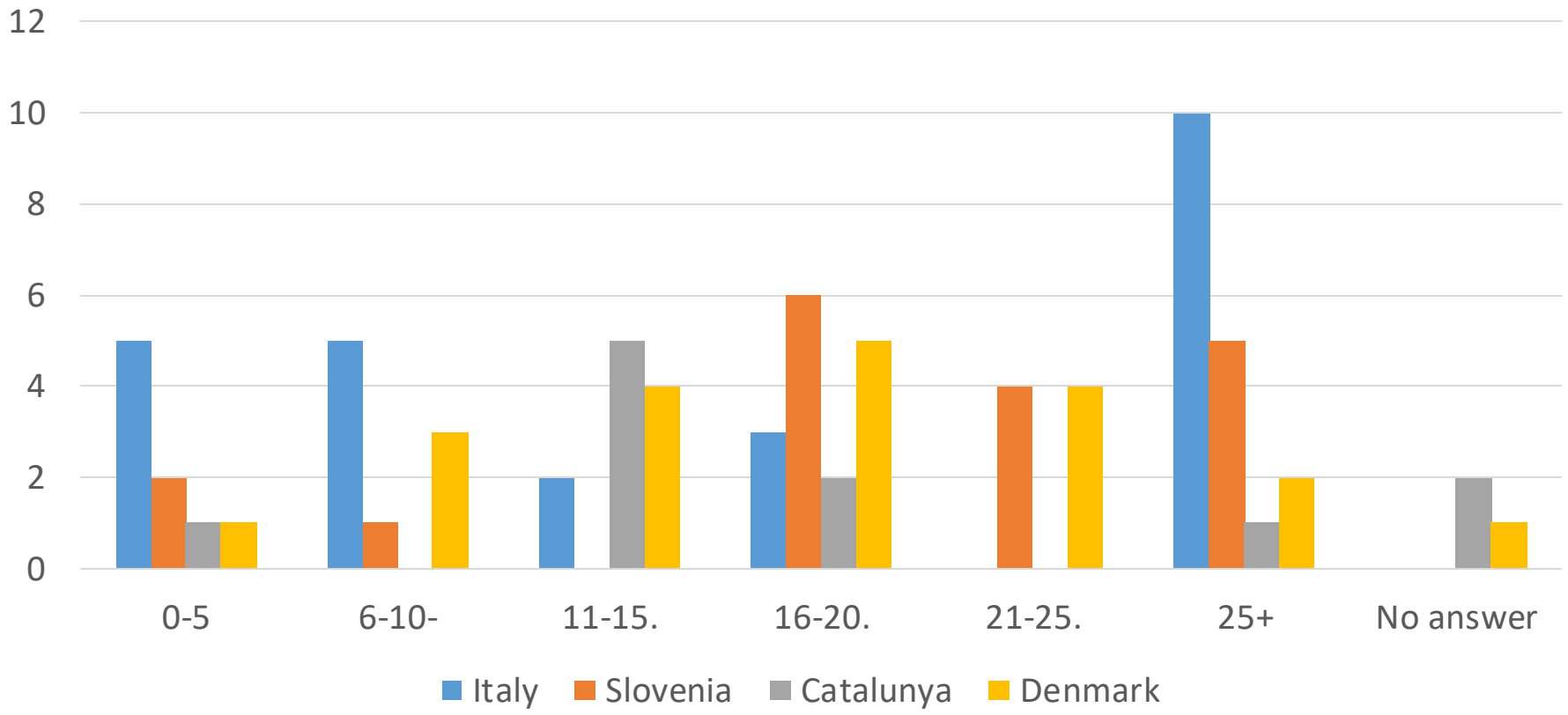
- **74 respondents across four countries + 4 ICT specialists** (Denmark, Italy, Catalonia & Slovenia)

Sample: Professions of respondents %



Sample: Work sector of respondents %

Sample: Work experience of respondents %



RESULTS OF QUALITATIVE ANALYSIS

Organisational readyness for digitalization

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Attitudes of institution towards digitization

- Overall attitude of the management towards digitalisation in health care institution is positive. In many organisations, there are difficulties due to budgets, the difficulty of replacing old computers and providing new tools and work programmes to meet the needs of HCPs. Many workers, especially older ones, often find it difficult to use the computers and programmes and are not given support by experienced staff. Another concern of HCPs is confidentiality and privacy of the data, which need to be taken care of and well communicated.
- **Italy**: Despite the need to invest, the health care institutions have not increased the number and the qualifications of the staff devoted to digitization transformation.
- **Denmark:** positive attitude of the management
- **Slovenia**: management has a positive attitude towards digitalization, however it is not always a priority: sometimes support is only verbal where only implemented solutions are used without further development.
- **Catalonia**: Pandemic brought different dynamic of work and more HCPs tried to digitize their work processes

One HCP said that *this strategic line "has not been seriously issued until the beginning of the pandemic, which has forced many organizations to digitize in record time".*

(Catalonia)

"In particular, I don't know whether everyone is doing it. So it is not required or that someone has control over it to make sure everyone is doing it. It often happens that only a part of people is working diligently on it, while others don't."

(Slovenia)

Equipment of organisation for adaption of digital technologies

HCP

- **Denmark & Catalonia**: health care institutions are well equipped with digital technology (hardware and software); problems are lack of time for proper training and resources for implementation (Denmark).

- **Italy & Slovenia**: situation depends on the sector: private health care facilities are far better equipped than public, inside public sector some departments are well digitalised: Covid-19 departments (Slovenia), oncology or neurosurgery (Italy). The rest of the departments are faced with lack of equipment or old equipment and not updated in the software.
- In Slovenia some remote Community Health Centres face poor internet connection; bigger health care institutions have problems getting IT help after regular working hours (afternoons, nights).

HCM

- **Denmark & Catalonia**: that organizations are well-equipped with desktop computers and wired Internet access everywhere.
- **Italy & Slovenia:** private healthcare facilities are much better equipped with digital technology than public. There are still many public facilities with old technology and a lack of staff to support HCPs in the use of new technology and programs. There is a need to develop a new way of thinking to allow digital transformation of the institutions. In Slovenia lack of hardware in public institutions leads to duplication of work (paper and digital documents). In Italy strategies used to offer education and training are not consistent with the expected competencies.

" Some members of the staff is at risk to be excluded: may we accept this?" / "up-dates are not performed on a regular basis - therefore the systems available are not accessible"

(Italy)

Perception of being supported by organisation in using digital technologies (HCP)

- **Catalonia & Denmark**: HCPs feel supported by their organization in the use of digital tools.

Problems with training for new technologies.

- **Slovenia**: training is provided for existing employees when new software/system is deployed; training for software already in use is carried out by colleagues who are already using the software - employees provide knowledge transfer to new employees. Because software is provided by external partners later adaptations and improvements are hard to implement
- **Italy**: the organisation often drops instructions and implementation of new programmes from above without providing adequate training, or there is a lack of new equipment and technology. As a result, many HCPs do not feel prepared or supported to use the technologies, or they cannot have new equipment and computers.

"Health care professionals need more integrated and ergonomic systems to perceive themselves supported.. of course, they need to acquire competencies but on the other, they need to be more supported."

(Italy)

„They are very responsive to new initiatives that can help in our daily lives and make it easier. However, there are financial challenges.“

(Denmark)

Strategy for digitization (HCM)

Catalonia: it seems that HCMs do not know about the digitalization strategy of their organizations because their work area is not within the scope of digital transformation. Only one manager was an exception.

Italy: there is not unified strategy for digitalisation. It is important to promote light digitization processes, accompanying HCPs to change their practice. Moreover, in each unit, there is a need to have a professional who has this attitude and who is available to help others. Digital systems should be intuitive, not complex (similar to Mobile phone solutions). There is also a need to change the educational support given: manuals are ineffective; on-the-job support or mentoring and short videos do much better job.

Denmark: there are strategies for digitization in hospital sector and in many municipalities, however they are not known by many HCP´s.

Slovenia: HCMs mostly stress that digitisation is a priority and they focus on paperless operations.

" ..it does not have to be heavy, it does not have to be something that weighs you down but something that lightens you and that you like and that gives you something."

"It must also be accompanied by a support of a specialized type, that is, we cannot be left to ourselves in using it"

(Italy)

"we want to go paperless within a year ... that's one of the management's demands and that's what we're aiming for ... we're already buying devices."

(Slovenia)

Barriers to succesful implementation of digital health solutions

HCP

Citizens: lack of technological understanding and digital skills among patients/citizens; lack of interest if other options ar available.

HCP: Resistance to change, lack of training, and lack of equipment. More in detail:

Italy: 1) the physical provision of IT support (e.g. having computers available, having an effective internet connection, and appropriate allocation of the resources); 2) lack of time to learn to use programmes and new technologies properly; 3) lack of training to make the best use of the programmes and devices provided; 4) lack of proper educators.

Denmark: organizational barriers relate to lack of resources due to lack of staff (especially nurses) and poor implementation). Technical barriers relate to "immature" systems (inflexible structures and rules) and unsustainable systems. Also resistance to change and lack of digital skills can be found with HCPs and HCMs.

Slovenia. some software is unified, some software solutions are different in each institution. Physiotherapists in Slovenia mentioned most barriers because their work is not digitalised.

HCM

Slovenia: lack of unified digital solutions at the national level; lack of knowledge/inability to use digital technologies, resistance to digitisation by senior managers/staff; but also patients who do not use technology.

Catalonia: the reluctance to change and the lack of time for training.

Italy: outdated structure of the available information systems (reflecting outdated methods and logic); lack of systematic planning and organisation to facilitate the transition of health institutions to the digitisation; lack of training to make the best use of the programmes and devices provided.

Denmark: the same as HCP.

"The transition to digital technology was left somewhat to chance and therefore perhaps not included in programmes, training and organisational plans"

Italy

Facilitators to succesful implementation of digital health solutions

HCP. usefulness, easy to use, and organization's digital culture. More in detail:

Slovenia: deployment/implementation of tablets for real-time data entry; motivation of people; cooperation between all levels of healthcare; ideas, suggestions and solutions from staff; funding secured; appropriate presentation of digitisation to staff - benefits, appropriate computer equipment for work secured; appropriate training provided. The COVID-19 epidemic has accelerated digitisation.

Italy: 1) The use of very fast technologies for certain procedures, like digital signatures through the use of mobile phones; 2) To have trained and dedicated staff who can train HCP in the use of software; 3) The development of simple, intuitive programmes with attractive interfaces, built around the needs of professionals. Moreover to have efficient wireless systems, working in a safe manner to protect patients' data.

Denmark: the importance of organisational digital culture where HCMs see digital technology as priority, share confidence in digital transition and allocate enough resources (time, money, IT help). simple, user-friendly, easily accessible technical equipment that is continuously updated. Sufficient time for training and time and opportunity to try out and become confident with new technology

HCM

Denmark: HCMs share the same view as HCPs.

Slovenia: HCMs mostly talked about their interest in digitalisation:expressed interest in training by employees; they would like to have young mentors/tutors when it comes to the use of advanced technologies.

Catalonia: technological enablers (useful and easy-to-use tools) and organizational (the digital culture of the organization is a key to the implementation of technology).

Italy: trained and dedicated staff who can train professionals in the use of software and new programmes and can intervene if necessary; time to learn how to use new technologies (that this time has to be formally recognised); regional or national planning that promotes the digitisation; reducing workloads of the specialised ICT staff or improving their availability for HCPs; there is also a need to differentiate the hard digital skills and the soft digital skills: the first are easily learnt, the second require more time, strategic thinking and support.

DISCUSSION

ANSWERS TO RESEARCH QUESTION OF QUALITATIVE ANALYSIS IN IO2

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#1 Organisational readiness for digitization, including strategies for digitization and equipment/organisational structures for adaption of digital technologies.

- **Denmark** has a strategy for digitalisation in hospitals and some municipalities, although it is not known to many HCP.
- In **Catalonia** HCMs are not aware of the digitalisation strategy because it is not in their scope of responsibilities.
- In **Italy and Slovenia** there is not unified strategy to digitalisation. In Slovenia some solutions are on a national level but many are developped by health care organisations themselves because no national solutions are available. In Italy light and inclusive approach is suggested with professional in each unit that support digitalisation process

- In **Denmark and Catalonia** health care institutions are well equipped with digital technology (hardware and software);
- **Italy & Slovenia**: situation depends on the sector: private health care facilities are far better equipped than public, inside public sector some departments are well digitalised: Covid-19 departments (Slovenia), oncology or neurosurgery (Italy). The rest of the departments are faced with lack of equipment or old equipment and not updated in the software. Also the way of thinking about digitalisation in public institutuins need to be changed as well as strategies to implement digitalisation

"We need to overcome the dualisms between digital and paper, digital and analogic..." / " ..it does not have to be heavy, it does not have to be something that weighs you down but something that lightens you and that you like and that gives you something." / "It must also be accompanied by a support of a specialized type, that is, we cannot be left to ourselves in using it" *Italy*

#2 Organisational attitude towards digitization and management support in using digital technologies.

- Overall attitude of the management towards digitalisation in health care institution is positive.
- In many organisations, there are difficulties due to budgets, the difficulty of replacing old computers and providing new tools and work programmes to meet the needs of HCPs. Many workers, especially older ones, often find it difficult to use the computers and programmes and are not given support by experienced staff. Another concern of HCPs is confidentiality and privacy of the data, which need to be taken care of and well communicated.
- Pandemic brought different dynamic of work and more HCPs tried to digitize their work processes (Catalonia, Slovenia)
- Training for new technologies is often a problem inside health care organisations. The organisation often drops instructions and implementation of new programmes from above without providing adequate training (Italy). In Slovenia training is provided for existing employees when new software/system is deployed; training for software already in use is carried out by colleagues who are already using the software - employees provide knowledge transfer to new employees. Because software is provided by external partners later adaptations and improvements are hard to implement.

- **Catalonia & Denmark**: HCPs feel supported by their organization in the use of digital tools.
- **Italy**: Despite the need to invest, the health care institutions have not increased the number and the qualifications of the staff devoted to digitization transformation.
- **Slovenia**: management has a positive attitude towards digitalization, however it is not always a priority: sometimes support is only verbal where only implemented solutions are used without further development.

"The employer is already in favour of change. But most of the time the problem is the software itself.... it's the software developer's responsibility. And that's a big expense. So ideas for improvements come up all the time, but usually the answer is that the change is too big and that this would entail changing the entire software product, which is not something done by our institution but by the software developer in charge of the institution. Then these things we want to do sometimes take a year. In the meantime, something else comes up or the thing itself already becomes obsolete„ *Slovenia*

#3 Description of organizational factors that pose barriers and facilitators to the digitization and implementation of educational programme

- **Key barriers**: resistance to change & lack of digital skills (often by senior staff, sometimes by HCM), lack of training, lack of equipment and other resources (HCPs like nurses, educators)
- Slovenia added: some (odler) patients don‘t use technology; lack of unified digital solutions at the national level; among HCP psychoterapists mentioned most barriers because their work is not digitalised.
- Italy: outdated structure of the available information systems (reflecting outdated methods and logic); lack of systematic planning and organisation to facilitate the transition of health institutions to the digitisation; lack of training to make the best use of the programmes and devices provided.
- Denmark added immature” systems (inflexible structures and rules) and unsustainable systems

- **Key facilitators**: usefulness, easy to use, organization’s digital culture, Sufficient time for training and time and opportunity to try out and become confident with new technology
- Usefullness, easy to use: easily accessible technical equipment that is continuously updated; the development of simple, intuitive programmes with attractive interfaces, built around the needs of professionals; : implementation of tablets for real-time data entry;
- Organisation‘s digital culture: where HCMs see digital technology as priority, share confidence in digital transition and allocate enough resources (time, money, IT help); motivation of people; cooperation between all levels of healthcare; ideas, suggestions and solutions from staff; funding secured; appropriate presentation of digitisation to staff, appropriate computer equipment for work secured; appropriate training provided.

Limitations of study

- Some healthcare professions are not equally represented or missing in sample
- Big variation in ICT responsibility of respondents between countries

QUESTIONS, COMMENTS ?

Thank you for your attention,

Mirna Macur

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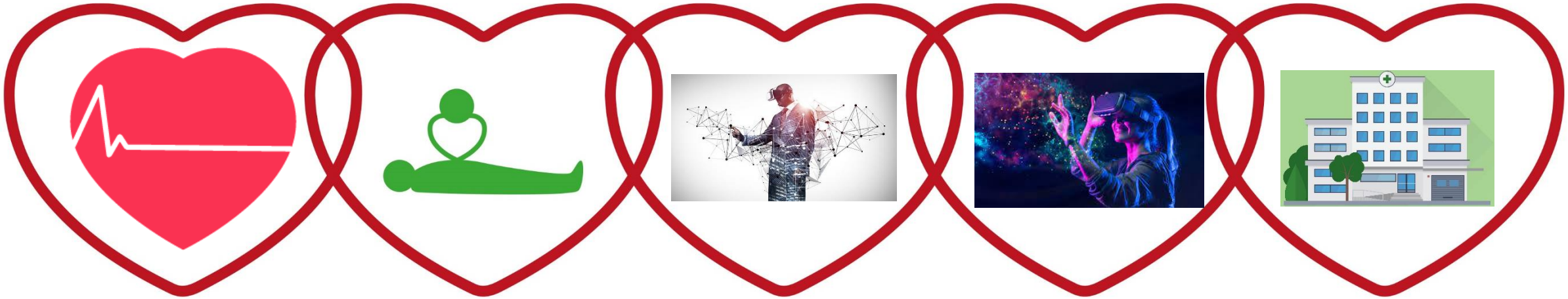
Virtual reality in cardiopulmonary resuscitation education: what are the outcomes at organizational level? Findings from a systematic review

Stefania Chiappinotto, RN, PhD

Ljubljana, 24th November 2023

BACKGROUND



CARDIAC ARREST
Globally a **cause of mortality**
(WHO Cardiovascular Disease Risk Charts Working Group, 2019)

CPR
For all healthcare professionals: importance of implementing **strategies** aimed at maintaining this skill and practice
(Braun et al., 2015)

SIMULATION
Beginning: Resusci Anne
(Calamassi, 2013)
Modern era: high-fidelity mannequins

VIRTUAL REALITY
Technology that creates a 100% simulated environment, in which users can fully immerse themselves
(Polga et al., n.d.)

BENEFIT FOR THE ORGANIZATION
Gaps in the economic evaluation (reduction in costs, a saving of time and greater effectiveness)
(Digital Mosaik, n.d.)

METHODS

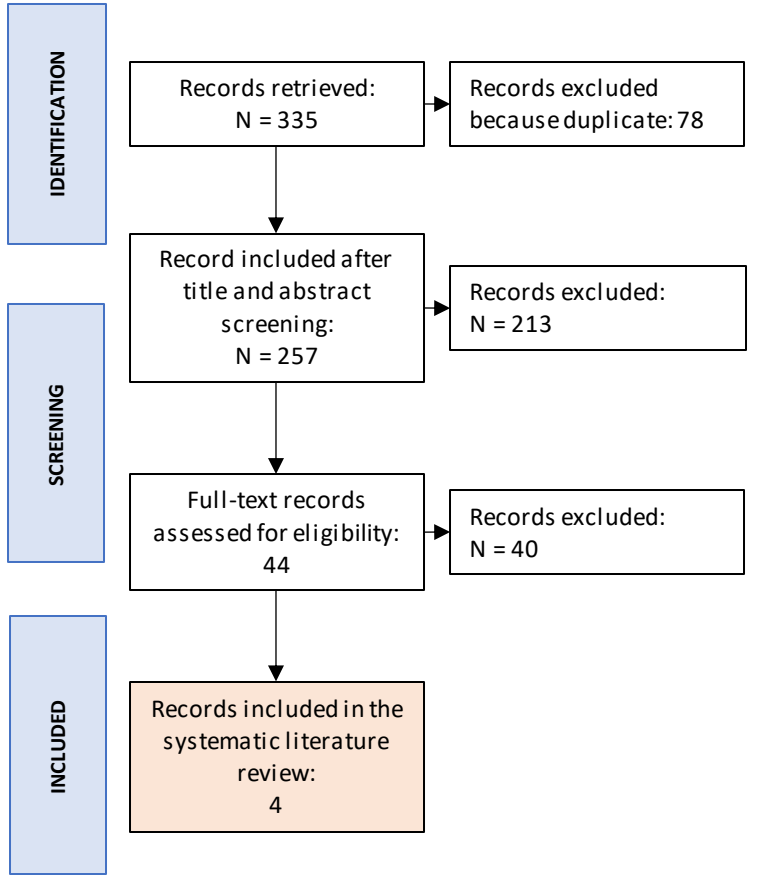
Systematic literature review (Page et al., 2021)

INCLUSION CRITERIA

- Any setting
- Regarding Virtual Reality in CardioPulmonary Resuscitation training
- Experimental or observational in design

QUALITY APPRAISAL

Joanna Briggs Institute Checklist



RESULTS (1)

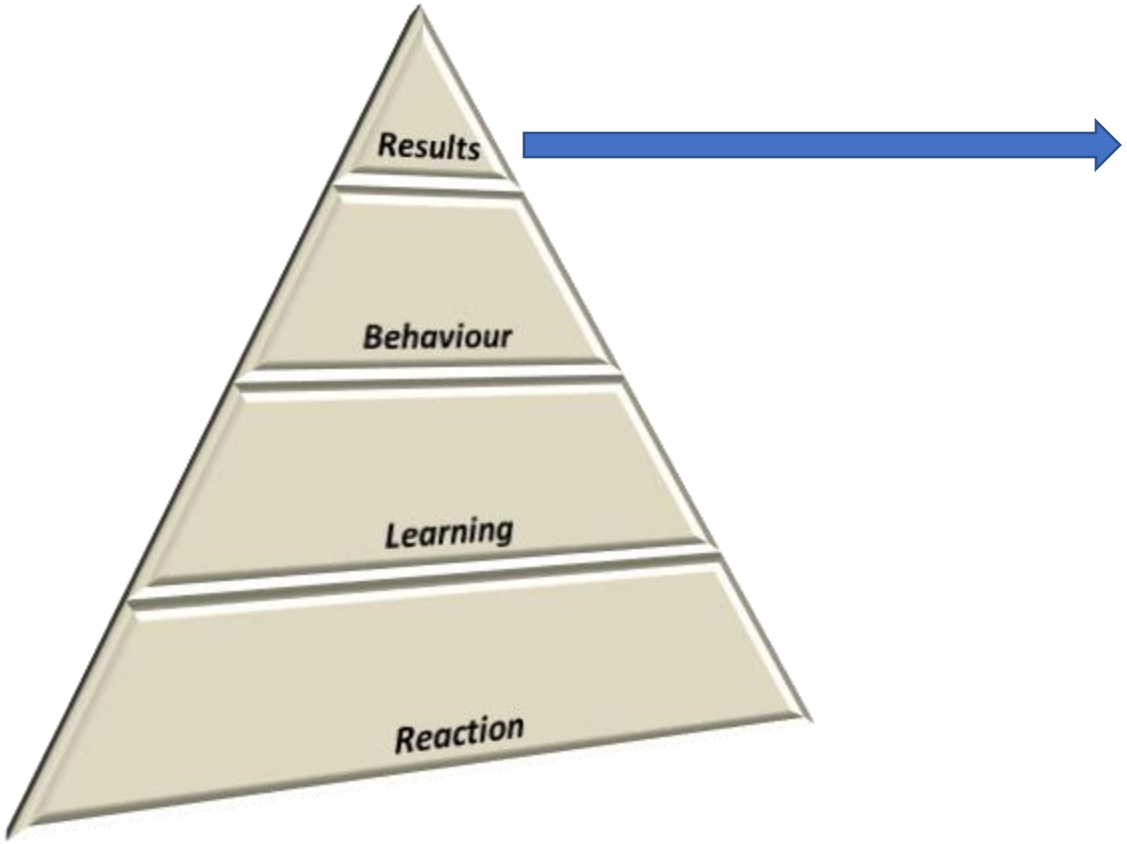
Author Publication year Country	Sampling Sample	Virtual simulation modality Devices
Buttussi et al. 2013 Udine, Italy	• Convenience sampling • **Physicians** and **nurses** (pre/posttest)	→ **EMSAVE**, a single-player serious game using a 3D scenario-based ALS simulation for computers → Desktop computers and earphones
Chang et al. 2021 Los Angeles, USA	• Convenience sampling • **Physicians**: pediatric residents (novices) and pediatric emergency medicine attending/fellow (experts) (novice vs expert professionals)	→ **Oculus Rift Touch** → Played on consoles, PCs and mobile devices
Katz et al. 2020 New York, USA	• Convenience sampling • Postgraduate year 2 **anesthesiology residents** (randomization to high fidelity simulation or virtual reality training and then crossed after a 2-week of washout)	→ **Virtual reality intervention**: voice controls, with a virtual team → **High Fidelity Simulation intervention**: human patient simulator mannequin (MUSE software), only vocal commands to the team → Laptops and virtual reality headsets
Sadeghi et al. 2022 Rotterdam, Netherlands	• Convenience sampling • **Cardiothoracic surgeons, residents, junior physicians, nurse practitioners, medical students** (expert vs novice professionals)	→ **Oculus Quest 2** head-mounted display → Two virtual reality controllers and a high-performance laptop

RESULTS (2)

Author Publication year Country	Outcome for the organization
Buttussi et al. 2013 Udine, Italy	• **Low-cost** regular retraining sessions • Retraining widely **accessible** and appealing for Advanced Life Support providers
Chang et al. 2021 Los Angeles, USA	• **Justifying this investment** is a major barrier in healthcare virtual reality simulation • Although front-end costs for virtual reality development are high, reusing code and assets for the second, third, and subsequent simulations should **drop cumulative costs**
Katz et al. 2020 New York, USA	• As the frequency of refresher training or the number of learners per session increases, the **cost savings** amplify • Virtual reality sessions were estimated to be USA $103.68 **less expensive** in a single-learner, single-session model
Sadeghi et al. 2022 Rotterdam, Netherlands	• Virtual reality training has **higher initial costs** than conventional training • The **increased accessibility** of virtual reality training results in more trainees being reached → initial costs spread over a larger group • Using virtual reality hardware adds a **new dimension** in training possibilities, which can also lead to **cost-efficiency**

DISCUSSION

KIRKPATRICK CONTINUING EDUCATION EVALUATION
(KIRKPATRICK AND KIRCKPATRICK, 2007)



- **Outcomes for the organization**: little investigated, without an exhaustive cost/effectiveness analysis
- Understanding Virtual Reality benefits in terms of **efficiency** as well as **effectiveness** is essential to develop an **alternative training program** (Lin et al., 2018)
- Understand whether an increase in the **performance** of the learners is actually followed by an improvement in their **practical professional life**, with an improvement in the **clinical outcomes** of the patients (Lin et al., 2018)
- Limit: Virtual Reality development is linked exclusively to costs or also to **strategic choices** by decision makers not to invest on it or to invest carefully (Urlings et al., 2023)?

TAKE HOME MESSAGES

1. **No strong evidence** that Virtual Reality applied to CardioPulmonary Resuscitation training is associated, and in what way, with **better or equivalent outcomes for the organization**

2. **No study** with a **cost-effectiveness analysis**

3. Virtual Reality is an **opportunity** for the future

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Stefania Chiappinotto

Ljubljana, 24th November 2023

DISCUSSION

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WORKSHOP

DELIVER e-learning platform

Digital Competence Wheel and 8 advice

With Randi Lehmann Boesen & Morten Sønderskov Frydensberg

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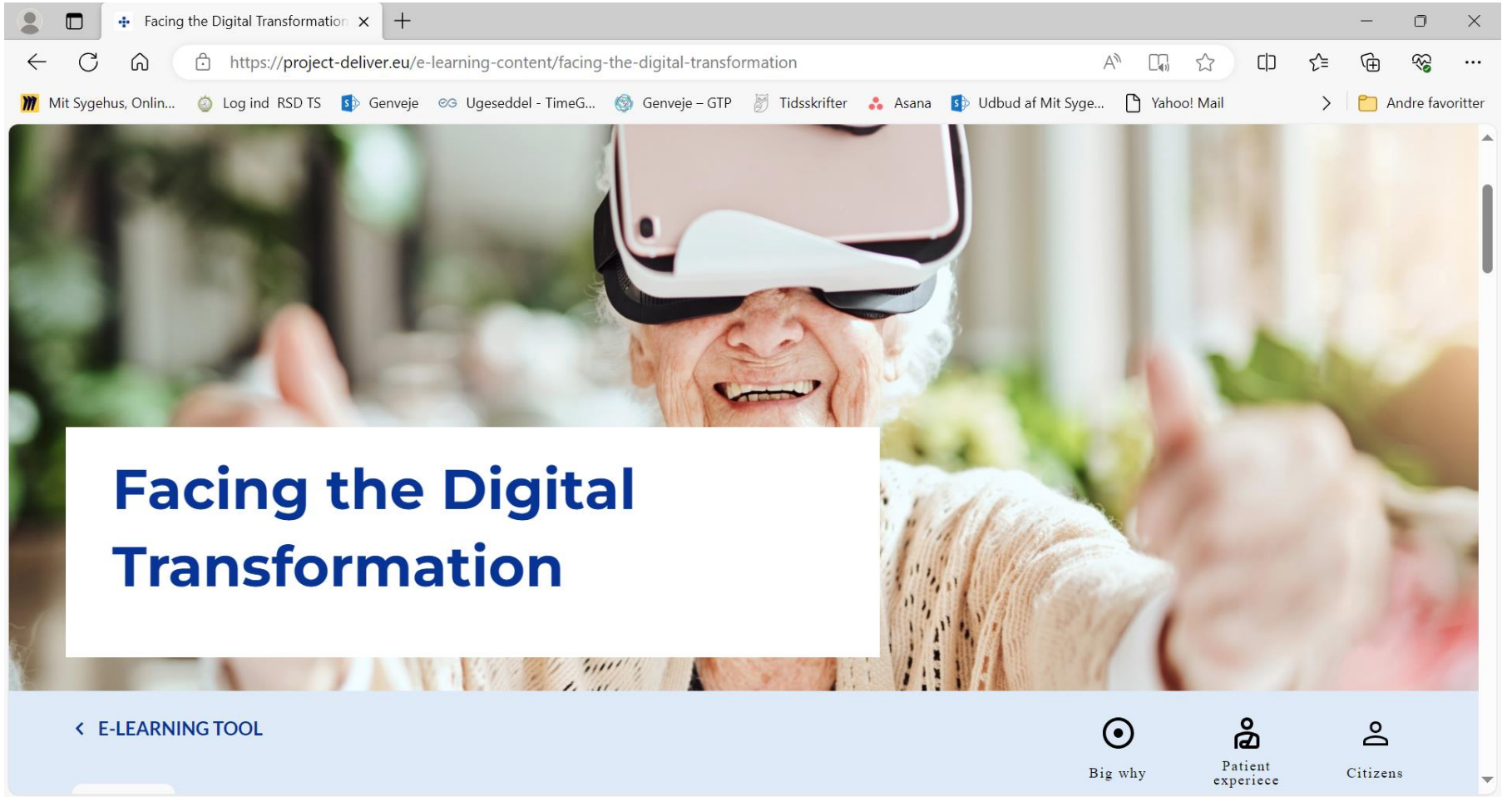
- E-learning platform
- Workshops

DELIVER e-learning platform



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Workshop:
Dilemma movie

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Do you recognize this dilemma?

What can be done to make professionals more comfortable in this kind of situation?

How has the digital transformation changed your practice?

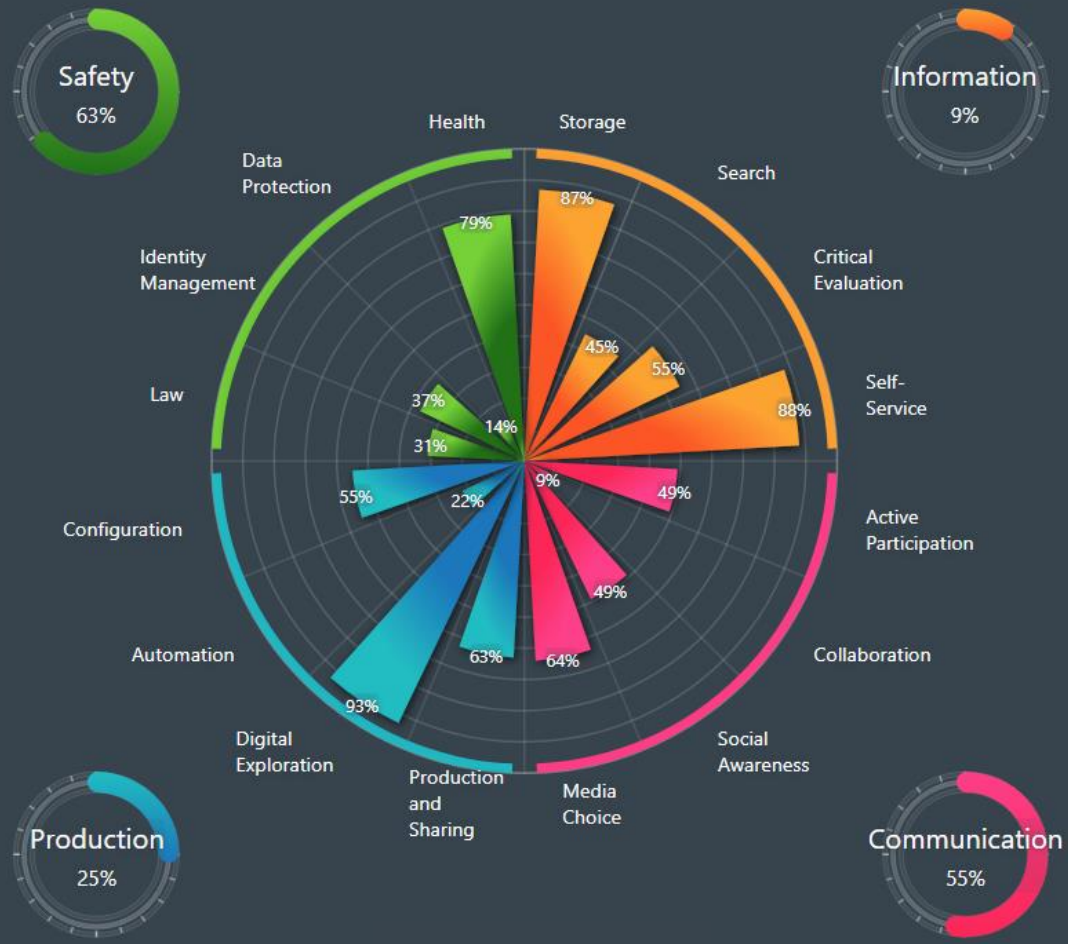
The Digital Competence Wheel

Safety

Ability to use digital technology safely and sustainably in relation to data, identity and work injuries and to pay attention to legal consequences, rights and duties

Information

Ability to identify, locate, retrieve, store, organise and analyse digital information and evaluate relevance and purpose



Production

Ability to create, configure, and edit digital content, solve digital problems and explore new ways to take advantage of technology

Communication

Ability to communicate, collaborate, interact with and participate in virtual teams and networks as well as make use of appropriate media, tone and behavior

https://digital-competence.eu/dc/en/

Workshop:
The Digital Competence Wheel

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Workshop:
8 advice

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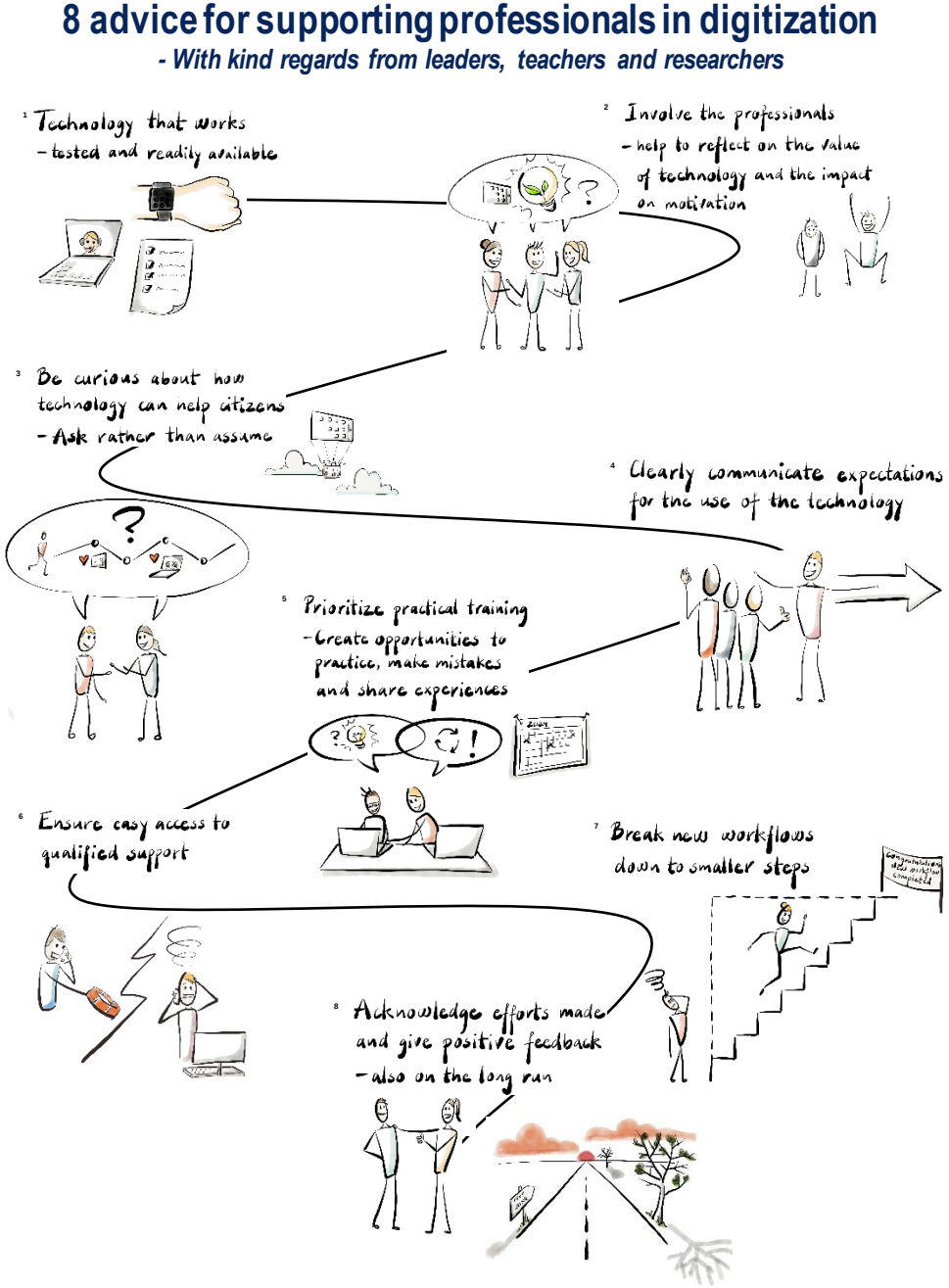

Thank you for your attention

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NEXT

Promoting the digital trasformation among healthcare professionals: policy - recommendations from the DELIVER project

Moderators:

Dr Mirna Macur and Dr Katja Pesjak

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Promoting the digital trasformation among healthcare professionals: policy reccomandations from DELIVER

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Alvisa Palese, PhD, RN
Alessandro Galazzi, PhD, RN

Agenda

- The digital and digital health transformation
- The need of digital health policies
- A proposal of digital policies from the DELIVER project (IO5)
- Implication for the future

The digital transformation

- The digital transformation is involving **people worldwide**.
- All aspects of life, **private** (e.g., smartphone, domotics applications) and **professional** (e.g., electronic medical records, remote robotic surgery).
- Accelerated during **COVID-19** pandemic, changing the rules of communication (e.g., videocall in hospitas, distance learning).

De' et al. 2020; World Health Organization, 2021; Longhini et al. 2022

The digital health policies

- = **formal documents** aimed at guiding and regulating the digital transformation of healthcare. Policies are recognized as a key bureaucratic characteristic by which modern societies function.

- Digital health policies may target:
  (a) citizens (e.g., health promotion initiatives) and patients (e.g., services),
  (b) healthcare providers (e.g., working with electronic devices),
  (c) healthcare services (e.g., adoption of electronic shift rostering),
  (d) whole data services (e.g. collection, management, use, and exchange of data), including those involved in research.

Dalglish et al. 2021

The digital health policies

- UN in the Sustainable Development Goals (SDGs) highlights the digitalisation as a goal but also a factor capable of promoting the acceleration of a sustainable.

- EU recognises and supports digital health policies developement and improvement (e.g., programs EU4Health 2021–2027 or DIGITAL).

World Health Organization, 2016

There are no reccomendation in the literature
for developing digital health policies
in enhancing the digital health skills of HCPs.

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Aim

To establish **policy and implementation recommendations** to multi-sectorial stakeholders within the fields of healthcare, education, technology and others interested in **enhancing the digital health skills of HCPs**.

How will DELIVER achieve its goal?

DELIVER will produce five intellectual outputs (IOs):

- **IO1** : Needs analysis
- **IO2** : Organisational analysis
- **IO3** : Curriculum and learning material
- **IO4** : Health care professionals e-learning platform for digital skills
- **IO5** : Policy and implementation recommendations

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Methods

1) **21** recommendations were **developed** on the basis of the:

- analysis of current scientific literature;
- findings of the DELIVER 1,2,3,4 IOs;
- opinions of experts in digital health partners of the DELIVER.

2) The recommendations were sent (email) and **discussed** (meetings) with all DELIVER members (Consensus Development Method).

3) The recommendations should be finally **voted** and **approved** (closing congress).

4) Reccomendations will be published for **dissemination**.

Palese et al. 2019

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Scan the QR code to take the survey.

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Policy and implementation recommendations (1/21)

Education (1/7)

Ensuring awareness by healthcare professionals (HCPs) of the benefits that digital health involves in order to motivate them to implement it in their work practice and develop a more positive attitude and mindset towards digitization. HCPs also need to be clear about the limits of digital health; therefore, when its use is not recommended and/or should be avoided, since one size doesn't fit all.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (2/21)

Education (2/7)

Certifying the training attended by HCPs and the competencies achieved, using the same classification, to render transparent the level of competence achieved in a clear and unambiguous manner.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (3/21)

Education (3/7)

Using validated instruments to assess HCP digital health competences in different healthcare settings, allowing periodic self-evaluation or hetero-evaluation to promote access to continuing education services aimed at increasing competences.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (4/21)

Education (4/7)

Designing educational opportunities for HCPs and healthcare managers from the first level of studies (i.e., bachelor's degree or similar) and deepening them during advanced levels of education (i.e., master's degree or PhD), as well as through lifelong learning.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (5/21)

Education (5/7)

The educational programs should be defined at the macro level, involving experts in the field of digitalization of healthcare, but the educational interventions must be customized according to the hardware and software used in specific realities. The programs should also consider the different skills that different profiles of HCPs need to perform their jobs (e.g., radiology technician compared to occupational therapist).

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (6/21)

Education (6/7)

Basic digital skills must be possessed by every HCP and healthcare manager. Examples of basic digital skills are word processing, database management, email, searching and browsing the internet, using spreadsheets, using presentation software, and using electronic medical records.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (7/21)

Education (7/7)

Educational courses should be conducted according to the best educational standards available and following the principles of andragogy. Teaching and training in the use of digital tools should be integrated into everyday work life (pragmatic cases) and delivered only by qualified personnel (including local frontrunners or peers), providing materials for further study. New educational strategies may also be employed, such as massive open online courses, with a digital interface and gamification rules to be more impactful and intuitive.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (8/21)

Implementation (1/9)

Considering different levels of digital transformation of society/HCPs and the digital divide existing in the general population as well as among HCPs, a modular approach (from the simplest to the most complicated competences) in the educational pathways is required. The digitization process must allow all HCPs to take advantage of its benefits.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (9/21)

Implementation (2/9)

Recording the level of competences achieved by HCPs to map them at the local, regional, and national levels. This could be a strategic performance indicator, so decision-makers can establish a baseline and work toward improving digital competencies.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (10/21)

Implementation (3/9)

As with the implementation of new digital technologies, new ethical issues may arise; therefore, ethics in digital health should be carefully considered and taught with practical cases, examples, and solution proposals. It is necessary to create conditions to enable HCPs to learn about new technologies and to reflect on the use they make of them in a meaningful manner.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (11/21)

Implementation (4/9)

The time spent by HCPs attending digitization courses must be recognized as working time. The education activity should be accredited as continuing professional education. The development of digital competencies should be prioritized and acknowledged like healthcare specialization courses. **It should also be a strategic priority. Learning and/or updating digital skills is a right and yet also a duty of HCPs, but they may not have the time for doing it.**

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (12/21)

Implementation (5/9)

Promote national and international recommendations not only for the development of HCP digital skills but also for the digitization of healthcare environments (hospitals, outpatient clinics, healthcare facilities, home care services) and for patients who use digital health services.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (13/21)

Implementation (6/9)

The provision of active support from healthcare direction positively influences HCPs' attitudes toward working with digital health. Healthcare managers should promote a culture to motivate staff toward positive acceptance of innovation. An effective collaboration between information technology staff and HCPs would enhance digital implementation.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (14/21)

Implementation (7/9)

To avoid changes being perceived by HCPs as overwhelming and sudden, healthcare managers should break them down into smaller phases that address existing workflows and habits.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (15/21)

Implementation (8/9)

Healthcare managers should reward the achievement of goals related to digital health implementation as with all types of programming.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (16/21)

Implementation (9/9)

The health digitization process does not end with providing digital technologies to be used by HCPs for working but includes the phases of choosing/purchasing new technology tools, training/implementation, maintenance, and updating of hardware and software.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

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Policy and implementation recommendations (17/21)

Technical features (1/5)

When a new technology is implemented in clinical practice, HCPs must be provided with complete training, a user-friendly manual, and the possibility of having technical support for any problem. Technical support could be provided both in-person and remotely.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

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Policy and implementation recommendations (18/21)

Technical features (2/5)

The technologies used in out-of-hospital settings should be capable of interoperating with those in in-hospital settings, allowing patients and HCPs to have all health information together, available, updated, and protected. Interoperability within the sectors of the local region but also between regions is important. The presence of a stable and fast internet connection is required to work.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (19/21)

Technical features (3/5)

Ensure that digital health systems are designed with appropriate technological redundancy in case of service interruptions, ensuring an on-demand equivalent backup system. Instructions for potential information technology failures are mandatory. Paper documentation should be used as a temporary solution only when the technological backup is not available, to avoid data duplication and loss. Ensure the adequate availability of digital health systems both in the hospital and for home care services.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (20/21)

Technical features (4/5)

Teach HCPs how to have a secondary plan for managing their work if the technology fails. In fact, patient care should not be interrupted in the event of problems with the technological systems.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Policy and implementation recommendations (21/21)

Technical features (5/5)

Healthcare system software (e.g., electronic medical records), for hospitals or home care, should be intuitive to use and enable the extraction of data on patients and the interventions performed, to quickly create clinical reports supporting the decision-making process, internal quality evaluations, or analysis of the quality of the service provided.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Implication for the future

The recommendations approved by consensus today **can help multi-sectoral stakeholders**, particularly policy makers for an optimal **implementation of digital health** processes among HCPs.

Thank you for voting
the statements!

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CLOSURE OF THE CONFERENCE

Linda Justi

DELIVER

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Closing conference

24 November 2023

Radisson Blu Hotel, Ljubljana

THANK YOU FOR ATTENDING!

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