universität Witten/Herdecke

Digital Upskilling: A joint task for the future of healthcare provision

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PREFACE

Frontline health professionals generally show great openness to new technologies. This is a key insight and revelation from our research and a shared experience from our communities of practice on digital transformation in healthcare. Digitalization, therefore, has long been accepted and embraced. Health professionals know with full certainty that the future of healthcare will require more digitally enabled inter-professional and intersectional collaboration. Consequently, it is a broad consensus that the digital transformation will require all professions to expand or rebuild their competencies: a so-called „digital upskilling".

Therefore, it is time to discern and demystify its tangible benefits and how they relate to health professionals' roles and responsibilities, as well as the implementation of new applications and necessary changes in organizational structure, processes, and culture in this new digital era.

This White Paper tackles this complex subject and provides a concise state of knowledge for professionals and executives in the healthcare sector. It is organized as follows: We introduce reasons and explanations for digital upskilling and present major application scopes. A use case for digital documentation exemplifies health professionals' crucial role in creating value from data. We introduce five skill types and illustrate different expressions of skills with profiles of fictitious professionals („personas"). The „personas" are designed to be comprehensible and tangible for our readers, emphasizing that digital upskilling is a joint effort. Subsequently, we present challenges and paths to success, closing with key takeaways.

We want to take this opportunity to thank our partners in business and academia for the valuable collaboration, and the state of North Rhine-Westphalia, especially the NRW Ministry of Economic Affairs, for financial grants to the ATLAS project.

Witten, October 2023

VOICES

from the healthcare sector

Prof. Dr. Sven Meister
Health Informatics Scientist

„No health professional needs to become a coder, but having a grasp on tech tools? That's a game-changer."

Prof. Dr. h.c. Christel Bienstein
Nurse Scientist

„Using a tablet for nursing documentation isn't harder than using paper. In fact, it's a genuine advancement toward proficient and safe patient care and projects a modern, professional image in our field."

Dr. Holger Raphael
Hospital CEO

„For me, going digital isn't about buzzwords. It's about giving our teams the right tools to fulfill their roles even better."

Pascal Fischer, MD
Thoracic Surgery Resident

„Digital skills are as crucial as medical knowledge. They empower us to personalize patient care and stay updated with the latest advancements."

Dr. Bernadette Klapper
CEO of The German Nurses Association

„Imagine nurses in their full scope of practice, digital skills included: How beautiful this would be for the nursing profession and even more for our patients.“

Sami Gaber, MD
General Practitioner, Chief Medical Officer

„Tomorrow's medicine is taking a quantum leap as we translate the vast amount of routine medical information from primary care practices into treatment recommendations.“

Dr. Dominik Fenske
Head Hospital Pharmacist

„Digital documentation of medications brings consistency and accuracy. It's safer for our patients, and more efficient for us.”

Dr. Julia Sattelberger, MD
Anesthesiology Resident

“The ability to effectively use digital tools enhances patient care, enabling quicker diagnosis and treatment.”

Prof. Dr. Manfred Wojciechowski
Computer Scientist

„Getting feedback from the people actually using our software? It is paramount. Their input ensures we build tools that are both functional and user-friendly.“

EXECUTIVE SUMMARY

Digital upskilling is high on the strategic agenda of healthcare executives.
Digital transformation permeates the core processes of health service delivery. It provides opportunities to improve patient care and has the potential to ease the workload of health professionals. Healthcare providers must equip their staff with the digital skills they need and lead organizational change for the digitalized future of healthcare provision.

Data literacy and awareness of data safety are crucial.
Digital transformation involves many professions and results in intricate systems of competencies and responsibilities. Evaluating the strengths and limitations of different data sources and content is mandatory for all professional activities in healthcare. Given the confidential nature of health data and taking into account the rising number of data breaches, an in-depth understanding of information safety and cybersecurity is also indispensable. Further, ethical considerations and collaboration are essential in healthcare provision in digital workflows.

Value creation from data starts with health data management and documentation.
Electronic health records are a fundamental prerequisite to increasing patient safety and allowing information and communication to flow between shifts, professions, departments, and organizations. Anonymized and aggregated data can help identify trends in public health and shed light on patient needs for improved or innovative products and services. Frontline health professionals must understand the value of maintaining flawless digital documentation for their patients.

Not every professional has to master all digital skills.
Barcodes, sensors, tracking devices, service robots, and clinical decision support systems with or without AI provide many opportunities to facilitate the work of healthcare and administrative professionals. Wearables and applications can offer additional personal health data. For now, the potential of workflow enhancement in healthcare organizations is barely tapped and needs differentiation of competencies. Developing specialized digital skills will open new career paths for health and administrative professionals.

Today‘s digital upskilling will be the new normal tomorrow.

Health professionals‘ competence development involves costs for training programs and time and space to learn, adapt, and feel confident using digital applications. A diverse set of learning resources and flexible learning opportunities are necessary but insufficient prerequisites. Health professionals need to understand the value of digital transformation for their patients‘ good as the best motivation to develop their digital skills continuously.

Digital upskilling is an investment in the future.

Investing in health professionals‘ competence development involves costs for training programs and time and space to learn, adapt, and feel confident using digital applications. A diverse set of learning resources and flexible learning opportunities are necessary but insufficient prerequisites. Health professionals need to understand the value of digital transformation for their patients‘ good as the best motivation to develop their digital skills continuously.

Closing the digital skills gap is a top leadership responsibility.

Developing professionals’ digital skills is critical to healthcare organizations‘ competitive advantage and future viability. As digital transformation touches all organizational points, a profound cultural shift will be required to create a work environment that fosters learning, adaptability, and change. Management and senior executives must encourage and empower their teams to embrace digital change.

1.

Why is digital upskilling relevant for the provision of healthcare?

Digital transformation has revolutionized healthcare, from electronic documentation and e-prescriptions to significant advancements in artificial intelligence (AI) and robot-assisted treatments. Big data, improved analytics, telemedicine, and other technologies provide numerous opportunities to improve patient care and promote precision medicine and personalized healthcare.

Demand for health practitioners and services is consistently increasing as digitalization progresses relentlessly in various sectors. Healthcare providers have realized that digital transformation is essential for elevating healthcare quality and strengthening business-client relationships. It opens up new business opportunities and innovative business models while improving patient experiences and overall population health and reducing costs. Digital innovations have the potential to ease the workload of healthcare professionals, streamline communication among stakeholders in healthcare, and give patients more power to play an active role in their care.

However, digital transformation is more than just investing in technology. It involves fully integrating digital technologies into all aspects of a business requiring providers to alter their existing activities, processes, stakeholders, and assets, resulting in new forms of value by creating innovative products, services, and solutions. This profound transformation affects multiple aspects of organizations, including restructuring their culture, developing digital growth strategies, procuring digital resources, and establishing suitable metrics and goals. It also involves changes to employee participation and responsibilities as digital transformation is imposing heightened requirements on employee skills and qualifications.

Digital Upskilling - the enhancement of digital expertise - emerges as a crucial factor for the future readiness of healthcare provision and business success. It emphasizes broadening employee capabilities to equip them for various organizational roles and responsibilities. Healthcare practitioners must continuously improve and refine their skills and knowledge. By mastering digital skills, they can integrate new technologies into their professional roles and actively engage in their organization's transformational procedures. This requires laying a cultural foundation, providing additional training programs for healthcare personnel, and adjusting work processes, provision of services, and legal frameworks.

2.

How does digital transformation manifest itself in the healthcare sector?

The digital transformation encompasses a broad assortment of technologies and opportunities. These include, for instance, digital documentation and paperless data management, workflow enhancements and process automation, decision support through artificial intelligence and assistive systems, and the potential for online interactions between patients and healthcare professionals.

Digital documentation and paperless data management:
Patient medical records are central to digitalization in healthcare, where accurate information at the right place and time is paramount. The use of digital documentation systems and advanced information and communication technologies among healthcare providers and care services, prompt access to personal information, can be ensured at critical junctions. The digital consolidation of crucial information such as detailed medical reports, diagnostic test results, and medication plans, allows practitioners seamless access to post and review documents, enabling continuous and personalized healthcare. On the side of the patient, access to health information through a single location, i.e., a website or smartphone app, fosters patients' self-management and empowers to actively shape their health journey. Furthermore, data management is of immense value at the organizational level, where high-quality information can help ensure effective operational workflows and business success. From a macro perspective, it can also help predict health trends, identify rare effects, and discover previously unknown correlations within populations at regional or national levels, thereby offering new insights into public health.

Real World Data (RWD) can come from health professionals as part of their routine assessments, as well as medical registries, electronic patient records, health insurance claims, or patients' mobile devices. The vast amount of health data being generated is analyzed to great effect by health informaticians using data science techniques. Thereby, essential insights to inform medical decisions and predictive models for diagnostics are being developed. However, the quality and nature of the data being processed are of high importance to produce optimal results. The key challenge of digital information and paperless data management, therefore, is the prompt and thorough collection of high-quality data with minimal errors at regular intervals. The information should be uniformly presented and easily accessible in a user-friendly and understandable format in a standardized system.

USE CASE

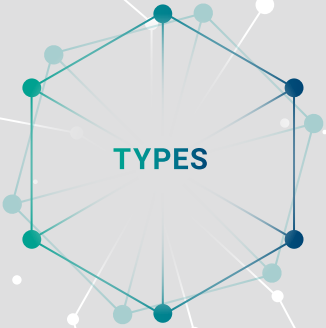
Digital Treatment and Care Documentation

TYPES OF DIGITAL DOCUMENTATION

Manual Entry:
Health professionals input data using tablets or computers.

Speech-to-Text Systems:
Speech recognition technology to transcribe spoken words into text in real-time.

Smart Dressings/Implants:
Sensors relay information directly to a wound documentation system.

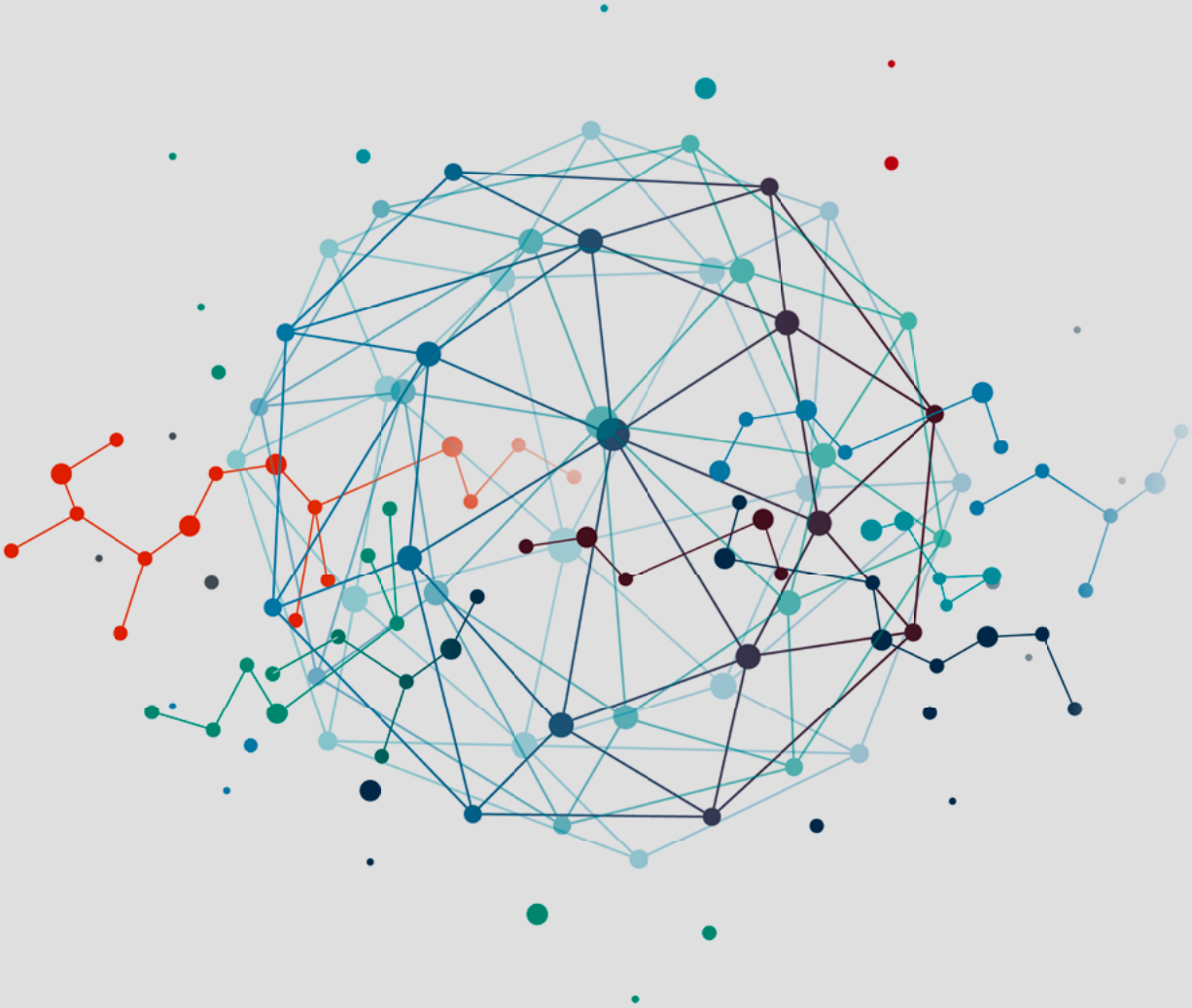


Internet of Things (IoT):
Documents the usage of medical devices, signaling the IoT cloud with a single button press by health professional (example).

Tracking Systems (RFID/ NFC Tags/Barcodes):
Used for patient identification or tracking movable items such as measuring devices or auto-mating inventory updates.

Augmented Reality:
Real-time documentation through virtual keyboards or voice com-mands via smart glasses, auto-matically saved in the appropriate patient document.

ROLES OF HEALTHCARE STAFF IN DIGITAL DOCUMENTATION



ORGANIZATION

Frontline Health Professionals:
Document treatment interventions digitally in real-time.

IT Professionals
Maintain the information technology infrastructure, conducting system updates and backups.

Management & Executives:
Initiate strategic projects introducing digital applications and transforming work processes.

Administrative Staff:
Extract information from documentation for business administration.

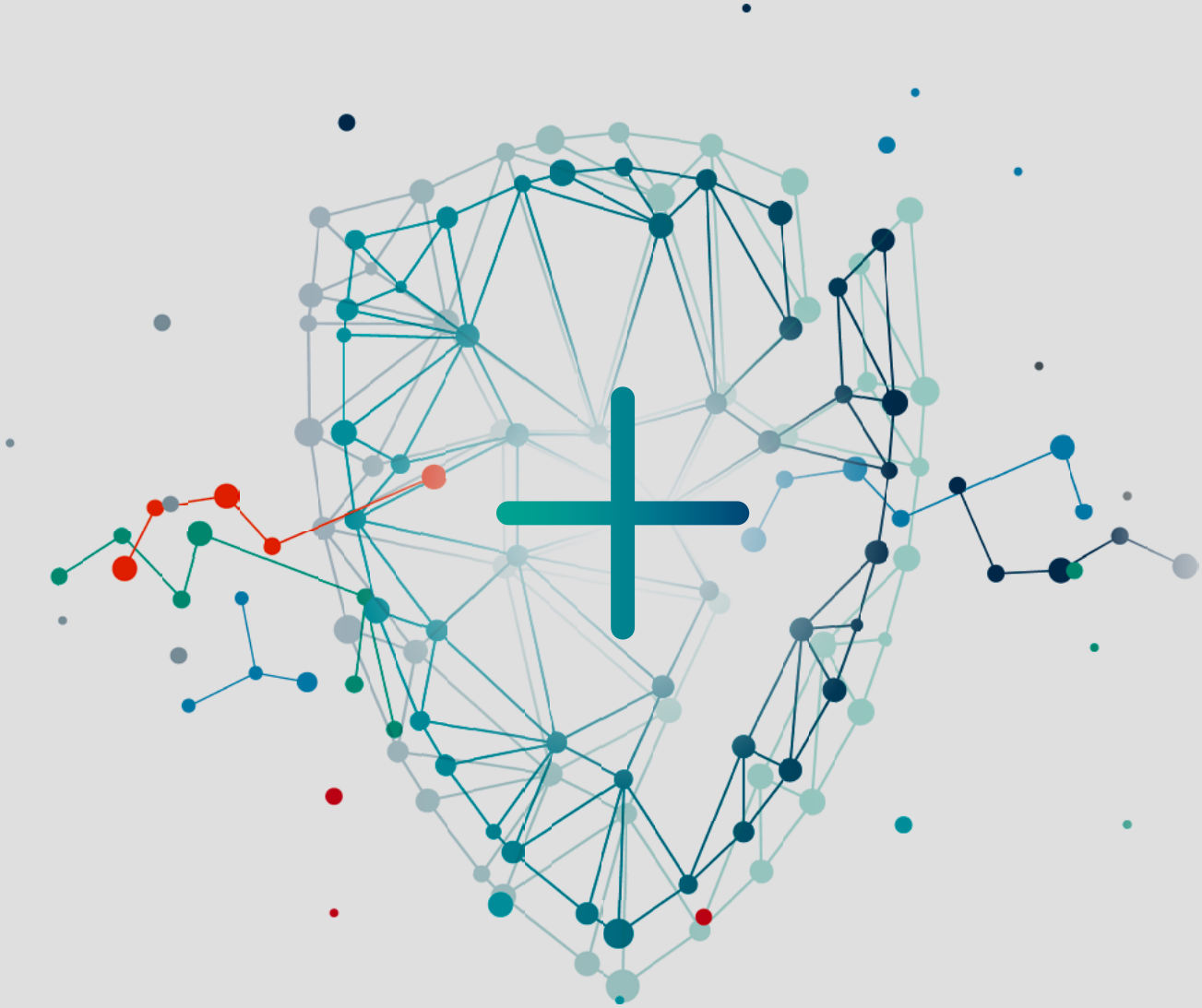
INDUSTRY

Health Informaticians:
Design and refine digital applications, enhancing user-friendliness and the functionality of digital systems.

RESEARCH

Researchers
Utilize aggregated data from the digital documentation to conduct research with real-world data and explore new treatment methods.

WHAT ARE THE BENEFITS OF DIGITAL DOCUMENTATION?



BENEFITS FOR PATIENT CARE:

Data Access
Health professionals can swiftly retrieve patient profiles via a secure digital system.

Real-time Documentation
The system captures exhaustive health information and real-world data, contributing to research and promoting the improvement of digital health tools.

Collaboration
Electronic documentation promotes interdisciplinary, interprofessional, and intersectoral cooperation, streamlining care and reducing information gaps.

Data Archiving
Patient data is securely archived, facilitating continuous care during subsequent visits.

ORGANIZATIONAL BENEFITS:

Quality Oversight
Quality monitoring through aggregated data enhances patient safety continuously.

Efficiency and Sustainability
Despite initial costs, the digital system eventually brings economic savings through process optimizations and offers a sustainable alternative to paper records.

Workflow enhancements and process automation:

Beyond advanced insights through data collection and analysis, digital transformation can directly impact health professionals' workflows. Examples include tracking devices using RFID technology, Barcode-based digital medication management, Robotic Process Automation (RPA), bot service, and surgical robotics. Tracking devices and barcode-based digital medication management can support workflows on-site, locating different kinds of assets and simplifying the identification of prescribed medications, improving medication safety and logistical processes in pharmacy orders. RPA can automate repetitive and manual tasks with virtual assistants, providing workflow enhancements for administrative staff, automated billing and payment systems, data reporting, or bed allocation planning in clinics. Finally, emerging capabilities in robotics are opening new possibilities in acute settings for service robotics designed for different objectives, such as load carriers, robot-assisted disinfection systems, or cleaning robots. Especially in care facilities like senior living and nursing homes, clinics, and hospitals, they can alleviate specific routine tasks for the nursing staff. Moreover, computer-assisted surgical robots expand the scope of surgical interventions with remote extensions and provide high-resolution images. Challenges of such workflow enhancements and process automation center on regulatory requirements and administrative processes.

Decision support through artificial intelligence and assistive systems:

The rapid advances in digitalization and significant computational capabilities have driven the integration of AI into healthcare in recent years. AI implementation has reduced diagnosis costs and improved treatment prediction accuracy. Therefore, the primary objective of AI in healthcare is to assist health professionals in executing their tasks with greater efficiency and precision. As clinical data in the healthcare industry grows, computer-assisted Clinical Decision Support Systems (CDSS) present new opportunities. These AI applications are mainly incorporated into electronic health records or mobile devices or accessible online. CDSS are typically provided as licensed features in hospital information systems, enabling timely information retrieval, and aiding in rendering case-specific decisions or recommendations based on the patient data present in the active knowledge system. These systems include computer-generated alerts and reminders for healthcare providers and patients, clinical guidelines, patient data reports and summaries, or documentation templates. Common applications include diagnosis support, risk prognosis based on patient history, and real-time patient monitoring.

Online resources and interactions:
Digital health applications enable individual patients to learn about diseases and medications, record health data, or find support within a community. Furthermore, they may serve as symptom documentation tools or interactive online therapy programs. The emergence of personalized health-monitoring devices and wearables linked to smartphone apps or integrated sensors allows remote health tracking for an individual. While these sensors typically possess a lower quality compared to professional medical equipment, their advantage lies in allowing consistent health tracking for an individual.

Remote monitoring of clinical parameters can be essential for patients with chronic illnesses, enabling precise early detection of complications. Moreover, telemedicine video consultations expand care in remote or underserved areas, offering flexible and location-independent healthcare provision. To fully utilize the potential of digital solutions, essential factors such as digital accessibility and inclusivity must be considered to encourage people‘s engagement and trust in digital systems.

3.

Which digital skills are important for healthcare professionals?

The rapid advancement of digital technologies has brought about significant changes in the healthcare industry. In pursuing successful digital transformation, however, it is essential to recognize that investments in technology alone are insufficient. Advanced digital skills and the widespread adoption of digital technologies are equally crucial. Digital skills are therefore not only necessary for IT staff or health informaticians within large corporations: Proficiency in digital skills and literacy among healthcare staff and patients is pivotal in facilitating the broader implementation of digital health technologies. However, specific required digital competencies can vary significantly depending on the healthcare profession and industry. Digital skills should empower healthcare staff to use digital innovations and data effectively and securely for optimized healthcare while fostering holistic collaboration with patients and care recipients.

Healthcare personnel occupy a variety of roles in the transformational process. Each of these roles is integral to the broader scope of digital transformation, and collectively, their competencies converge to drive successful change. The following illustration depicts some main features of these roles, presented as simplified healthcare personas:

HEALTHCARE PERSONAS

Frontline Health Professionals:

Users of digital technologies in practical settings

+ Expert handling and application of technologies
+ Knowledge about the benefits and application settings of digital tools
+ Collection, securement, and evaluation of data in electronic records

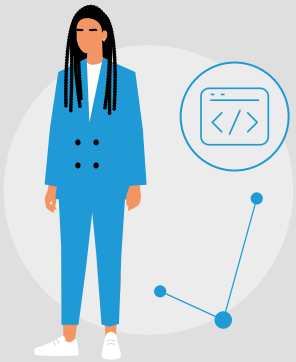
> *I prioritize patient care above all. I will be part of the transformation if digital solutions enhance that mission.*

Management and Executives:

Strategic planners and leaders of digital transformation in organizations

+ Knowledge about digital technologies and future trends
+ Leadership of change processes and facilitating a culture of change
+ Planning and implementation of a comprehensive digitalization strategy

> *In the digital age, leveraging technology is key to optimizing efficiency and staying ahead.*

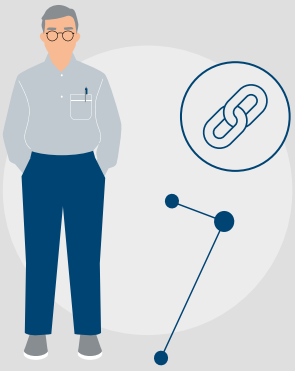


Administrative Staff:

Operators of business processes in the digital landscape

+ Knowledge in handling digital software for business administration
+ Streamlining processes for digitalization
+ Expertise in managing and organizing data across digital platforms

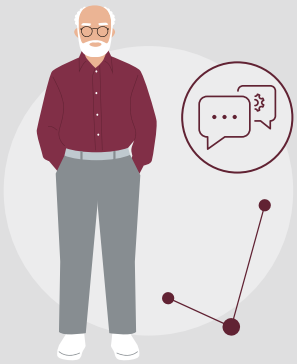
> *Digital transformation not only streamlines our processes but also empowers our administrative responsibilities*



Researchers and Educators:
Users of digital tools for generating and teaching new knowledge

+ Process and analyze big data to identify trends and insights
+ Integrate digital innovations into research designs
+ Conceptualize and implement digital-based teaching and curricula

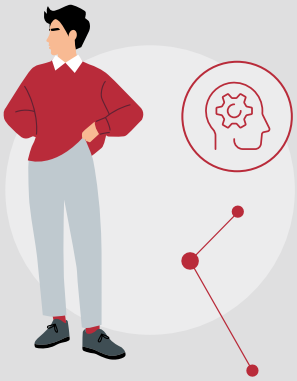
> *We delve into research to deepen insights and generate new knowledge.*



IT Professionals:
Specialists for operating IT infrastructure and applications in healthcare

+ Knowledge about IT infrastructure, programming, and cybersecurity
+ Installation, configuration, and maintenance of hardware and software
+ Setup, security, and administration of IT systems and networks

> *For technological challenges, I am on the frontlines, ensuring everything runs smoothly.*



Health Informaticians:
Developers of digital solutions and systems in healthcare

+ Knowledge about programming, information systems, and security procedures
+ Development, testing, and implementation of digital solutions
+ Requirements engineering involving stakeholders

> *My goal is to develop technology that's both intuitive and error-resistant.*

Navigating Core Digital Tools:
Health professionals must possess a foundational technical proficiency that enables them to effectively utilize specialized hardware and software tools integral to their roles. While digital upskilling is often associated with complex technologies, it is also crucial for common everyday applications such as word processing programs like MS Office, digital administrative and documentation platforms, and software catered to order management and personnel scheduling. Beyond these basics, there is an increasing demand for familiarity with advanced digital devices, such as digital assistant systems, service robots, or intelligent caregiving beds.

Information and Data Literacy:
Information and data literacy is a critical skill set encompassing several vital components beyond mere data handling and extends into understanding, evaluating, and effectively utilizing information within digital systems. Information and data literacy have profound significance in healthcare, where data accuracy and reliability can directly impact patient outcomes. One fundamental aspect is the ability to accurately capture, comprehend, and analyze data within digital systems. Healthcare professionals must be able to ensure data accuracy, as erroneous data can lead to incorrect diagnoses and treatment decisions.

Understanding the strengths and limitations of different data sources is crucial for evidence-based decision-making in clinical practice. Real-world data consists of healthcare information gathered from actual care contexts, routinely and anonymously sourced from various outlets, such as electronic health records, insurance billing data, or patients' mobile devices. Healthcare professionals, including physicians and nurses, directly shape data quality through routine assessments and coding processes for diagnoses and treatments in electronic records. Consequently, they generate a significant data foundation in clinical settings that is pivotal for advancing digital solutions.

Furthermore, healthcare practitioners should be skilled in researching information online, evaluating digital sources' quality, and reflecting thoughtfully on the content they encounter, ensuring it aligns with their professional knowledge and standards.

Awareness of safety and ethical considerations:
Healthcare professionals must ensure security and ethical integrity in using digital technologies in patient care and research. The frequency of data breaches underscores the criticality of safeguarding patients' private details. The imperative nature of digital resource security requires an in-depth understanding of cybersecurity and information safety. Given the confidential nature of health data, healthcare practitioners need proficiency in multiple aspects, such as understanding internal security protocols associated with data storage, sharing, and retrieval, to protect personal and sensitive information. Abilities such as identifying phishing endeavors, ensuring secure Wi-Fi connectivity, and maintaining unwavering oversight of patient data access and usage have become integral to contemporary healthcare.

Practitioners must critically reflect on the benefits and potential risks of adopting or refusing specific technological tools and platforms in their clinical practice. The advantages of digital innovations cannot replace health professionals' clinical judgment or human interaction. It becomes imperative to draw boundaries in digital technology, especially when they risk undermining individuals' dignity, rights, and autonomy.

Problem solving abilities:
Healthcare professionals often face intricate clinical and administrative obstacles. One crucial skill is to address these challenges via digital tools and technologies in modern healthcare settings. Mastering digital technologies facilitates identifying and resolving these challenges, increasing efficiency in processes and ultimately improving patient outcomes. For example, the emergence of AI has presented healthcare with transformative opportunities. Health professionals generally do not require specialized technical or programming knowledge but to discern the most effective ways to integrate these tools into existing systems and processes.

However, the use of digital technologies extends far beyond their application in routine tasks. As mentioned before, professionals must critically evaluate digital technologies' impact on patient care. This involves recognizing their advantages while evaluating their effectiveness and applicability in diverse clinical scenarios. Additionally, independently troubleshooting issues arising from these tools is essential and involves defining the problem, comprehending conventional solutions, and researching and implementing alternative solutions.

Communication and collaboration

As digital communication tools become increasingly integral to healthcare, professionals must be adept at technological and interpersonal aspects. Digital tools, like secure messaging or video conferencing platforms (such as Telecare and Telemedicine), facilitate secure, rapid information exchange, allowing healthcare professionals to offer more immediate and personalized care. Engaging appropriately with colleagues, patients, family members, and doctors through digital channels requires a distinct set of skills. Training professionals in the best digital communication and collaboration practices is paramount as the digital sphere becomes integral to healthcare, including understanding the technical aspects and importance of clear and effective communication. Adhering to conversation norms and determining what topics are suitable for digital discussions versus face-to-face interactions are crucial components of this skill set.

While digital health tools offer patients unprecedented access to information and control over their health, not all patients fully possess the confidence or understanding to harness these technologies. Healthcare professionals must assume the role of educators, guiding patients in managing their health using digital tools, understanding the processing of their health data, and accessing their data, ensuring patients are informed and comfortable in this digital age.

In conclusion, the rapid evolution of digital technology in the healthcare industry highlights the need for ongoing professional development. Prioritizing digital proficiency and skills is now more than just staying up to date - it is essential for providing patients with optimal care in the digital age. Although developing and acquiring digital skills is gradual, their urgent significance cannot be stressed enough. By continually refining and updating their skill set, professionals ensure their qualifications always meet the highest standards of patient care. Only through relentless upskilling and adaptation can healthcare professionals fully harness the potential of digital tools and technologies in their practice.

4.

Challenges for digital upskilling in the healthcare sector

The pursuit of digital upskilling within healthcare professions is a complex endeavor. It demands rigorous strategic foresight from leadership and management to navigate multifaceted challenges. These challenges span from technological intricacies to allocating financial and temporal resources for training and equipment. Additionally, cultural and organizational barriers can hinder seamless adaptation, and legal and ethical considerations further complicate the transition. As healthcare progresses toward comprehensive digital proficiency, it becomes imperative for decision-makers to recognize and address these potential impediments:

Inconsistent technological infrastructure:
A consistent and robust technological infrastructure is crucial for successful digital transformation. Challenges frequently arise when integrating new digital tools into existing systems, mainly due to the need for more standardization across various healthcare facilities. Given the diverse information sources and data formats, multiple software solutions can challenge interoperability, especially in processes spanning departments or institutions. This complexity poses additional challenges for health professionals navigating multiple platforms or seeking alternative solutions for integration issues. Interoperability of devices and systems is vital, as it enables the secure exchange of medical data, reports, and other results, independent of time and location. Moreover, older infrastructural frameworks can impede the transformation process, necessitating cost-intensive and time-consuming renovations before innovative solutions can be effectively implemented. In outpatient services, ensuring robust infrastructures in rural regions is essential so practitioners can provide remote healthcare to all patients regardless of geographical location.

Financial and time investments:
Digital upskilling in healthcare demands significant financial and temporal resources, including costs and time associated with training programs, purchasing new technologies, and updating existing systems. Health professionals often operate within a dynamic work environment where time constraints, increasing work intensity, and expenses associated with training can become substantial barriers. This is particularly an issue when professionals are expected to cover expenses, like purchasing specialized software or equipment, or demand extra work outside of business hours.

Cultural and organizational barriers:

Addressing cultural and organizational barriers is pivotal to guarantee that digital transformation initiatives are seamlessly integrated, executed, and refined to the advantage of health professionals and their patients. The challenge lies not only in recognizing the necessity for this change but also in facilitating it. However, conventional healthcare practices, established hierarchies, and institutional resistance can pose significant obstacles when transitioning from traditional to new approaches. Hesitancy among staff can persist if health professionals do not perceive an immediate value or enhancement to their routine tasks. For example, shifting from conventional paper-based documentation to electronic health records might initially appear daunting and time-intensive, going against ingrained work habits. Such perceived complexities in incorporating digital solutions can dampen enthusiasm toward future transformation processes. Therefore, it is crucial to understand and address the root of resistance, which involves presenting a compelling case for the digital transition and ensuring training and support mechanisms align with health professionals' specific apprehensions and needs. Digital transformation within healthcare institutions requires a profound cultural shift supporting continuous learning, encouraging innovation, and fostering adaptability.

Legal and ethical concerns:

Digital advancements are transforming patient interaction, raising concerns about potential adverse outcomes. The advances in genetics and artificial intelligence in medical diagnostics bring complex legal and ethical dilemmas in digital transformation. For instance, new digital tools and data collection raise questions on legal regulations and liability issues, especially concerning accountability for inaccuracies stemming from digital systems. One main challenge is ensuring strong security measures to safeguard sensitive patient data from hacking attempts and misuse. Equally critical is the emphasis on data reliability and integrity, as ensuring consistently high-quality data is foundational for successfully applying machine learning and AI-driven methodologies. Moreover, there is a growing concern about depersonalization in healthcare delivery resulting from adopting digital approaches. These multifaceted challenges highlight the urgency to address ethical and legal complexities among staff. Doing so ensures that healthcare professionals are prepared to act within the digital landscape with diligence and proficiency.

5.

Navigating the path to successful digital upskilling

Digital transformation in healthcare is a technology-driven change process that requires a multifaceted approach that incorporates multiple perspectives on existing technologies, processes, and, most importantly, the stakeholders. It is important to note that healthcare does not transform itself - we are the agents of its transformation. It requires a proactive stance by leadership and management to shape and influence the transformational journey.
Overcoming organizational barriers and recognizing the added value of digital technologies for healthcare are critical elements in this endeavor. Furthermore, there are numerous avenues for organizations and service providers to navigate this path successfully:

Strategic planning and leadership:
A crucial starting point for analyzing and designing business operations revolves around the company's technical and organizational processes. Effective and efficient processes form the bedrock of company success regarding quality, patient or customer orientation, and profitability. Integrating new technologies thus requires supervising, regulating, and continually enhancing work processes and qualifications, which makes strategic planning by management necessary. This includes carefully assessing internal and external processes, as digitizing them does not automatically ensure enhancements. In the rapidly changing environment, leaders must continuously reflect on decisions and revise them when necessary.

Alignment with organizational goals:
Sustainable digital transformation requires thoughtful preparation in operational organization and personnel development. The process can start by understanding the current competencies of staff members and pinpointing areas for potential growth. An essential aspect of any training is the definition of performance indicators and milestones for measuring success. This provides employees with insight into the process while simultaneously allowing them to actively participate in promoting their progression. By clarifying expectations for professional development and setting explicit criteria for individual assessment, employees are provided with a framework within which they can operate. Successful digital upskilling must consider the dynamic work environment and align with the needs and schedules of employees – for instance, through flexible learning opportunities, time off during working hours, and funding for further education.

Access to Training Opportunities:

To effectively implement digital upskilling for healthcare professionals, it is essential to offer easily accessible educational programs and provide the necessary resources, including relevant hardware and software. An influential learning culture manifests through values and processes that encourage and nurture continuous and collegial learning among healthcare employees, individually and collectively. Potential avenues include specialized in-house workshops or external training sessions, which can be conducted either in person or online through webinars utilizing video conferencing solutions. Digital platforms and tools also introduce innovative teaching and learning methods, such as blended learning through mobile learning applications, serious games, and VR-supported learning environments. It is imperative that employees not only have access to these digital tools and resources but are also given avenues to implement their newfound knowledge in practical settings. Acquiring new competencies could be acknowledged through formal certificates to motivate further and validate their progress. Moreover, preparing future generations for digital transformations requires a more thorough incorporation of digital skills into health professionals' academic and non-academic curricula.

Cross-Skilling:

Digital competences are not exclusive to those in technical roles; it is about everyone in the organization contributing to change. A diverse qualification mix among health professionals can ensure the comprehensive deployment of multifunctional competencies. Cross-skilling, also called cross-training, provides an avenue for a blended comprehension of technology and clinical practices among diverse professional groups. From an organizational viewpoint, it is essential to channel the individual learning ambitions of staff members in a direction consistent with the company's overarching goals. By doing so, healthcare institutions not only cater to the professional growth aspirations of their employees but also elevate the collective expertise within the organization. It is worth noting that when training and development initiatives are aligned with the institution's strategic vision, it sets the stage for teams, departments, and entire divisions to realize their objectives. Such alignment often results in heightened motivation and superior performance outcomes at both the individual and collective levels. Leaders, managers, and IT professionals also need a profound understanding of care practices to ensure that digital solutions align with the realities of daily care provision. This ensures that as digital transformations sweep across the healthcare sector, the introduced solutions are innovative and seamlessly integrate with the ground realities of everyday care. Ultimately, the ideal outcome of such initiatives is a workforce that is both motivated and proficient, ready to address the multifaceted challenges of modern healthcare.

6.

Conclusion

Integrating digital technologies into healthcare offers many opportunities for information management, clinical decision support, and novel diagnostic and treatment modalities. Digital competencies empower healthcare professionals to proficiently harness digital innovations and data for enhanced patient care and collaboration with patients and caregivers. Digital upskilling presents a cardinal responsibility for leadership and organizational HR development, often confronting financial and structural challenges. Healthcare employees must develop technical understanding and knowledge of cyber and information security processes. Additionally, they should be able to critically evaluate statistics and information and professionally assess the advantages and drawbacks of deploying digital technologies. This necessitates investments in foundational technologies, technical infrastructure, and accessible, continuous education opportunities for healthcare personnel. An open learning culture within institutions, bolstered by financial and temporal incentives for further education, can amplify the willingness to acquire new skills. Given the ever-evolving technological landscape and societal needs, digital upskilling should be recognized as an ongoing process that can significantly enhance healthcare delivery and fortify an institution's competitive edge. Considering these developments, there is a pressing need to institute mandatory tailored training programs on digital skills for health professionals. These initiatives should be tailored to cater to the diverse roles of health professionals, aligning with their specific digital skill needs, frequency of digital technology usage, and competence levels. Such training endeavors should commence early in educational trajectories and persist through workplace learning and professional development modules.

KEY TAKEAWAYS

for Leadership and Management

1. Digital Upskilling must be an Integral Part of Corporate Strategy:
Developing digital skills is critical to the competitive advantage and future viability of healthcare organizations. Integrating digital upskilling into the overall business strategy ensures that employees have the necessary skills to fully exploit the potential of innovative digital technologies.

2. Rapid Digitalization requires Proactive Leadership
Executives must promptly identify new trends and developments, adopting a proactive and forward-looking approach instead of solely responding to changes. Leadership and management play a significant role and serve as role models and motivators, encouraging their teams to actively leverage the opportunities of digitalization.

3. Digital Transformation requires Openness and Investment:
A robust technological infrastructure forms the cornerstone for successful digital transformation processes in healthcare. This includes investments in hardware, software, networking technologies, and data security measures. Leaders must operate flexibly in a dynamic environment, reviewing and adjusting decisions if necessary. Furthermore, they should be open to innovations, including the evaluation of digital or hybrid approaches for business models and the implementation of innovative workflows.

4. Early Employee Involvement is Crucial:
Engaging employees in transformation processes is fundamentally important. Leaders should explain the reasons for the imminent changes on time, highlight the foreseeable impacts on work processes, and acknowledge the value of individual contributions from employees. Open and transparent communication promotes acceptance and minimizes potential resistance.

5. Digital Upskilling must Cater to a Dynamic Work Environment:
Providing a diverse set of learning resources, including digital options, offers flexible learning opportunities that meet both the demands of a dynamic work environment and the employee's needs. Moreover, it is essential to provide support for implementing new digital skills in daily routine tasks.

Glossary

Algorithm
A systematic set of rules and steps used to solve a problem or achieve an objective. Algorithms are fundamental to programming and computer science.

Artificial Intelligence (AI)
The simulation of human intelligence by computers, enabling them to perform tasks requiring human-like learning and reasoning.

Big Data
Large and complex data sets are generated by digital devices and analyzed to reveal patterns and insights, particularly influential in decision-making in fields like healthcare.

Blended learning
An educational approach that combines traditional classroom teaching with online learning, enhancing flexibility and various forms of engagement in the learning process.

Clinical Decision Support Systems (CDSS)
AI-enhanced systems that analyze medical information and assist healthcare professionals in making accurate and effective clinical decisions.

Clinical Information Systems (CIS)
Clinical Information Systems or Hospital information systems (HIS) include all of a hospital's information and communication systems. These integrated systems allow various data and administrative processes to be captured, stored, processed, and used long-term, improving efficiency and patient care.

Cybersecurity
Protection strategies against digital attacks, safeguarding information, systems, and individuals from threats and unauthorized access.

Data Science
A multidisciplinary field focused on extracting knowledge and insights from structured and unstructured data through various scientific methods and algorithms.

Digital Health Application
Apps prescribed by physicians and psychotherapists assist in managing health and wellness, enabling users to monitor and maintain their health conditions.

Electronic health record
Digital repositories of patient health information are collected and managed across different healthcare encounters, ensuring comprehensive patient data is accessible and secure.

E-prescriptions
E-prescription enables the electronic prescription of medications. Advantages include medication reminders and medication planning with cross-checking for pharmaceutical interactions.

Gamification
Incorporation of game-like elements into non-gaming contexts, aiming to boost engagement, motivation, and participation. Typical game elements are progress indicators, ranking lists, and bonus systems.

Information Safety
Strategies and technologies aimed at protecting information from unauthorized access and threats, ensuring its confidentiality and integrity. It comprises network security, data protection, security policies, and encryption.

Internet of Things (IoT)
A network of interconnected devices and objects capable of collecting, exchanging, and responding to data without human interaction.

Interoperability
The capability of different IT systems, applications, and devices to communicate and exchange data effectively and accurately.

Machine learning
Machine learning is a subfield of artificial intelligence that encompasses an iterative process. Algorithms are designed to learn patterns and make predictions from data sets.

Near Field Communication (NFC) Tags
Small electronic devices used in healthcare for storing and sharing data wirelessly, improving information access and communication.

Phishing
Deceptive attempts in online fraud to acquire sensitive information, such as usernames and passwords, by masquerading as a trustworthy entity in digital communications.

Precision medicine
An innovative approach in medicine that customizes healthcare, with medical decisions, treatments, practices, or products being tailored to the individual patient, taking into account their genes, environment, and circumstances.

Radio Frequency Identification (RFID)
A technology using electromagnetic fields automatically identifies, tracks, and manages information attached to objects or individuals.

Real World Data (RWD)
Data collected outside conventional clinical trials, reflecting actual healthcare experiences and outcomes, influential in clinical and policy decision-making.

Robotic Process Automation (RPA)
Utilizing software robots to automate repetitive, rule-based tasks within business processes, enhancing operational efficiency.

Serious games
Games designed with a primary purpose beyond entertainment, such as education or health improvement, merging enjoyment with practical application.

Telecare
Remote care services that support and enhance the care of individuals, often leveraging technology to monitor and assist people in need of care and their caregivers.

Telemedicine
The remote diagnosis and treatment of patients through telecommunications technology, extending healthcare reach and accessibility.

Telemonitoring

The remote monitoring of a patient's health and clinical parameters in real-time, promoting proactive and responsive care. Telemonitoring can be carried out using smart devices such as wearables, implants, or manual data entry in an app.

Wearables

Sensor-based technological devices worn on the body that monitor, analyze, and communicate various health parameters, such as blood glucose levels, pulse rates, or sleep patterns.

Further readings:

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The ATLAS Project

The project „Innovation and Digital Transformation in Healthcare“ (ATLAS-ITG), funded by the state of North Rhine-Westphalia‘s Ministry of Economic Affairs, offers health professionals and executives an orientation in the field of digitalization. The ATLAS supports theory-practice transfer by evaluating current research and presents lighthouse projects in the healthcare sector.

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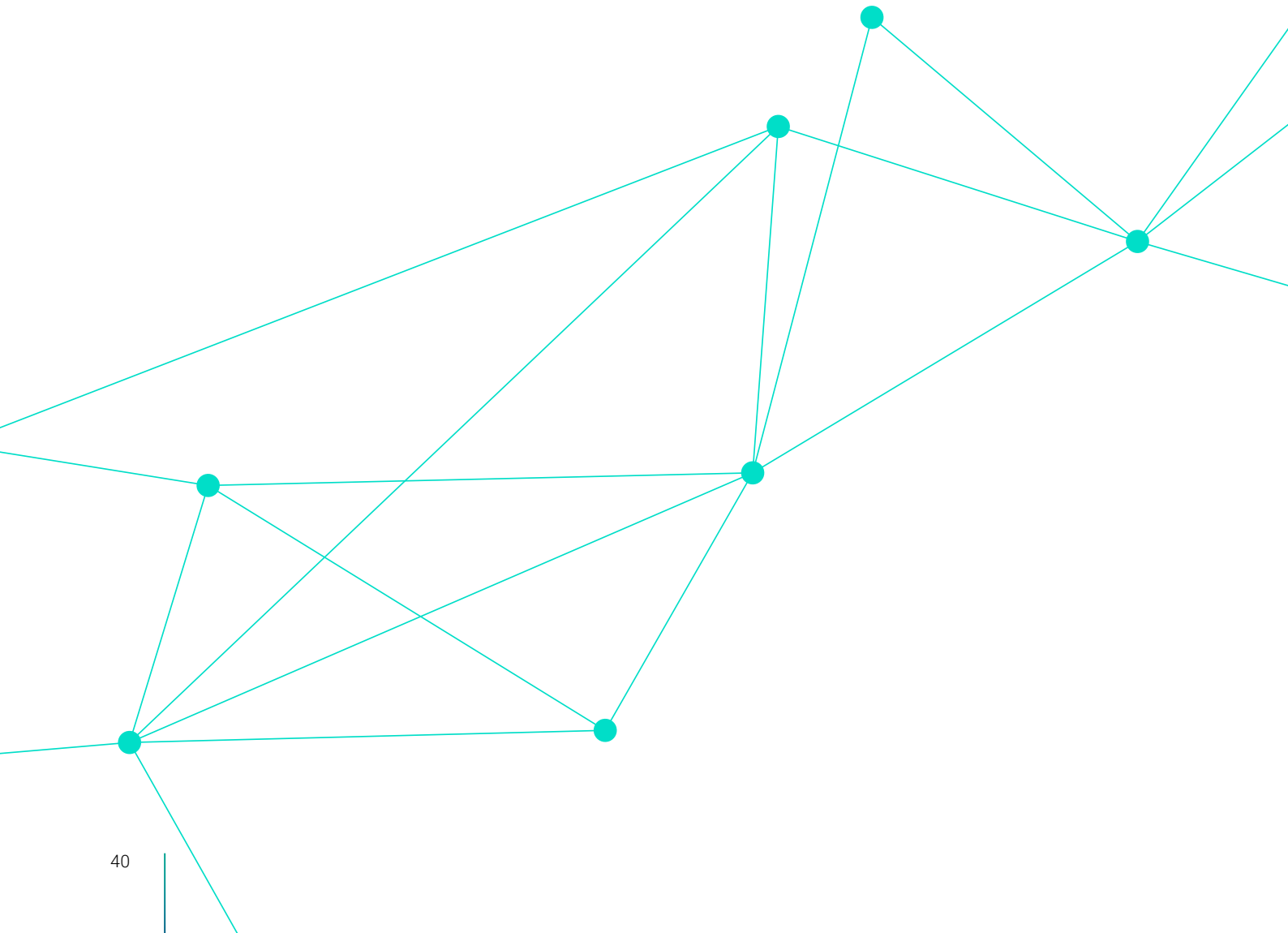
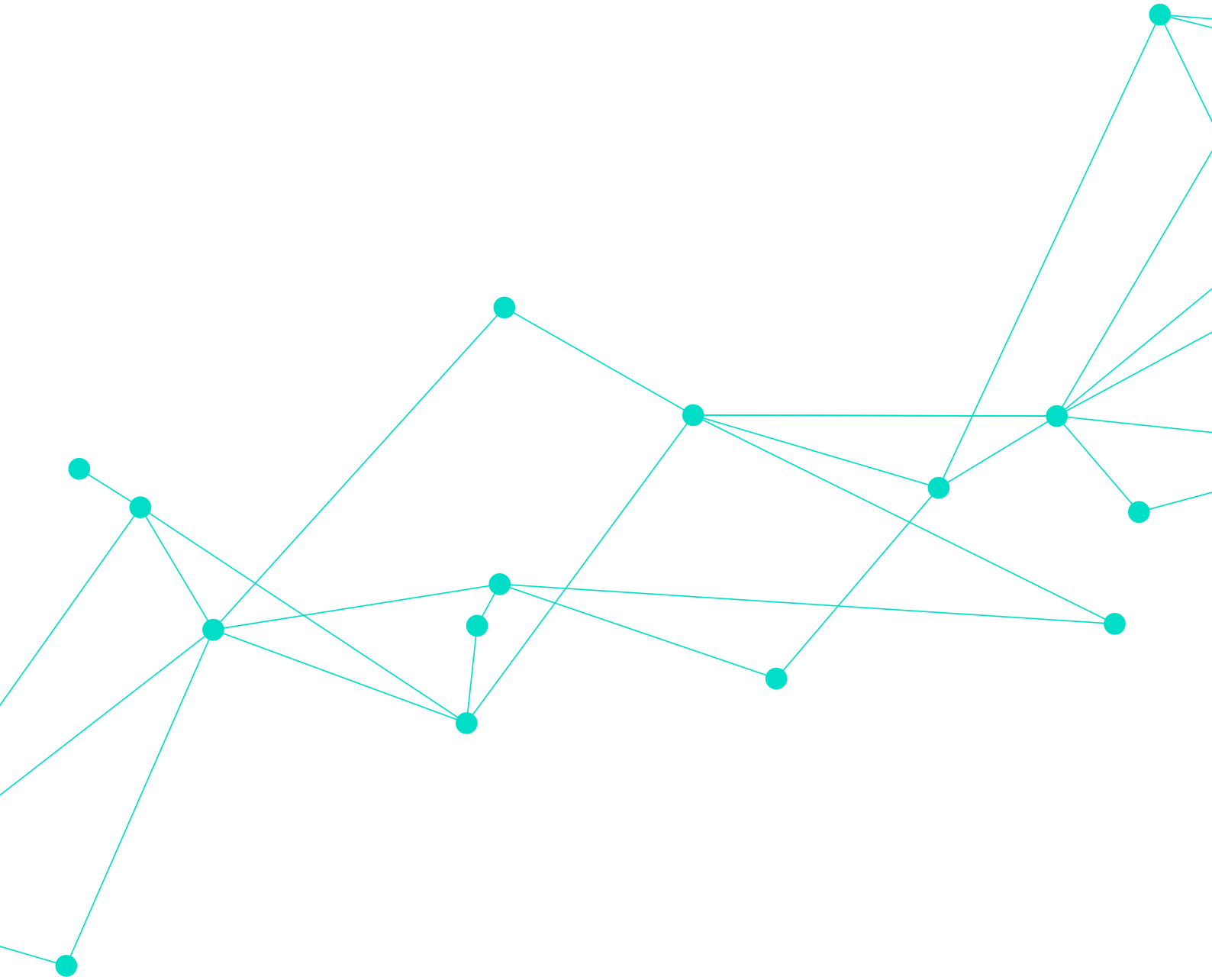
The ATLAS project is situated at the Chair for Management and Innovation in Healthcare at the Faculty of Management, Economics and Society at Witten/Herdecke University. The chair team works on economic issues in and between organizations of the health care industry. The chair is a member of the Interdisciplinary Center for Health Services Research (IZVF) and contributes to the description, explanation, testing and evaluation of concepts that ensure high-quality health care.

More about the chair: *www.uni-wh.de/MIG*
More about Witten/Herdecke University: *www.uni-wh.de*
Visit the ATLAS: *www.atlasdigihealth.org*





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