Block 1: Introduction – Overview, Requirements, Knowledge Profiles

FH-Prof. DI Dr. Stefan Sauermann

Juliane Herzog, MSc.

> So spannend kann Technik sein.

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University of Applied Sciences Technikum Wien

University of Applied Sciences (UAS) Technikum Wien – Hoechstaedtplatz and ENERGYbase

Austria's Largest Purely Technical UAS

- 2013 | Moved into the new building at Hoechstaedtplatz
- 2011 | Start of construction of the new building at Hoechstaedtplatz,
- 2008 | Moved into the second location at ENERGYbase
- 2004/05 | Degree programs switched to bachelor's/master's system
- 2003 | Opening of the headquarters at Hoechstaedtplatz
- 2000 | Became Vienna's first university of applied sciences
- 1994 | Founded at the initiative of FEEI – Association of the Austrian Electrical and Electronics Industries and respected industrial enterprises

Organization

- Institution | University of Applied Sciences Technikum Wien
  - ~ 3,100 students, about 6,000 alumni
  - 28 degree programs: organization of the courses of study, development and advancement of the curricula
  - 16 departments: technical know-how and expertise in the areas of instruction and research
  - 4 study centres
  - Steering and decision-making committee: University of Applied Sciences Council

- Operator | University of Applied Sciences Technikum Wien Association
  - Overall financial and legal responsibility

Research & Development

- Four main areas of research
  - Embedded Systems
  - Tissue Engineering
  - eHealth
  - Renewable Energy
- Funded R&D projects | contract R&D projects
- Among the top 5 in the UAS sector in terms of research & development
  - At the moment 3 major FHplus structural development projects (Embedded Systems, Tissue Engineering, eHealth) at the moment
  - Currently about 40 funded research projects
  - Appr. 20 innovation checks every year
- Josef Ressel Centre for Verification of Embedded Computing Systems

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Funded project: eLearning4eHealth Network

- Project overview
  - International eHealth experts network
  - Development of internationally coordinated teaching and certification programs
  - Offers for academic and vocational education
- Current activities
  - Determination of the current status quo in education in eHealth
  - Survey of requirements of different user groups
  - Development of knowledge profiles

Study: State of the art in education in eHealth

- Selection criteria of relevant educational services

- Internet based literature research

- Definition of three target professions

- Definition of three main thematic content categories

- Evaluation criteria

- Status analysis

  - Division into two analysis: All educational services and certification programs

Study: State of the art in education in eHealth
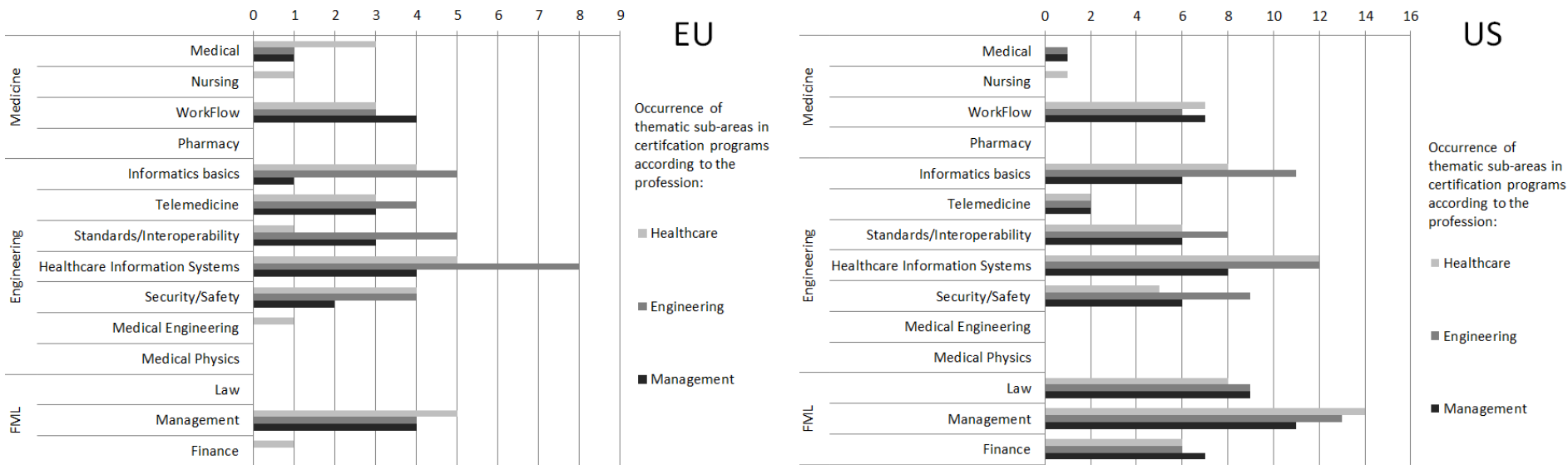
- 211 programs, 47 certifications

Figure 1. Occurrence of thematic sub-areas in certification programs according to the professions. Left: Within the EU; right: Within the US.

Study: State of the art in education in eHealth

- Great variety of educational programs
- Uneven distribution between target audiences
- Offerings adjusted to education for individual professions
- High presence of certification programs in the academic area in the US
  - Designed to meet the requirements of a broader target group
- Difference between EU and US: Coverage of the FML domain
- Importance of Standardization
- Programs not internationally coordinated and harmonized
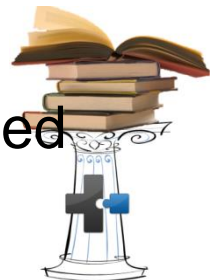
Survey - Requirements of user groups

- Basis: Analysis of contents of educational programs
- Participants:
  - Network partners
  - IHE Austria
  - HL7 Austria
  - Austrian Medical Chamber
  - Students from the University of Applied Sciences Technikum Wien

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Survey - Requirements of user groups

- Structure of the questionnaire
  - Personal information
  - Field of activity
  - eHealth
    - Relevance of applications
    - Use of knowledge areas related to eHealth
    - Opinion on content within the education in eHealth
- Responses: 61 questionnaires
  (41 professionals, 20 students)

Medical terminology – Fundamentals
Medical terminology – Coding system
Public health systems
Work flow, clinical pathways
Medical software development
Electronic data exchange
Programming
Databases
Software architecture
Decision support system
Standards/Interoperability
Healthcare information systems
Electronic patient record
Telemedicine/Telemonitoring
Medical imaging
Medical physics
Medical documentation
Mobile Health (mHealth)
Personalised Health (pHealth)
Ambient assisted living
Big data
Regulatory and legal issues
Security, Safety, Privacy
Health data management
Risk management
Project management
Process management
Change Management
Quality management
Knowledge management
Economics
Usability

Survey - Requirements of user groups

- Differentiation in professionals and students
- Further filtering criteria:
    - Profession
    - Education
    - Gender
    - Work experience in general and in eHealth (professionals)
    - Interest in eHealth (students)

Survey - Requirements of user groups

- Students (n=20)

Age	18-29	18
	30-44	2
	45-60	0
	>60	0
Gender	Male	15
	Female	5
Professions	Healthcare	4
	Engineering	16
	Management	0
Education	Austria	19
	Germany	0
	Switzerland	0
	Rest of Europe	0
	Outside Europe	1
Interest in eHealth	Very strong	4
	Rather strong	14
	Rather not	2
	Not at all	0
	I do not know the term.	0

Table 1. Characteristics of the students
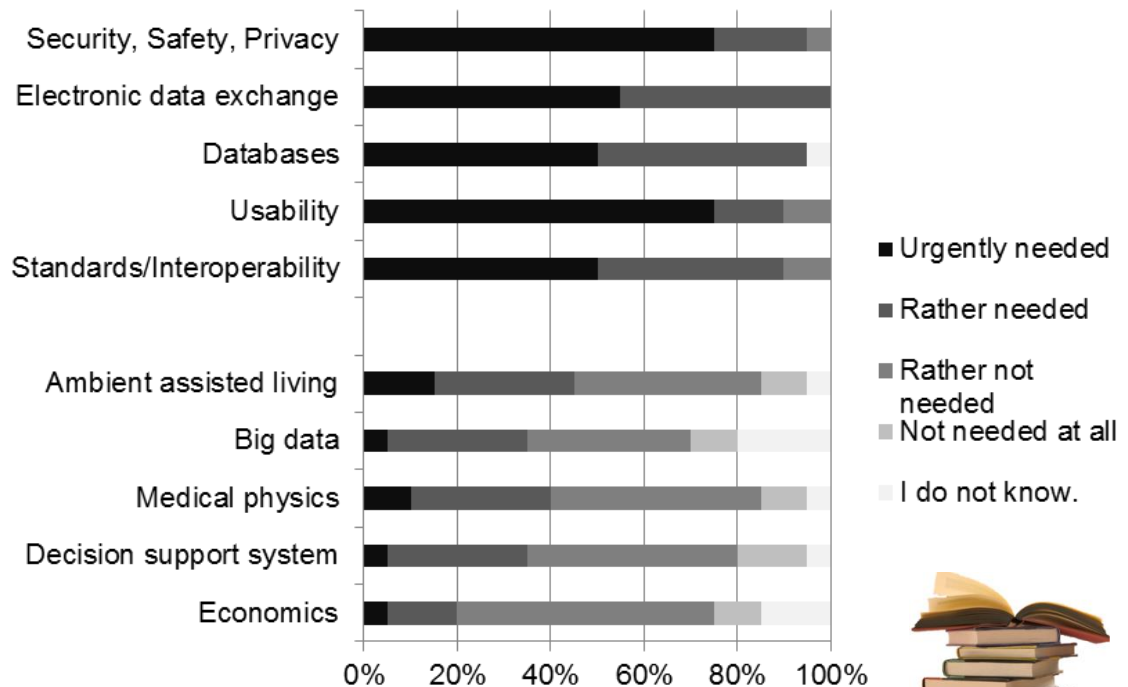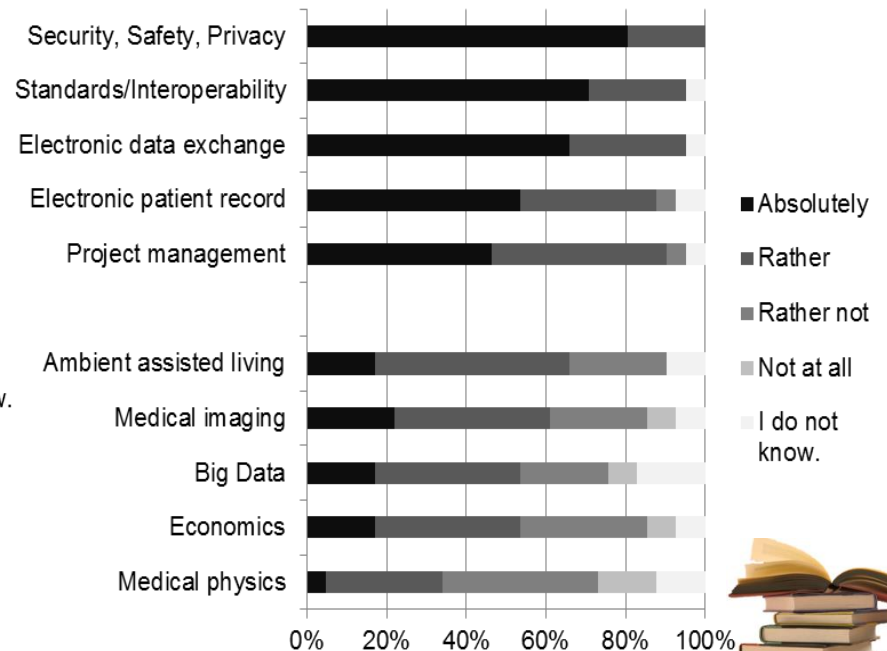

Figure 2. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of students

Survey - Requirements of user groups

- Professionals (n=41)

Age	18-29	15
	30-44	16
	45-60	9
	>60	1
Gender	Male	28
	Female	13
Profession	Healthcare	9
	Engineering	29
	Management	3
Education	Austria	36
	Germany	2
	Switzerland	0
	Rest of Europe	2
	Outside Europe	1

Work experience general	Less than 5 years		15
	For 5 - 14 years		15
	For 15 - 29 years		11
	For 30 years and longer		0
Work experience in eHealth		0	4
	Less than 1 year		2
	1 - 5 years		19
	6 - 10 years		5
	More than 10 years		11

Table 2. Characteristics of the professionals

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Survey - Requirements of user groups
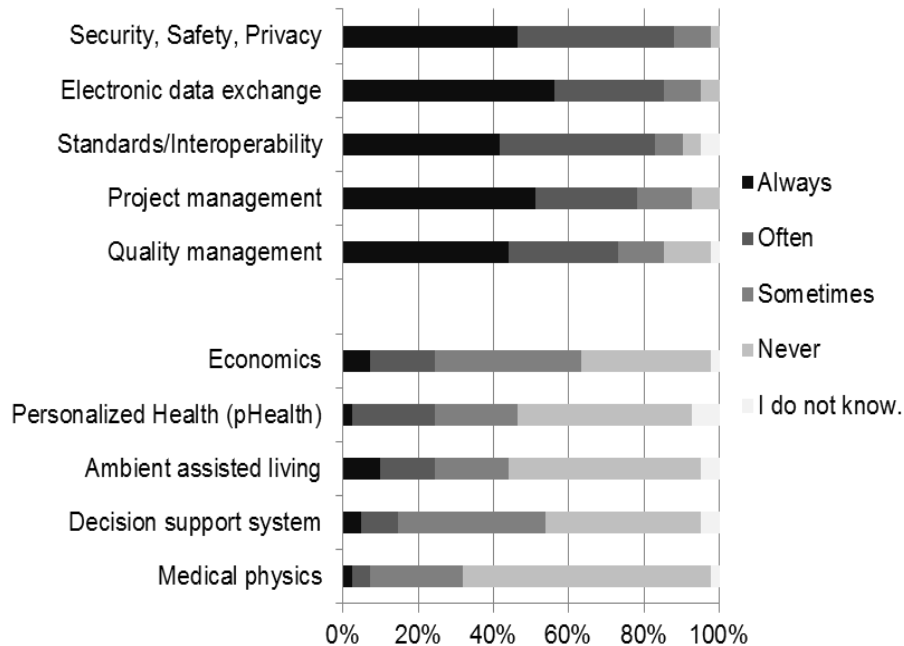
- Professionals (n=41)

Figure 3. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of all professionals

Figure 4. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of all professionals
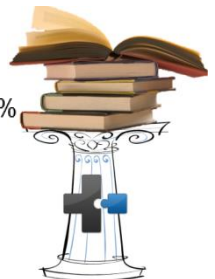
Preliminary results: First drafts of knowledge profiles

- Examples for roles
  - Physician
  - IT Architect
  - Lawyer
- Selected thematic content categories
  - IT/Engineering
  - Healthcare
  - Finance/Management/Law

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Preliminary results: First drafts of knowledge profiles

Thematic content category	Knowledge Area	Module	Physician	IT Architect	Lawyer
Engineering	Quality	SW-Dev Cycle	-	**X**	-
	Interoperability	Standards	X	**X**	X
		Application of standards (e.g. IHE XDS, ATNA)	X	X	X
	Security, Safety, Privacy	IHE Security	X	**X**	X
	Databases	Basics	X	**X**	X
	Health information system	EHR	X	**X**	X
		Health data management	X	**X**	X
	Usability	Principles	X	**X**	X

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Preliminary results: First drafts of knowledge profiles

Thematic content category	Knowledge Area	Module	Physician	IT Architect	Lawyer
Healthcare	Medical Terminology - Fundamentals	Wording	**X**	X	X
	Medical Terminology - Coding systems	Coding, classification	**X**	**X**	X

Preliminary results: First drafts of knowledge profiles

Thematic content category	Knowledge Area	Module	Physician	IT Architect	Lawyer
Finance Management and Law	Project Management	Activities, Systems	X	X	X
	Regulatory and legal issues	Medical device directive	-	X	**X**
		Data protection	X	X	**X**

EU – US eHealth Cooperation Initiative Workforce Development Work Group

It started with a Memorandum of Understanding

- In December 2010, the European Commission and the US Dept. of Health and Human Services signed a **Memorandum of Understanding (MOU)** to:
  - Help facilitate more effective uses of eHealth/Health IT;
  - Strengthen their international relationship; and
  - Support global cooperation in the area of health related information and communication technologies.

- In June 2013, Kick-off eHealth Cooperation Initiative

- In August 2013, Launch Workforce Development Work Group

Source: EU-US eHealth Cooperation Initiative Workforce Development Work Group: Panel Discussion, eHealth Forum 2014, Athens, Greece, May 2014.
http://wiki.siframework.org/Workforce+Development+Work+Group

Interoperability of EHRs

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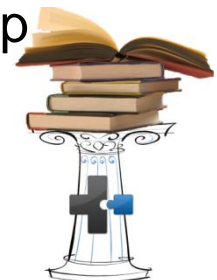
Workforce Development Work Group – Phases

- To successfully complete the activities the work group is breaking down the work into three phases:
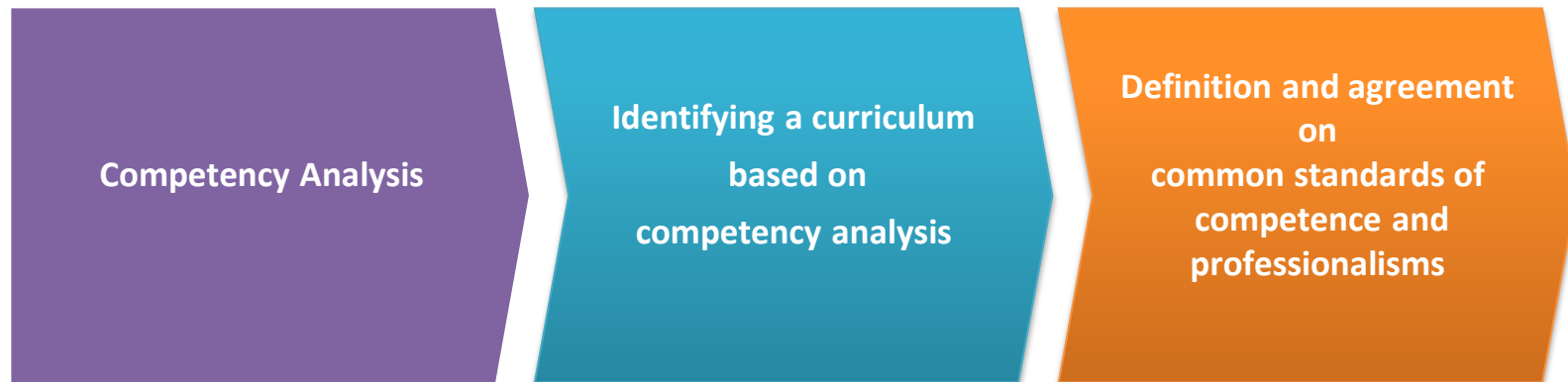
| Competency Analysis | Identifying a curriculum based on competency analysis | Definition and agreement on common standards of competence and professionalisms |

Source: EU-US eHealth Cooperation Initiative Workforce Development Work Group: Panel Discussion, eHealth Forum 2014, Athens, Greece, May 2014.
http://wiki.siframework.org/Workforce+Development+Work+Group

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Workforce Development Work Group – Classifications

- They categorized the roles into three classifications:
  - Domain (5):

    1. Direct Patient Care – 2. Administration, Management, Legal – 3. Engineering and Information Systems – 4. Informatics – 5. Research

  - Settings (2):

    1. Clinical – 2. Non Clinical

  - Skill Level (4):

    1. Basic – 2. Intermediate – 3. Advanced – 4. Expert

    IT Baseline Skills

Source: EU-US eHealth Cooperation
Initiative Workforce Development
Work Group: Panel Discussion,
eHealth Forum 2014, Athens,
Greece, May 2014.
http://wiki.siframework.org/Workforce
+Development+Work+Group

Workforce Development Work Group – Competency Matrix

- Sample of a Final Competency Matrix

Competency	Direct Patient Care - Basic	Direct Patient Care - Intermediate	Direct Patient Care - Advanced	Admin, Finance, Law, Management - Basic	Admin, Finance, Law, Management - Intermediate	Admin, Finance, Law, Management - Advanced	Informatics - Basic	Informatics - Intermediate	Informatics - Advanced	Research - Basic	Research - Intermediate
Know and apply the policies for accessing, collecting, entering, retrieval and storage of patient data for your role, as part of the appropriate patient care team	X	X	X	X	X	X	X	X	X	X	X
Determine what data is needed for specific functions of the EHR, where that data is located, and who has access to it		X	X		X	X	X	X	X		X
Access only those patient records for which you have a "business case" and "legitimate relationship" per your role, work duties, etc.	X	X	X	X	X	X	X	X	X	X	X
Understand the policies and procedures related to third party access, secondary use of information, disclosure and extraction of data related to the electronic health record		X	X	X	X	X			X	X	X
Recognise how health information systems can be used to coordinate patient care	X	X	X					X	X		
Recognise the role a complete medication record plays across the care continuum, including primary and secondary care		X						X	X		
Understand how health information exchanges and telehealth can improve care coordination between providers, increase access to specialist treatment and support regional models of service delivery		X	X			X	X	X	X		
Understand how clinical decision support systems work to help clinicians to make informed, evidence-based and best practice decisions		X	X					X	X		
Understand and responsibly use information processing tools to support health care professionals in their clinical decision making		X						X	X		
Identify the points of intersection between ePrescribing systems and clinical decision support systems		X	X			X			X		
Recognize the different types of clinical decision support systems, and describe how they can enhance clinical care	X	X	X					X	X		

Source: EU-US eHealth Cooperation Initiative Workforce Development Work Group: Panel Discussion, eHealth Forum 2014, Athens, Greece, May 2014. http://wiki.siframework.org/Workforce+Development+Work+Group

Outlook

- Referring to EU-US eHealth Cooperation Initiative Workforce Development Workgroup further steps will be:
    - Definition and description of skill levels
    - Definition of further roles and more detailed description of thematic content categories
    - Detailed description of knowledge and skills

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eLearning4eHealth Network

Thank you for your attention!

www.healthy-interoperability.at/ehl

Designing the optimal education for eHealth

Block 2: International experiences

- **Impulse statements from**:
  - Prof. Dr. med Sylvia Thun, FH Niederrhein – Germany
  - Justin Fyfe, Applied Research Manager (Software), Mohawk College – Canada
  - Prof. Luís Torres Pereira, University of Trás-os-Montes e Alto Douro – Portugal
  - Dr. Jan Muzik, Czech Technical University Prague – Czech Republic
- **Experiences and expertise:**
  - Target audience: Whom do we teach?
  - Content: What do they have to know?
  - Learning objectives and competence levels: Where and how far do we take them?
  - Materials and methods: How do we teach and assess?

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Designing the optimal education for eHealth

Block 3: Discussion

- Together with the attendees the educational eHealth landscape shall be discussed and the following items are covered.
- All participants will then:
  - Explore available educational offers
  - Discuss experiences, differences and cooperation's between disciplines
  - Identify gaps and potentials for the future
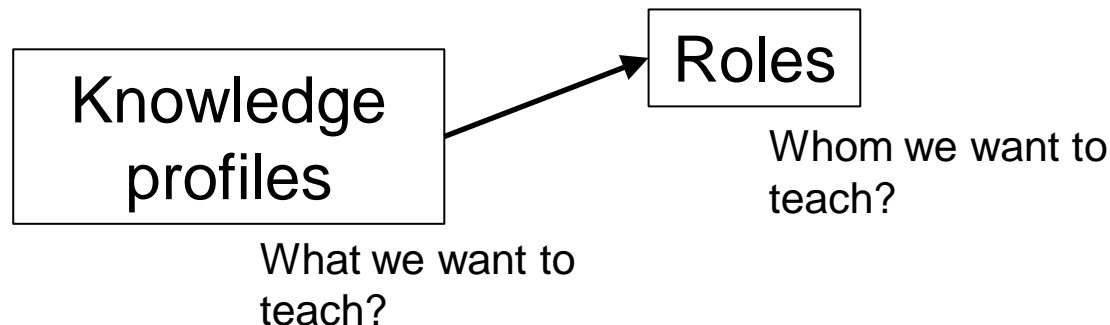
Knowledge profiles	Roles

Knowledge profiles → Roles

What we want to teach?

Whom we want to teach?

eLearning4eHealth Network

Thank you for your attention!

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Backup

Students – Professions
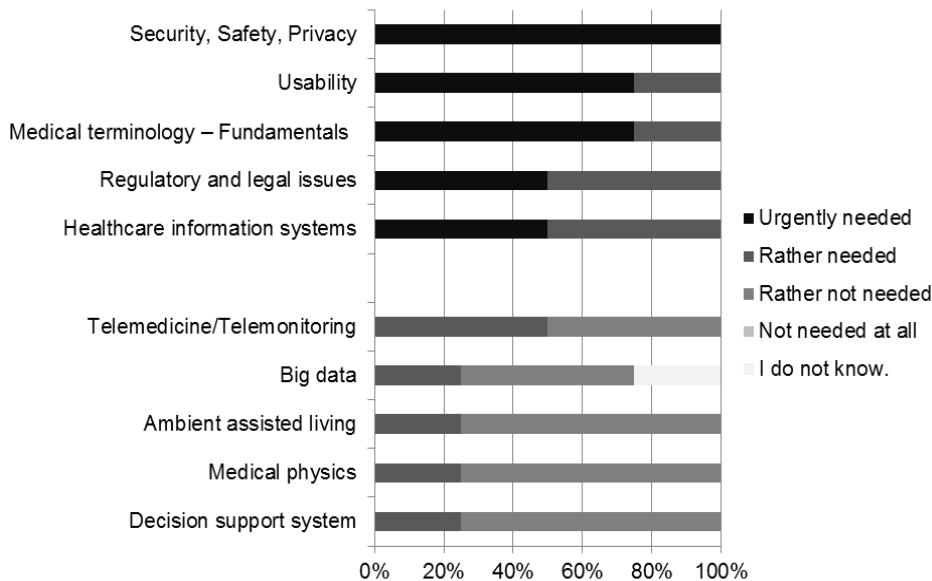
Figure 5. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of students in Healthcare
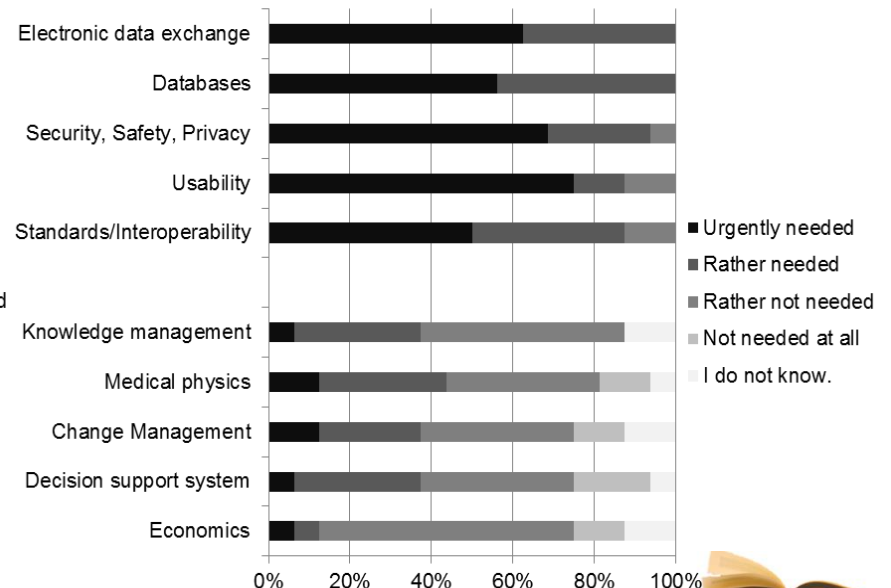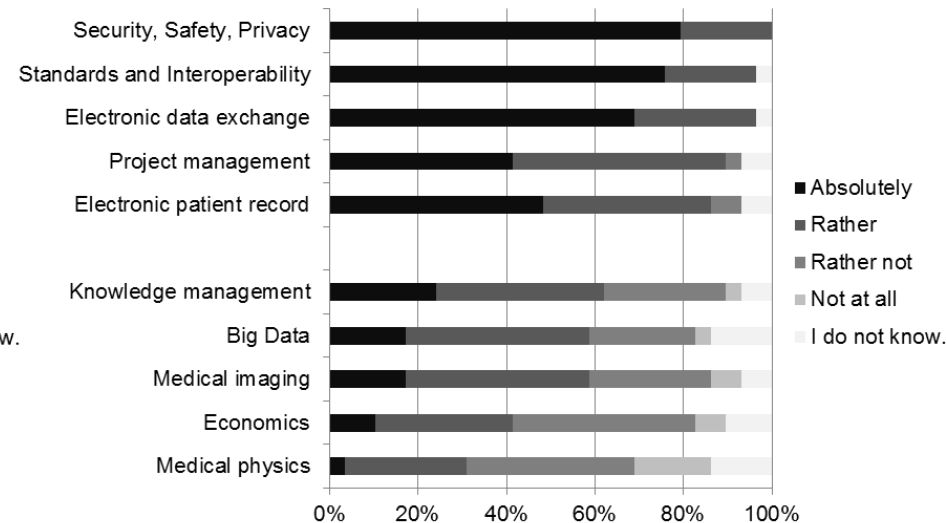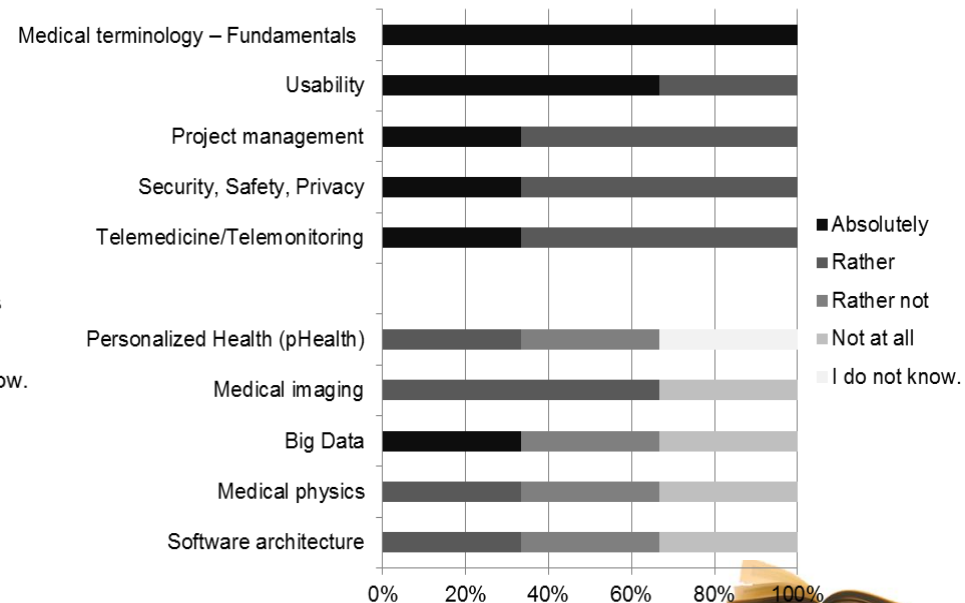

Figure 6. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of students in Engineering
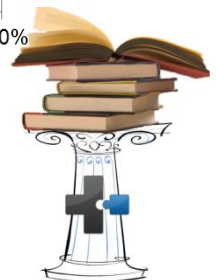
Backup

Students – Gender
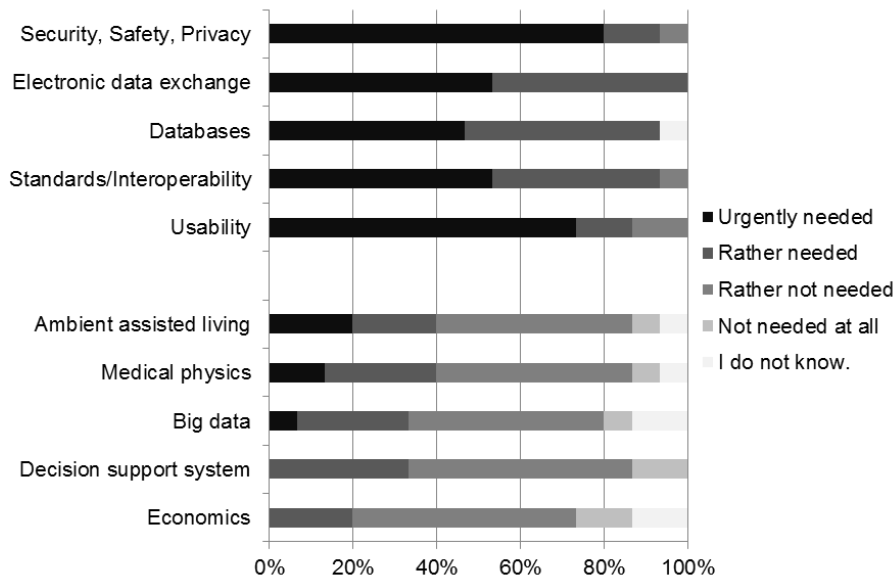
Figure 7. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of male students
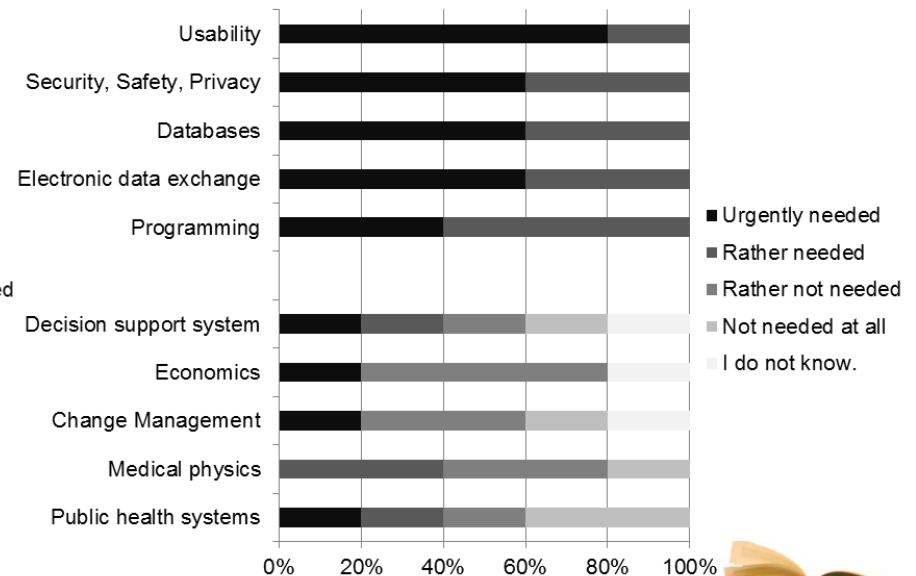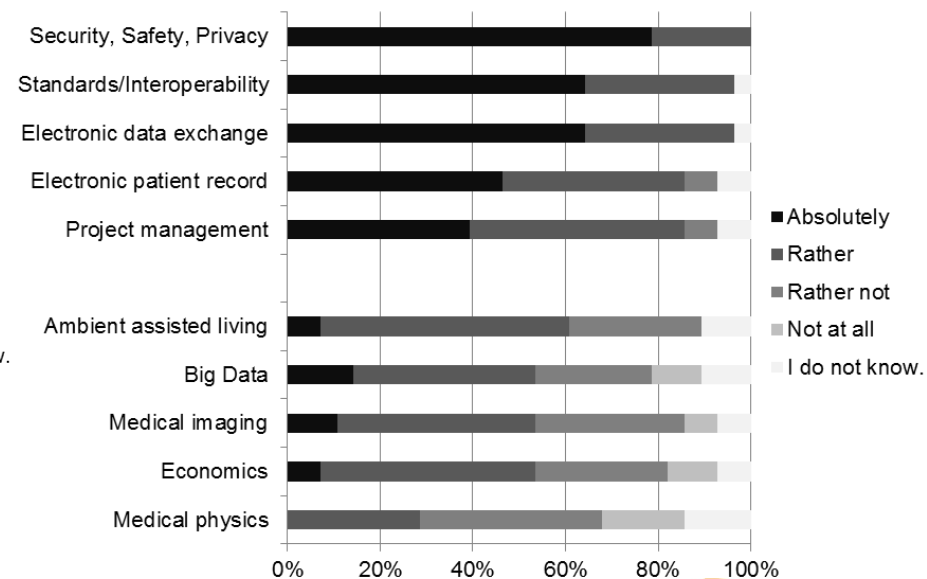

Figure 8. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of female students
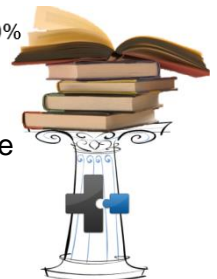
Backup

Students – Interest in eHealth
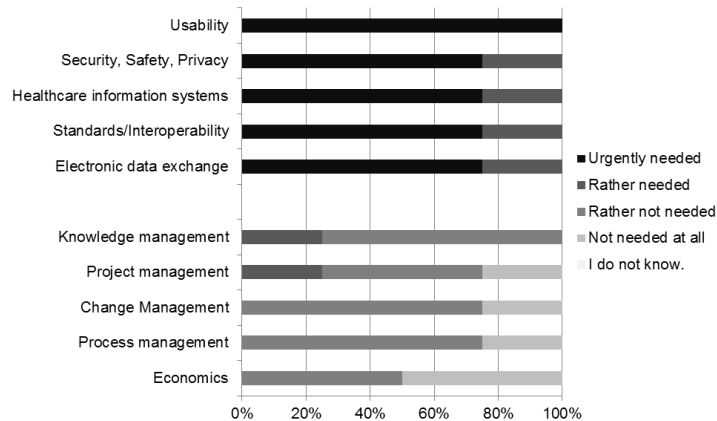
Figure 9. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of students with a very strong interest in eHealth
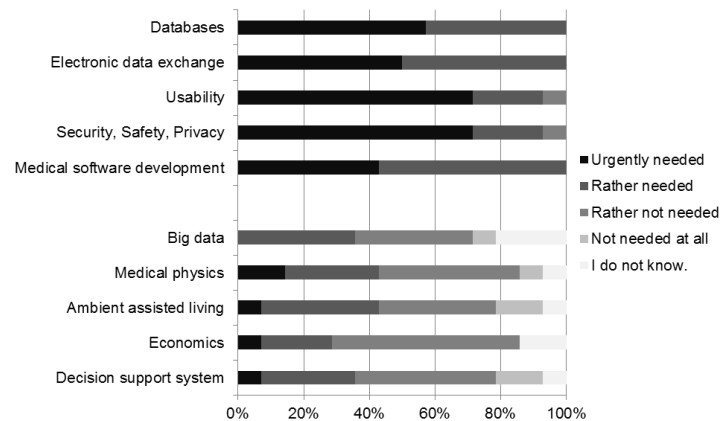
Figure 10. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of students with a rather strong interest in eHealth
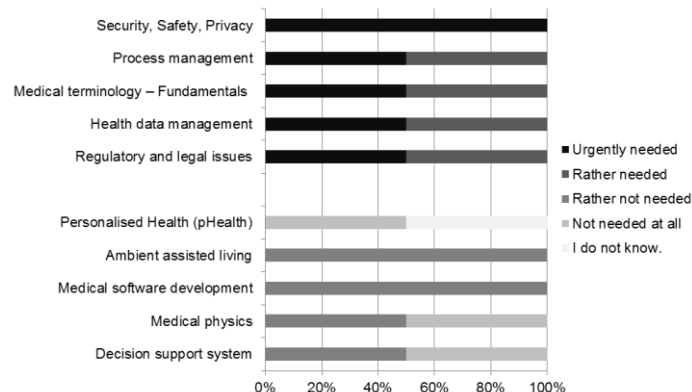
Figure 11. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of students with rather no interest in eHealth

Backup

Professionals – Healthcare
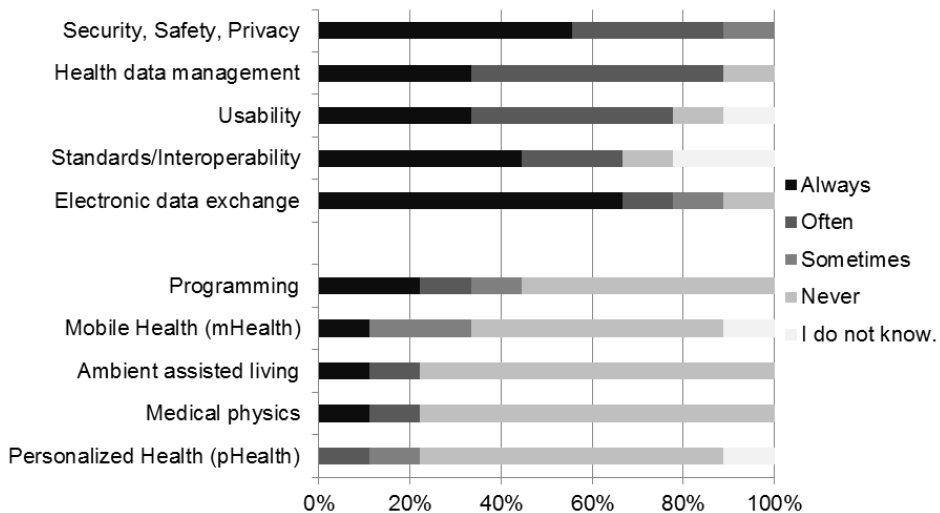
Figure 12. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals in Healthcare
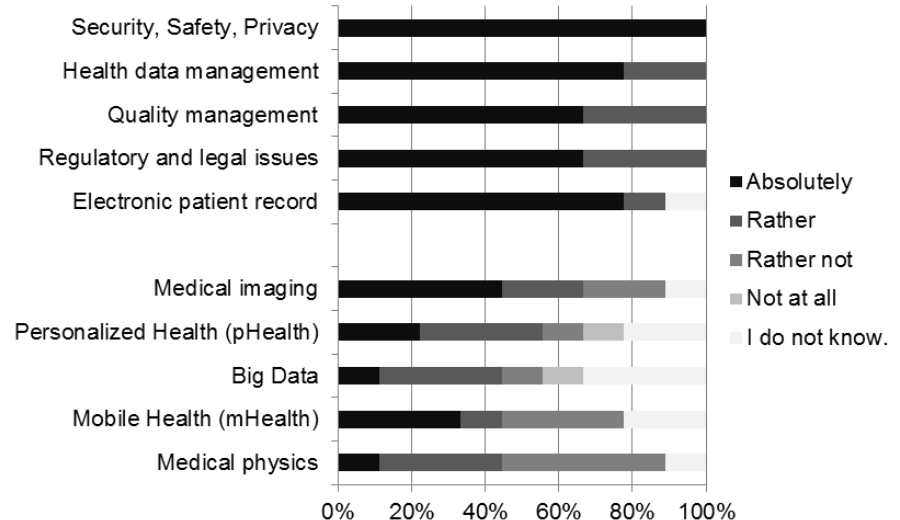
Figure 13. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals in Healthcare
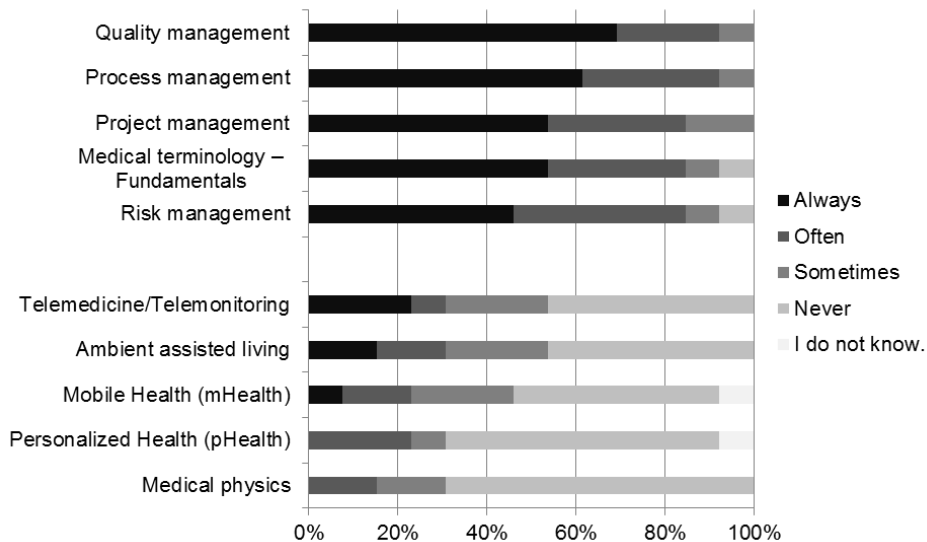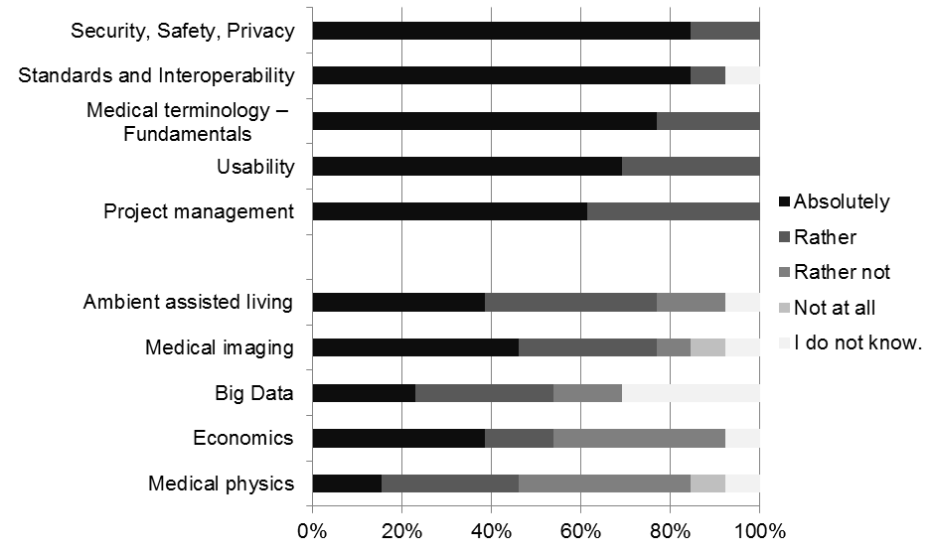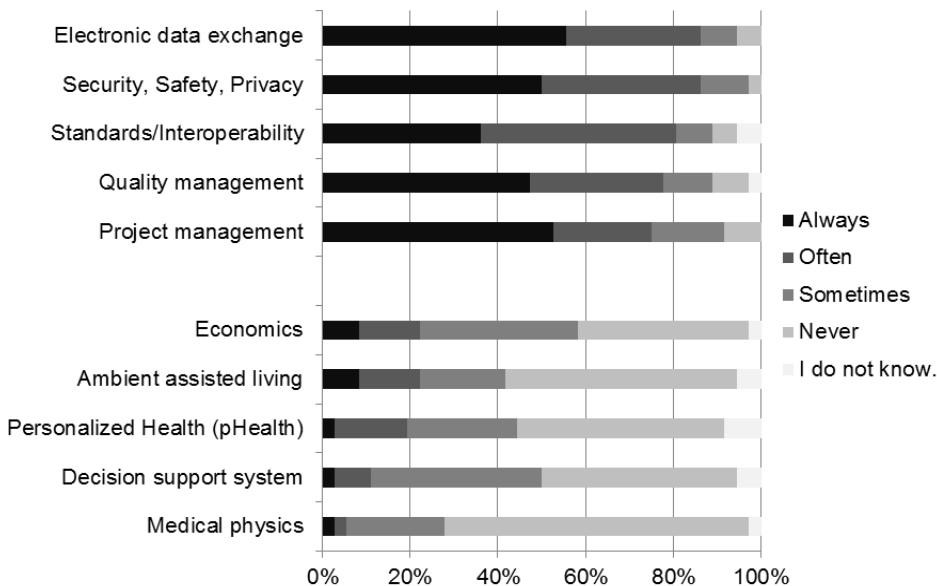
Backup

Professionals – Engineering
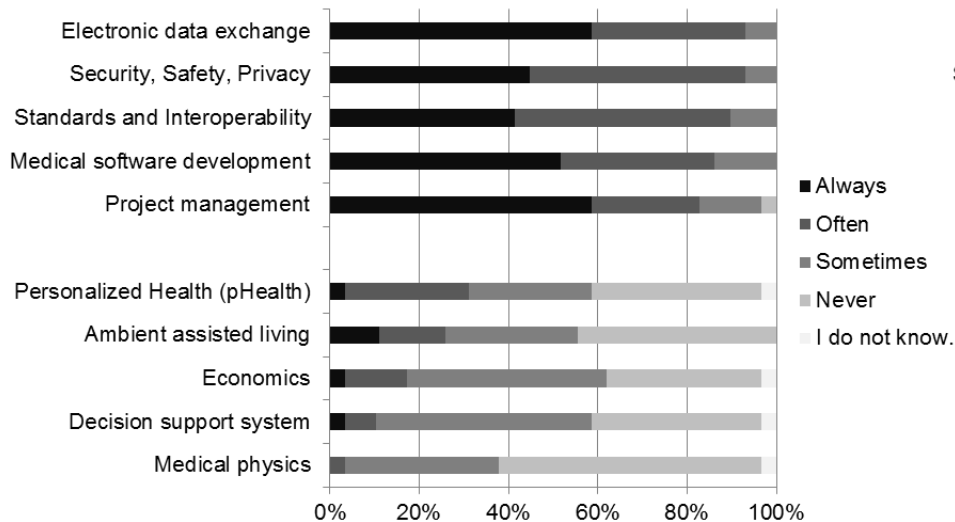
Figure 14. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals in Engineering

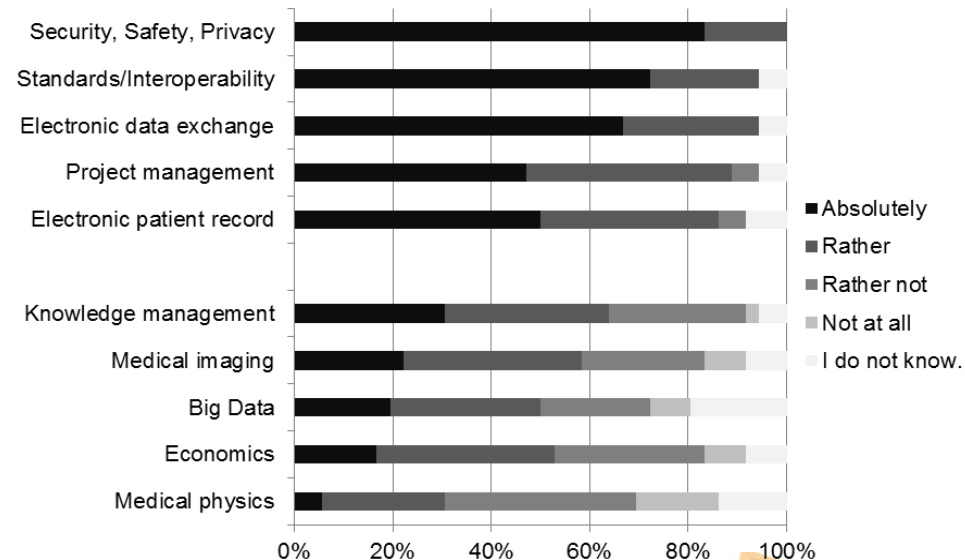Figure 15. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals in Engineering

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Professionals – Management
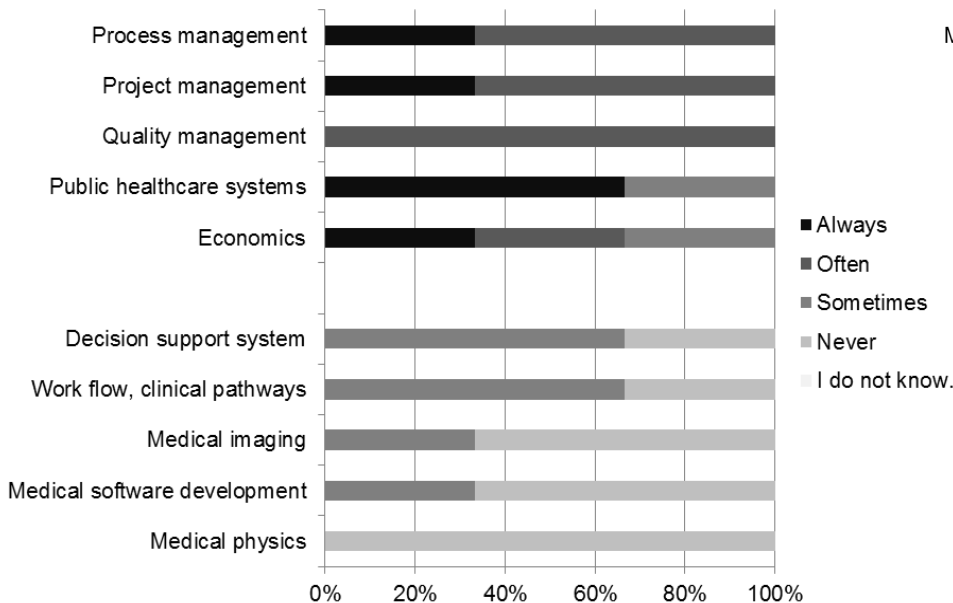
Figure 16. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals in Management

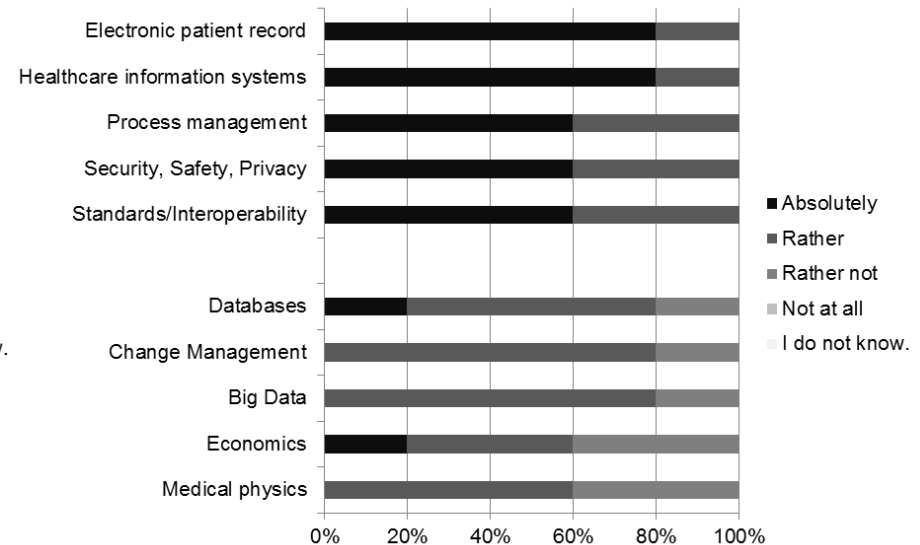Figure 17. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals in Management

Backup

Professionals – Male
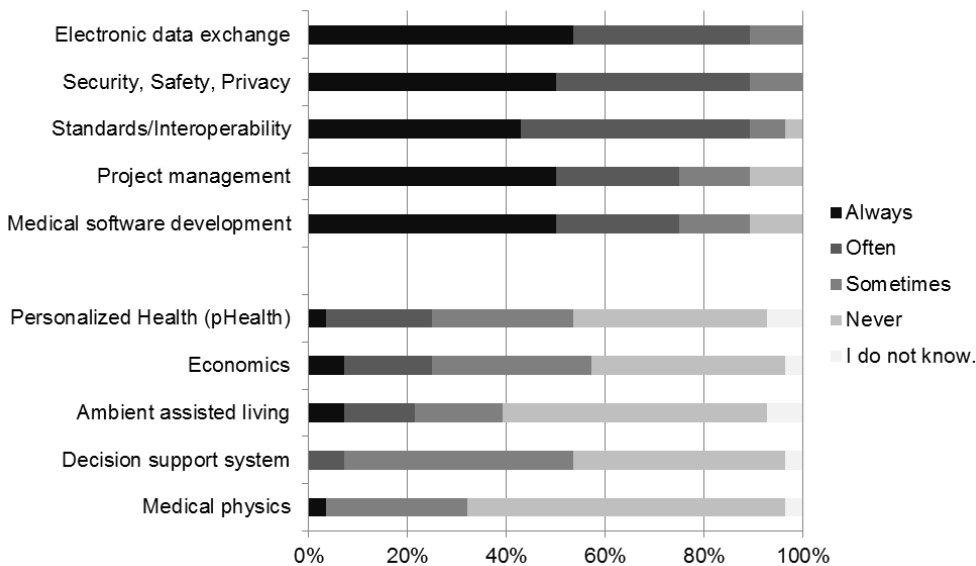
Figure 18. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of male professionals

Figure 19. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of male professionals

Backup

Professionals – Female

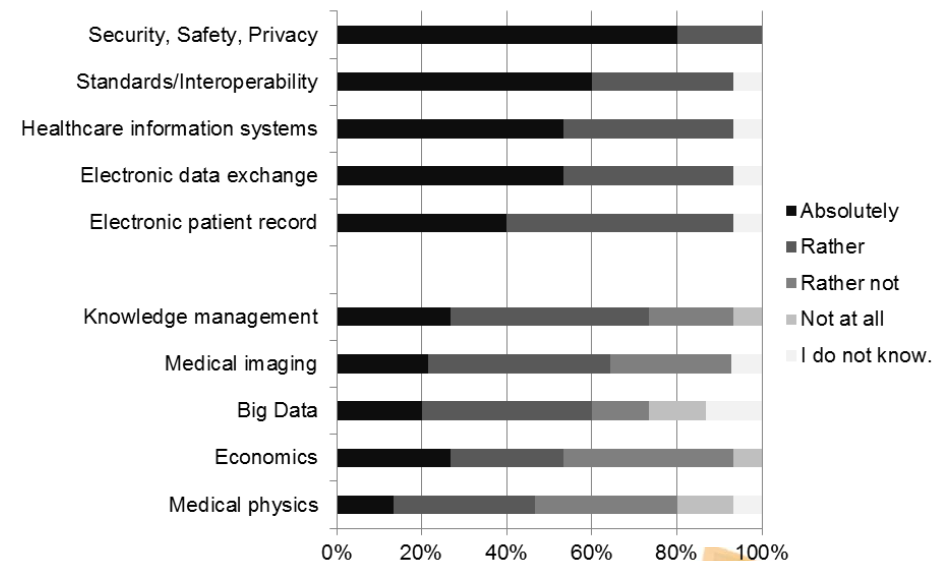Figure 20. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of female professionals

Figure 21. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of female professionals

Backup

Professionals – Education in Austria

Figure 22. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals completed their education in Austria

Figure 23. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals completed their education in Austria

Backup

Professionals – Education outside Austria
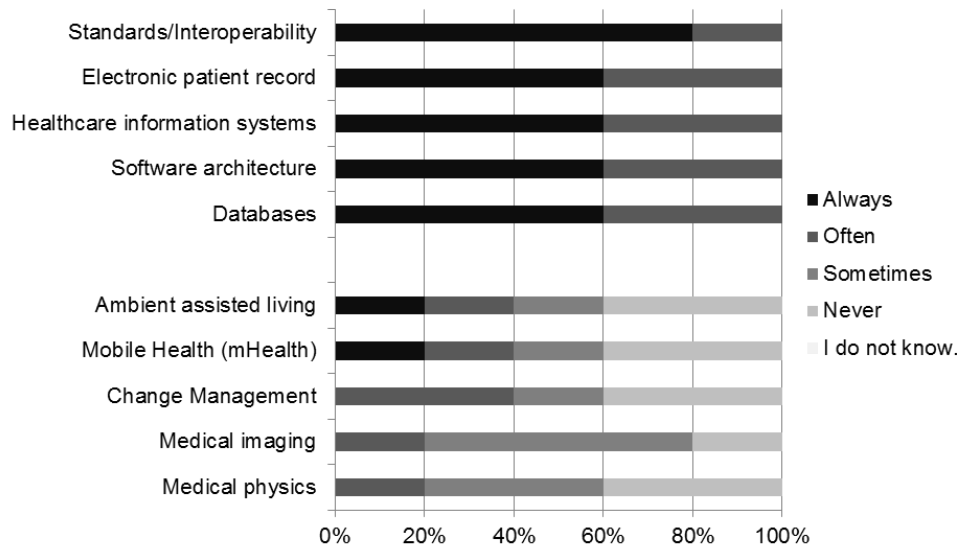
Figure 24. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals completed their education outside Austria

Figure 25. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals completed their education outside Austria

Backup

Professionals – Work experience in general <5 years
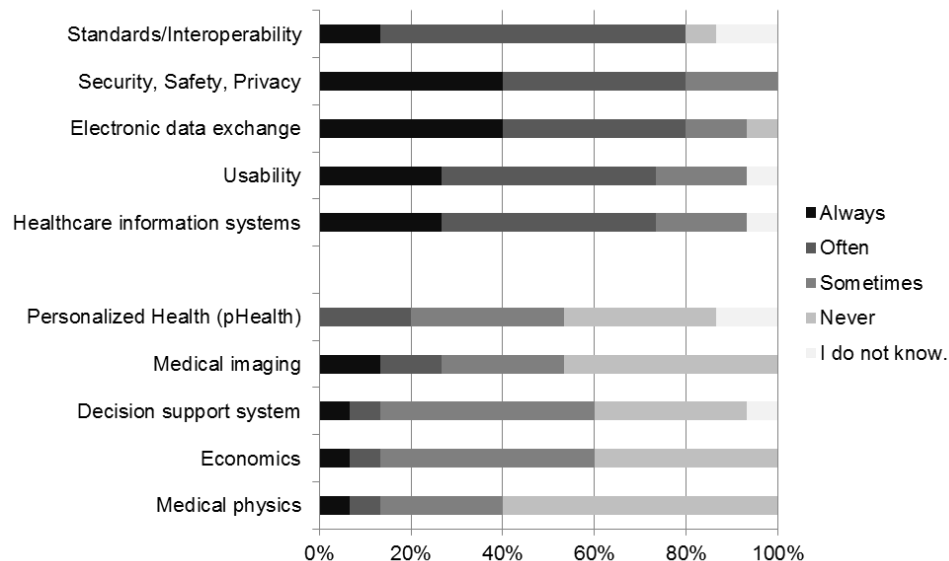
Figure 26. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals with less than 5 years work experience
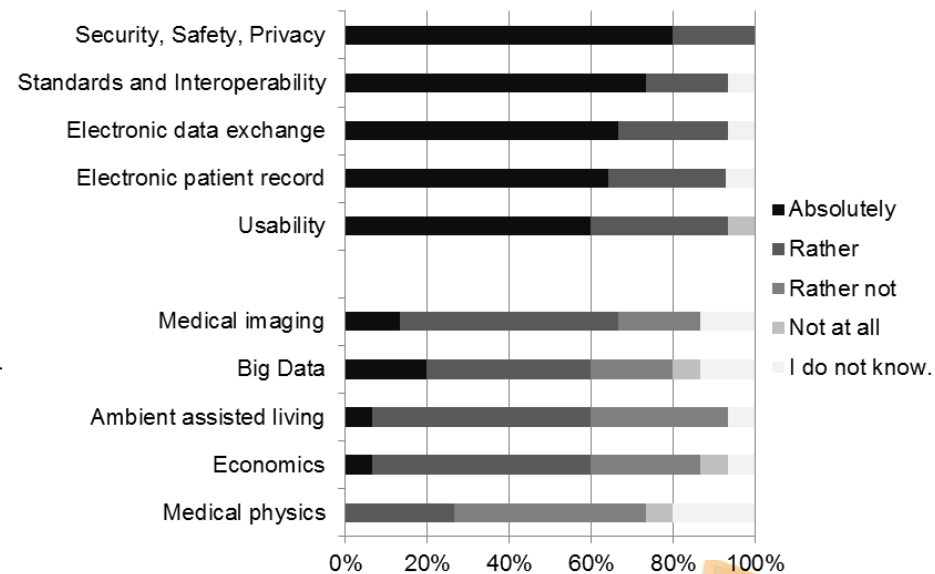

Figure 27. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals with less than 5 years work experience

Backup

Professionals – Work experience in general 5-14 years
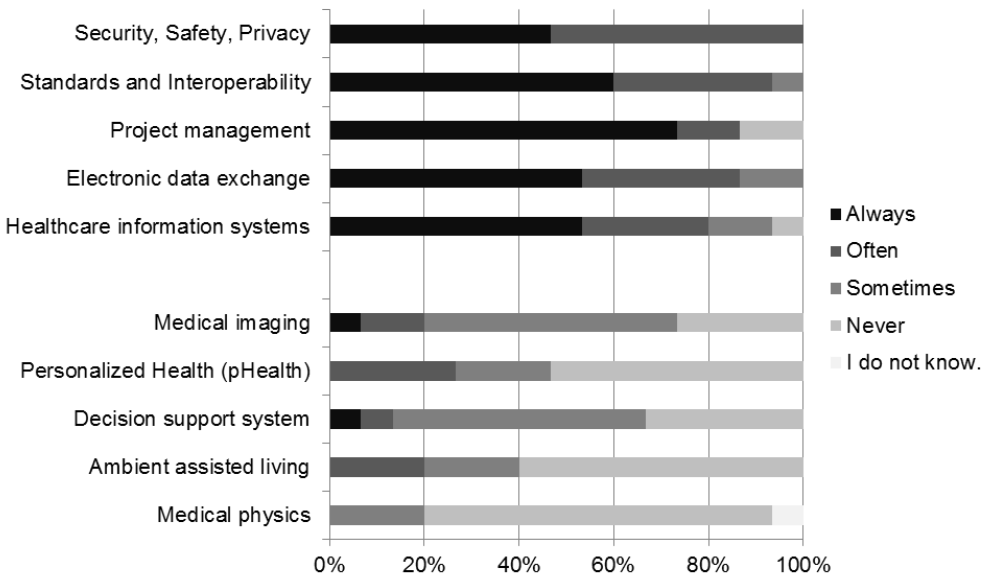
Figure 28. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals with 5-14 years work experience

Figure 29. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals with 5-14 years work experience

Backup

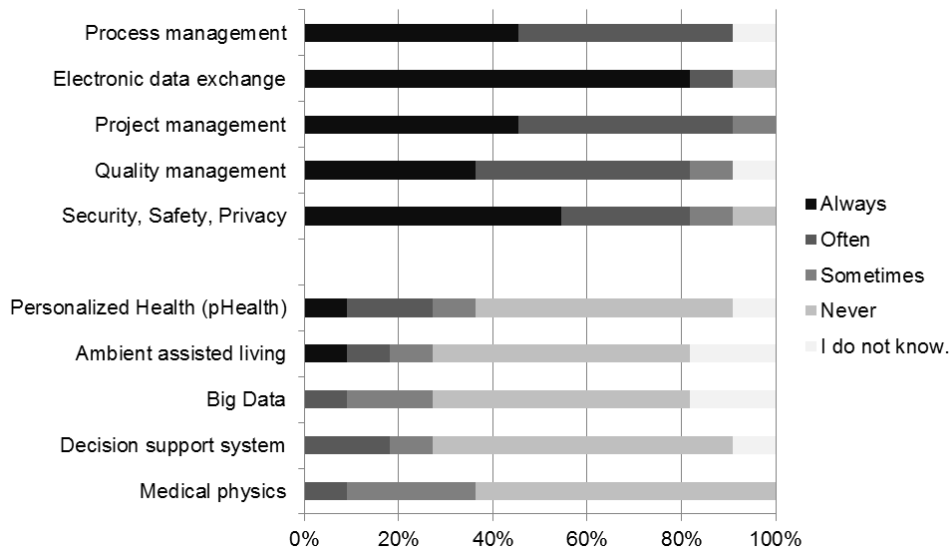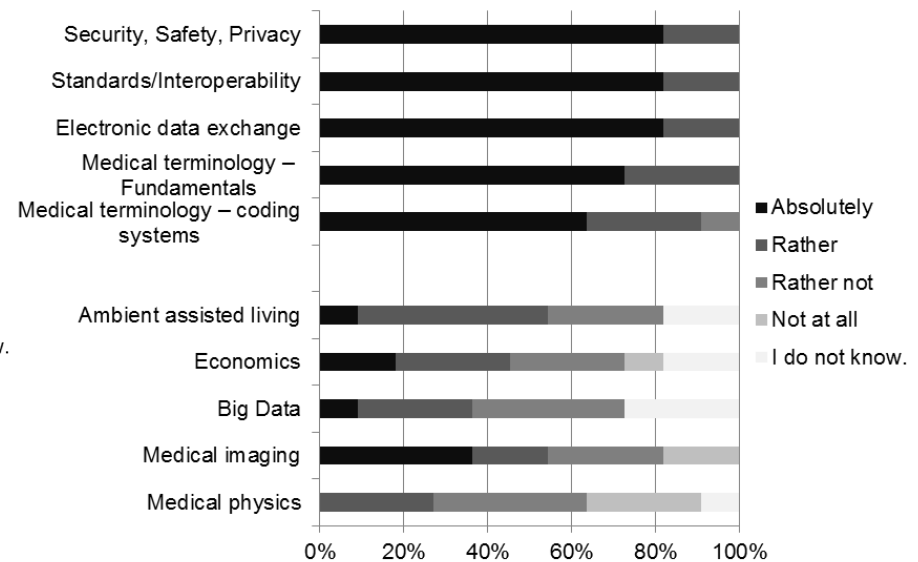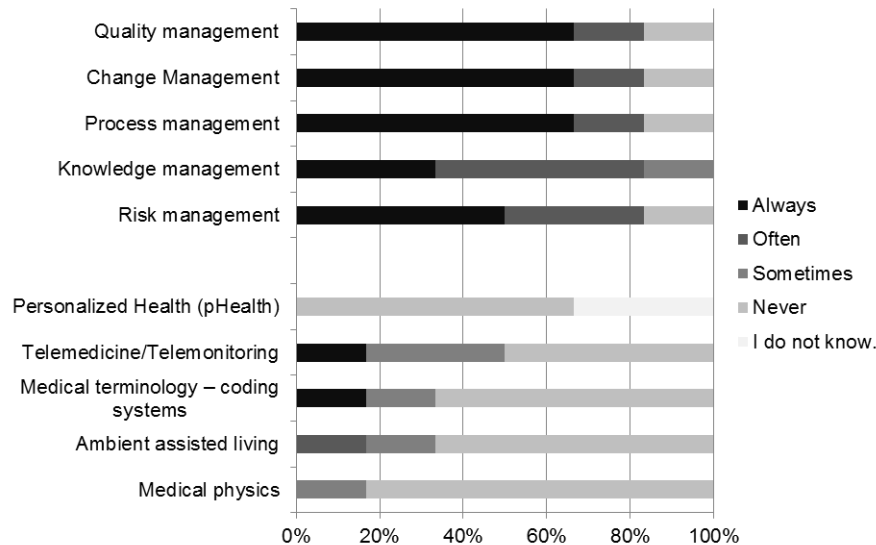## Professionals – Work experience in eHealth 15-29 years

Figure 30. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals with 15-29 years work experience

Figure 31. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals with 15-29 years work experience

Backup

Professionals – Work experience in eHealth <1 year

Figure 32. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals with less than 1 year work experience in eHealth
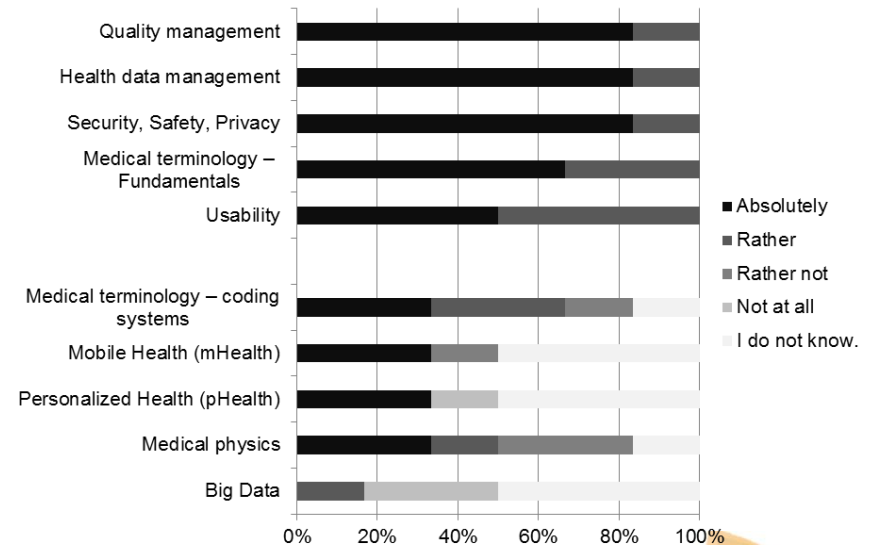

Figure 33. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals with less than 1 year work experience in eHealth

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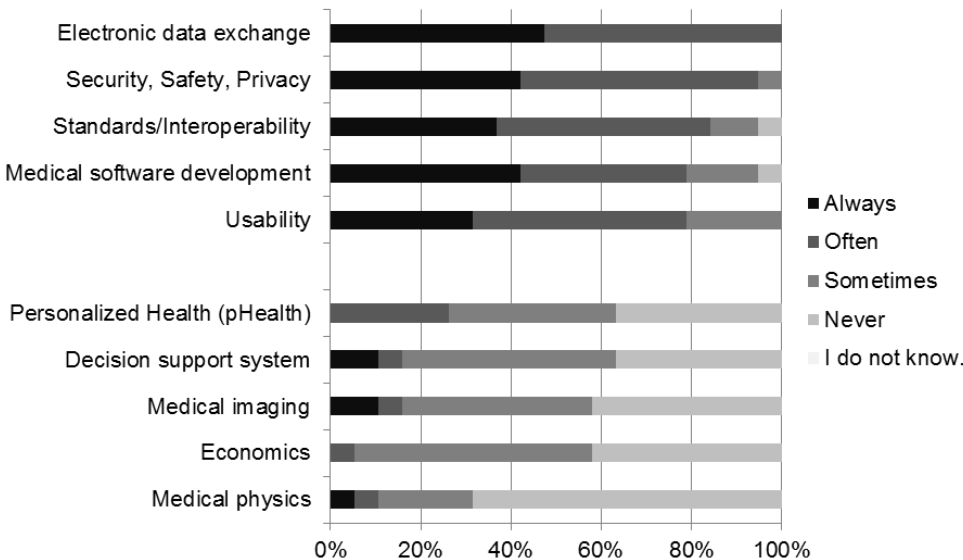## Professionals – Work experience in eHealth 1-5 years

Figure 34. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals with 1-5 years work experience in eHealth
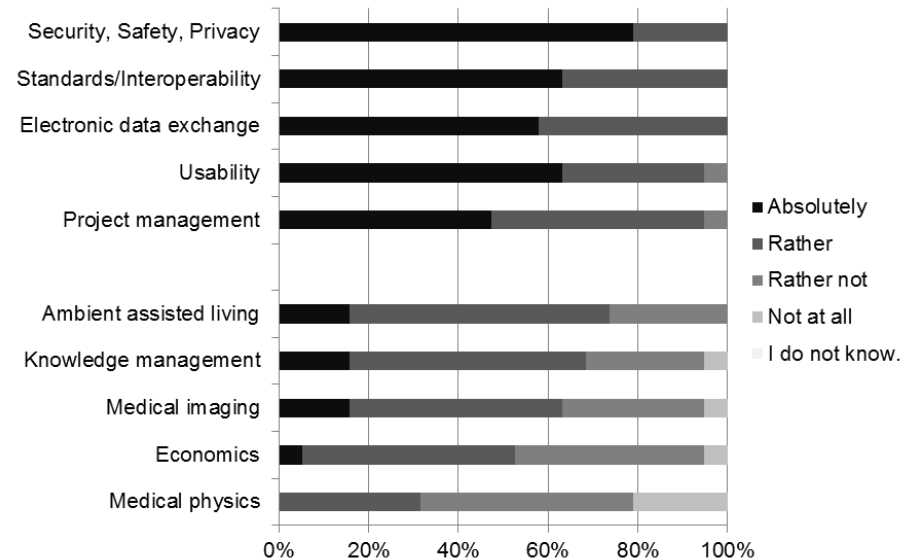
Figure 35. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals with 1-5 years work experience in eHealth

Backup
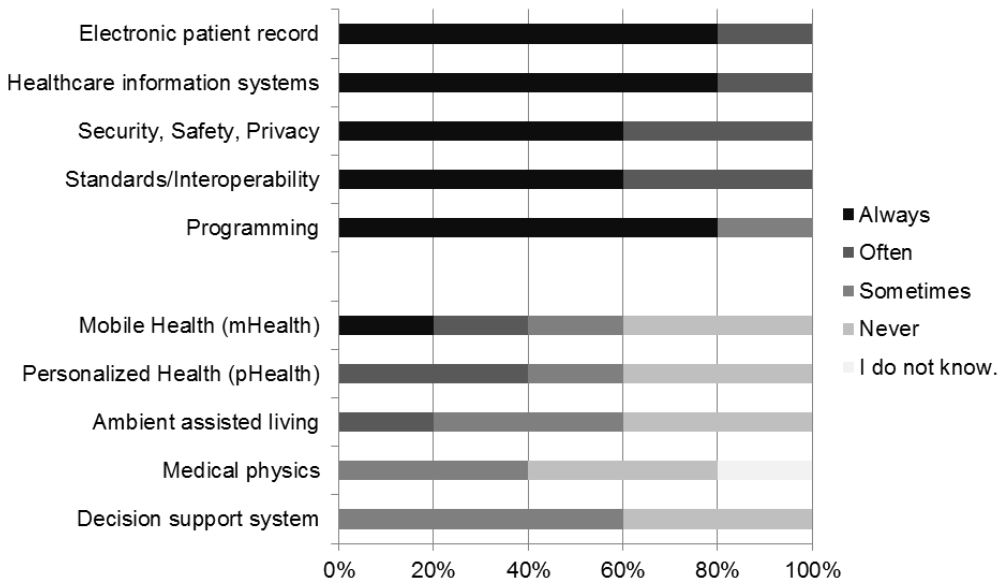
Professionals – Work experience in eHealth 6-10 years

Figure 36. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals with 6-10 years work experience in eHealth
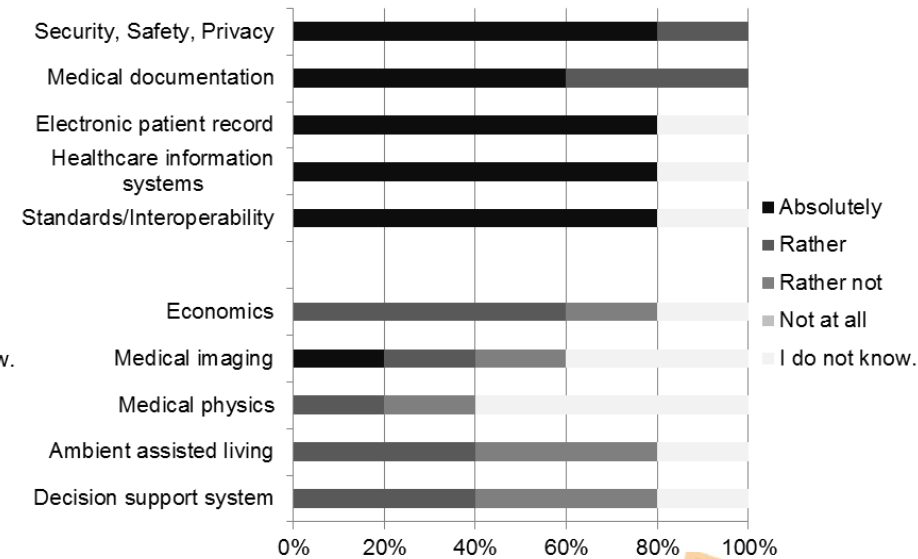

Figure 37. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals with 6-10 years work experience in eHealth

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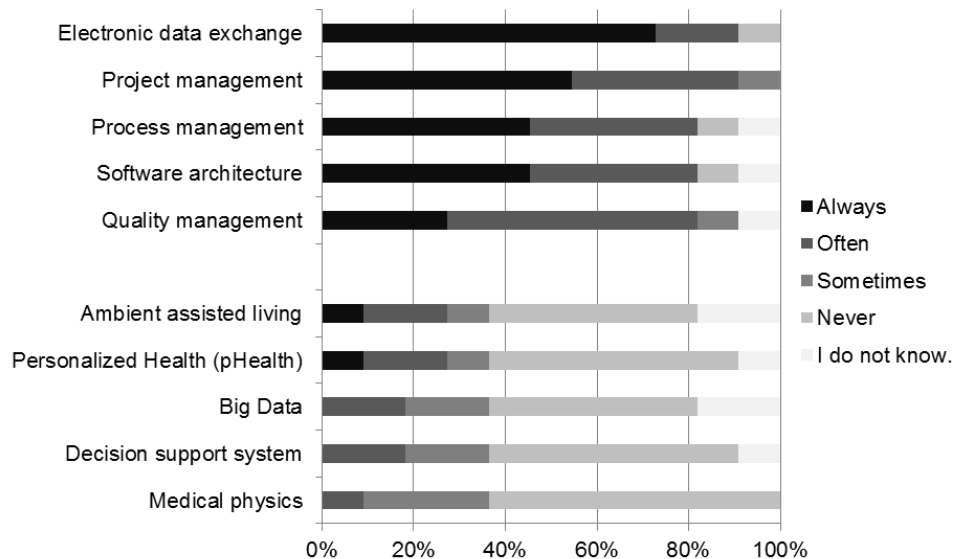## Professionals – Work experience in eHealth >10 years

Figure 38. The 5 most and the 5 least used knowledge areas to work in the field of eHealth of professionals with more than 10 years work experience in eHealth
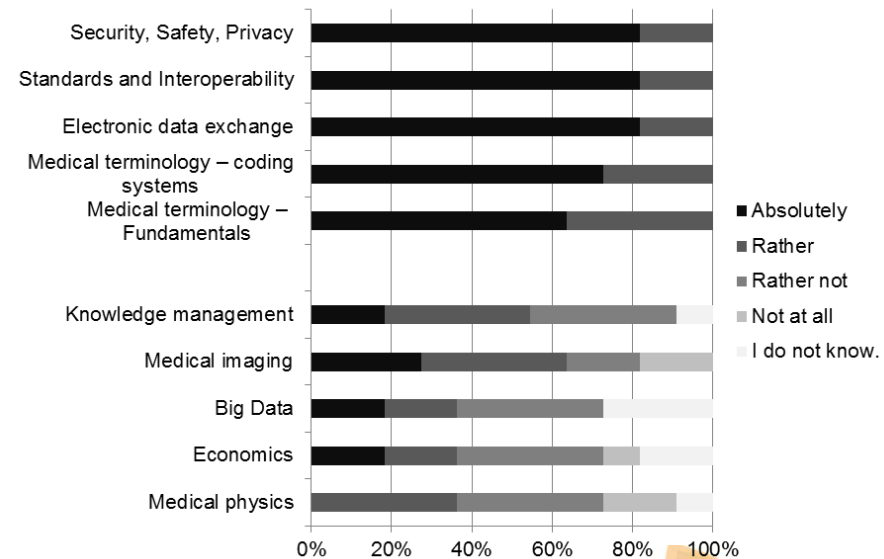

Figure 39. The 5 most and the 5 least necessary knowledge areas to work in the field of eHealth in the opinion of professionals with more than 10 years work experience in eHealth