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SOCIAL SERVICES, HEALTH AND SPORTS

ENHANCING THE SHARING OF DIGITAL INFORMATION IN SOCIAL WELFARE AND HEALTHCARE

RECOMMENDATIONS FOR DISSEMINATION OF DIGITAL WORK IN-
STRUCTIONS MATERIAL IN AN INTERORGANIZATIONAL LEVEL

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<p>One of the biggest changes in social welfare and healthcare in Finland's history entered into force at the beginning of 2023, when the wellbeing services counties started their operations. These wellbeing services counties faced many new and unprecedented challenges. One of these challenges was dissemination of information and instructions to people that has no access to a wellbeing county's intranet. Such information includes work instructions, operating instructions, training materials, and other publications. Persons who do not have access to a wellbeing services county's intranet are private service providers who provide services for the county but operate based on the county's instructions, guidance, and agreements.</p> <p>The purpose of this thesis was research how social welfare and healthcare organizations could improve dissemination and distribution of work instructions regarding information systems in an interorganizational level. The aim of the thesis was to formulate recommendations for the organizations, to improve dissemination of information. Improving these practices might have an impact on the distribution of work instructions of social welfare and healthcare information systems to external providers. The goal was to study the impact of digital solutions on organizational models, collaboration, and engagement, as well as the adoption of enabling technologies and e-learning platforms.</p> <p>This study employed an integrative literature review methodology to analyze existing research and identify key insights and recommendations. There seemed to be little previous research on the sharing of work instructions in an interorganizational level. Database searches for the literature review were conducted in March 2024 using database services from PubMed, CINAHL Ultimate, Sage Premiere and Science Direct. Thirteen studies were selected for the study and analyzed with inductive analysis.</p> <p>The findings revealed that digital technologies play a crucial role in reshaping organizational structures and fostering collaboration among stakeholders. Organizational development initiatives, such as the redefinition of traditional roles and the establishment of new digital business ecosystems, were highlighted as essential for adapting to the changing healthcare landscape. Additionally, the thesis emphasized the importance of trust, respect, and effective communication in fostering successful partnerships and collaborations within healthcare organizations. The integration of enabling technologies, such as data exchange and storage solutions, knowledge portals, and e-learning platforms, was identified as instrumental in facilitating information sharing and accessibility within healthcare education. However, the thesis acknowledged the challenges posed by the rapid evolution of technology, including the need for continuous updates and the risk of information overload.</p>	
Keywords information management, document management, knowledge bases, dissemination of information, work instructions	

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1 INTRODUCTION

An inseparable part of social welfare and healthcare work communities and organizational activities is knowledge activities, knowledge-based management, and knowledge itself. The whole field of activity is knowledge-based. Knowledge of treatments, illnesses or symptoms and the significance of this information make social welfare and healthcare activities knowledge intensive. Availability, reliability, and topicality are key requirements for knowledge-intensive operations. In public administration organizations, especially in terms of management and operational planning, information sharing, reliability and topicality may cause challenges. This is emphasized in organizations operating in knowledge-intensive industries. (Vakkala & Syväjärvi 2020, 123.)

The primary health care of the wellbeing services county of North Savo uses two different patient information systems, PegasosOmni360 and Lifecare (North Savo wellbeing county 2022). The operating methods of using patient information systems for the use of various subject areas are guided by work instructions. It is the employee's responsibility to familiarize themselves with these instructions, as well as the completed training recordings. This seems to be a trend in other organizations as well. An essential part of job nowadays is to be self-guided in learning while the learning has shifted from organizations to teams and individuals. There is also increased interest from organizations to make this transfer. (Colin & Lemmetty 2020, 50.)

At the moment, these above-mentioned materials are only available to employees of the wellbeing services county on the internal intranet. The wellbeing services county of North Savo also has private service providers, who provide services on behalf of the wellbeing services county. These service providers do not have access to the wellbeing services county's intranet, and for this reason, they also do not have access to the work instructions of the patient information systems or the training recordings. At the moment, all the work instructions they need are delivered to them as separate documents via email distributions.

In order for the wellbeing services counties to be able to guarantee equal access to the necessary material for all employees, regardless of whether the employee is on the payroll of a private employer or the wellbeing services county, the document management and operational methods used must be redesigned and an alternative operating model must be built. Re-engineering is the modification and examination of the system being processed to mold it into a new model that can be adopted later (Pankratius, Stucky and Vossen 2005, 462).

The aim of this thesis is formulate recommendations for the organizations, which can be used to improve dissemination of digital work instruction material in interorganizational level and in this way improve the distribution of social welfare and healthcare information systems work instructions. These recommendations can be utilized for developing information managing practices in social welfare and healthcare. Thesis will be conducted using the methods of integrative literature review.

2 THEORETICAL BACKGROUND

2.1 Wellbeing services counties reform

Wellbeing services county of North Savo is one of the autonomous wellbeing services counties launched at the beginning of 1.1.2023. Wellbeing services counties responsibility is organize and produce rescue services, social welfare, and healthcare services. Wellbeing services counties reform is one of the most significant administrative reforms in Finland's history, in which the responsibility for organizing rescue services and health care and social welfare services was transferred from municipalities and joint municipal authorities to the wellbeing services counties. (Ministry of Social- and Health Affairs 2023.) At the beginning of 2023, there was approximately 224,000 municipal sector personnel, who transferred to these wellbeing services counties throughout Finland (The Finnish News Agency 2024). At the moment, wellbeing services county of North Savo employs approximately 12,800 people who work in rescue services, social welfare, and healthcare services (Wellbeing services county of North Savo 2023).

In 2023, there has been wide variation in the consistency of patient and client information systems across Finland. If the wellbeing services counties are divided into two larger categories, half of the wellbeing services counties have either uniform or nearly uniform information systems and the other half have fragmented or almost fragmented systems. This fragmentation is due to the systems used on a municipality-specific basis before the wellbeing services county reform. (Ikonen 2024). This fragmentation and changes have also affected the information management of the wellbeing services counties and the availability of information for employees. Operating models and administrative structures have changed by the wellbeing services county reform, which has forced the wellbeing services county organizations to re-engineer several distinct functions in social welfare and healthcare.

Ministry of Social Affairs and Healthcare (2024) has prepared a strategy for digitalization and information management in healthcare and social welfare, as a result of which healthcare and social welfare professionals need training in the use of the services presented in the strategy. The aim of the strategy is to develop digital services that improve individuals' ability to sustain their wellbeing, health, and functional capacity autonomously. Concurrently, it aims to minimize reliance on intensive services, consequently alleviating the workload of professionals and enhancing their ability to engage with clients face-to-face.

2.2 Learning in healthcare

Everyone has the right to receive orientation for their work, and this right belongs to every employee in the social welfare and healthcare sector whether the employee works for a private company or is the wellbeing services county's staff. The Occupational Safety and Health Act (Occupational Safety and Health Act 738/2002, 14 §) requires employees to receive orientation to their work before introducing new tools and working and production methods and before starting a new task. The Ministry of Social- and Health Affairs national objectives for 2023–2026 is a publication prepared by the Government, in which it outlines the key objectives for the organization of social welfare and

healthcare every four years. There are eleven of these principles in total, and one of them deals with the importance of skilled personnel. Significant focus should be directed towards the prerequisites for working and the competence, because training of personnel is part of staff retention (Ministry of Social Affairs and Health 2022, 19). Information management and the availability of instructions and information play a key role in the employee's competence and learning.

The importance of these above-mentioned key factors is emphasized today, which has been permanently changed by the COVID-19 pandemic also in terms of learning and studying. The pandemic highlighted the importance of online learning and studying online, as traditional in-person teachings were abandoned, and people had to isolate themselves socially, and today, online learning is included in all learning (Bloomfield, Fisher, Davies, Randall & Gordon 2023, 1-5). Online learning also plays a leading role in learning the use of patient information systems and training. Online learning enables flexible and self-paced learning, it gives the opportunity to use interactive content and it is always the same for everyone. Training for learners supports their own competence and provides additional competence as an information technology expert, enabling them to keep up with the development of healthcare and to be involved in leading the digital era (Ting, Garnett & Donelle 2021, 1-5).

As traditional methods have in its most parts given way to remote alternatives and digital education solutions, more attention should be paid to the accessibility of information. Something that must not be forgotten, is the safe and proper use of medical devices and software in social welfare and health care. When introducing new technologies or evaluating existing ones, the importance of uniform statements and self-monitoring must be considered, as well as the availability of supplementary training by employers in the use of new tools (Ministry of Social Affairs and Health 2022, 34).

There is growing interest in utilizing and advancing digital technologies to enhance efficiencies and exploit sustainable prospects in the medical device and interconnected industries. The United States Food and Drug Administration has recognized the significance of digital technologies in facilitating advancements in the medical device industry. For instance, they have recently included 171 artificial intelligence (AI) and machine learning (AI/ML)-enabled medical devices in their list, acknowledging their capacity to derive novel and valuable insights from the extensive data generated during healthcare delivery. (Rowan 2024, 6.)

It is required in law (Medical Devices Act 2021/719, 32 §) that a person using a medical device has the training required for its safe use, that the device or it is accompanied by markings and instructions for use necessary for safe use, and that the device is used in accordance with the purpose and instructions stated by the manufacturer. It must be noted that not every software employed in healthcare is categorized automatically as medical device. Software`s search functionalities such as simple search, which involves retrieving records based on matching metadata with search criteria or obtaining information, do not meet the criteria for medical device software. Software`s that are designed to process, analyze, generate, or alter medical information might be classified as medical device, if its creation or modification aligns with a medical intended purpose. (Medical Devices Coordination Group 2019, 6.)

Patient information systems used in primary healthcare are classified as medical devices, and they contain instructions for use of the system electronically and thus complies with the EU Commission Implementing Regulation (Commission Implementing Regulation (EU) 2021/2226 of 14 December 2021 laying down rules for the application of Regulation (EU) 2017/745 of the European Parliament and of the Council as regards electronic instructions for use of medical devices), which defines the possibility for manufacturers to submit instructions for use of medical devices in electronic form.

The wellbeing services county of North Savo employs employees who work alongside their own work as a responsible user. Responsible users are sometimes called as nurse superuser. Their task differs from the most used title system administrator. These end-users have received additional training in the use of the systems and are able to familiarize, teach and support other staff alongside their own work (The Informatics Nurse 2011).

The wellbeing services county of North Savo has publicly available guidance material for healthcare professionals on its website. Professionals can also join the Teams channel maintained by the wellbeing services county, which offers instructions, links, and materials for professionals. It is also possible for people outside the organization to join that channel. Healthcare professionals can join by filling in the registration form on the website of the wellbeing services county. (North-Savo wellbeing county 2024.)

2.3 Digital learning

When media and digital electronic tools are used for learning, that means electronic learning (e-learning). When mobile devices and wireless data transfer are also used for learning, it is called mobile learning (m-learning). All this is summed up by the concept of digital learning (d-learning), which covers all forms of learning that make effective use of technology. As shown in the illustration (Figure 1.), d-learning is a combination of e-learning and m-learning, where m-learning is a subset of e-learning. (Basak, Wotto & Bélanger 2018, 191–216.)

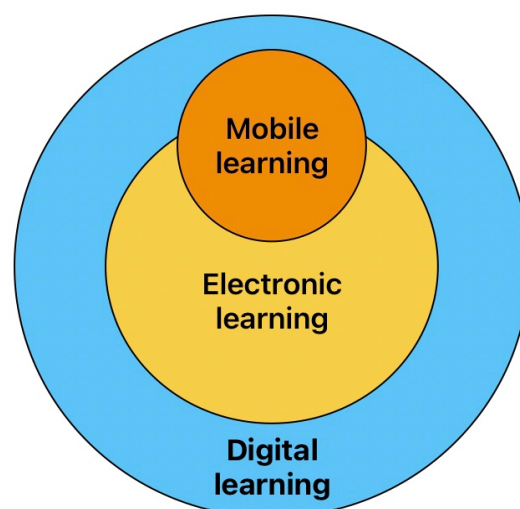


Figure 1. Relationship of e-learning, m-learning, and d-learning. (Illustration is based on Basak, Wotto & Belanger 2018)

In today's society and in education setting, these three tools are in important role, as they empower both educators and learners to assume responsibility for their individual development. Teachers and learners need to develop their technical skills in order to use these tools, as the use of these tools requires novel approaches. Today, d-learning has increasingly replaced e-learning as a term, and it encompasses all forms of use of Internet and Communication Technology (ICT) in learning and teaching (Basak et al. 191–216.)

In western countries across the world, e-learning has been adopted in healthcare. This change has been driven by the transition to electronic health records over time. Personal professional development and its maintenance are better enabled with digital tools, especially for people who have limited opportunities to participate in physical training and access to physical learning materials. (Mahdavi, Adibi, Golshan, Sadeghian 2023.)

Work instructions are instructions that describe how the activity is conducted and, depending on the scope of the topic being discussed, are drawn up in stages. Instructions always have an approver. (Jozsef & Blaga 2015, 515.) The work instructions of the wellbeing services county of North Savo are always being drawn up in the manner mentioned above. In addition to this, instructions are always checked by experts before approval.

Today, products should be able to be used easily and correctly, based on the premise that they are designed to be used in such a way that they cannot be misused and do not require instructions for use. If there are risks of wrong behavior when using a product, an intuition-related approach is unacceptable. One such product categories that requires precise and detailed guidance and expertise is healthcare products. Such products and systems may include diagnostic or therapeutic tools used, for example, by medical personnel or doctors. Users need to master every detail of these devices and systems and know how to use them correctly. To ensure this, the instructions must be easily accessible and written at the right time and in the right language. (Lapagna, Zollinger, Rennhard, Strobel & Derché 2018, 55).

Healthcare treatment and work instructions help and create an equal basis for new employee orientation, and they must always be easily available. The purpose of work and care instruction's is also always to standardize care and work. When drawing up treatment or work instructions, people who collaborate with patients or clients should always be involved. The content of the instructions should be such that it describes the key issues related to productivity, quality, and safety, and it should describe the main stages of treatment or work. Work or treatment instructions may include diagrams, videos, or images as illustrative elements, but the content must focus on the essentials for successful work performance or treatment. The instructions should always aim to facilitate and help with the work, while being short and clear. Especially when drawing up treatment instructions, patient safety must always be kept in mind. (Korte, Jokela, Korhonen & Perttunen 2020, 45.)

Today, labor shortages are almost an everyday problem in social and health care across Finland. Work instructions play a major role in the orientation of temporary employees and the workload of permanent staff orientation work. (Kinnunen, Liukka & Haatainen 2023.) In its productivity and

economy program 2.0, presented in November 2023, one of the key objectives proposed by the Regional Government is the development and strengthening of human resources. (North-Savo Wellbeing County 2023.) In the long term, solutions can be found to secure enough personnel by increasing the means to develop and maintain professional competence (Ministry of Social Affairs and Health 2022).

2.4 Information and knowledge

Information is data that can be interpreted and refined into knowledge (Finto 2018). However, as a concept, information is controversial and complex. Information is an important concept in many disciplines, such as social sciences, computer science and communication technology, biological sciences, and physical sciences. In information sciences it is a key concept. (Bawden & Robinson 2022, 81-82.) Defining information in general terms can be challenging. As Capurro & Hjørland (2003) write, across diverse scientific disciplines, the concept of information is employed within distinct contexts and in relation to specific phenomena, prompting the question of whether a unified meaning for this term can be discerned. The crucial differentiation in the concepts of information lies in the distinction between information as an object or entity and information as a subjective concept.

Knowledge is characterized as a validated individually held conviction that augments personal capabilities. Within an organization, knowledge can be categorized as either explicit or tacit. Explicit knowledge is described as formal and systematic information that can be expressed in words or numbers and is amenable to documentation or storage in electronic records, such as a telephone directory, an instruction manual, or a research findings report. On the other hand, tacit knowledge is subjective and experience-based knowledge that is challenging to articulate or document. It can be shared through discussions, narratives, and personal interactions, encompassing skills, experiences, insights, intuition, and judgment. (Husain & Nazim 2013, 265.)

The hierarchy between data, information, knowledge, and wisdom (DIKW) is often described using the Data–Information – Knowledge – Wisdom pyramid (Figure 2). DIKW, known as the Knowledge Hierarchy, the Information Hierarchy, and the Knowledge Pyramid, stands as a foundational and widely acknowledged model within the scholarly domain of information and knowledge. It is frequently referenced or implicitly utilized in defining data, information, and knowledge in textbooks related to information management, information systems, and knowledge management. This hierarchy serves to provide context for data, information, knowledge, and sometimes wisdom, in relation to each other. It is instrumental in identifying and describing the processes involved in transforming entities at lower levels in the hierarchy into entities at higher levels. Underlying this premise is the notion that data has the potential to generate information; information, in turn, can facilitate the creation of knowledge, and knowledge can ultimately foster the development of wisdom. (Rowley 2007, 163-164.)

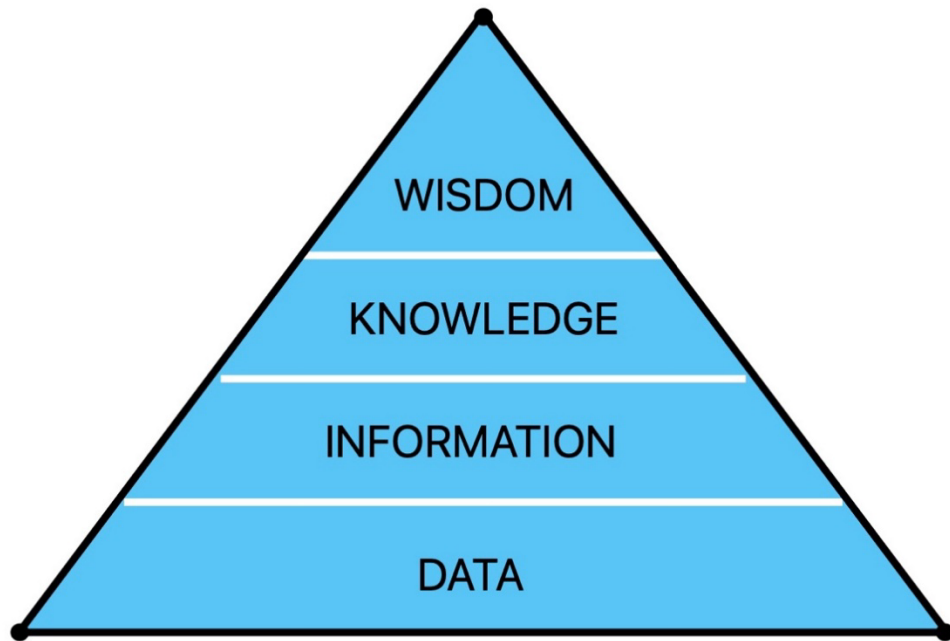


Figure 2. Data value chain (adapted Rowley 2006, 164)

Today, the simple definition offered by the DIKW pyramid may not be entirely correct, although it is widely used in industry, business, and academic circles. When the same simple chart is widely used, its use can perpetuate inaccurate assumptions. Data is not necessarily the basis for information, as data can be wrong or inaccurate. If information is misunderstood, inaccurate, wrong, or misused, it does not create a basis for knowledge either, but on the contrary diminishes it. Correct and accurate information creates a basis for knowledge, but only for its own part. Education and skills are also needed to gain knowledge. Wisdom is refined for man when he uses his intelligence to utilize the collected knowledge for the benefit of humanity and the human environment. (Van Meter 2020. 70-77.)

One of the tasks of administrative information management (AIM) is to create and maintain work instructions for employees. Such knowledge is so described as explicit knowledge. It can be said that AIM processes data into information, which by publishing and maintaining work instructions, the user of the material forms knowledge for themselves that later develops into wisdom (Figure 3). It can therefore be said that data represents the fundamental level, information imparts context, knowledge contributes the know-how, and wisdom enriches by providing the timing and rationale for its utilization. (Jifa & Lingling 2013, 814.)

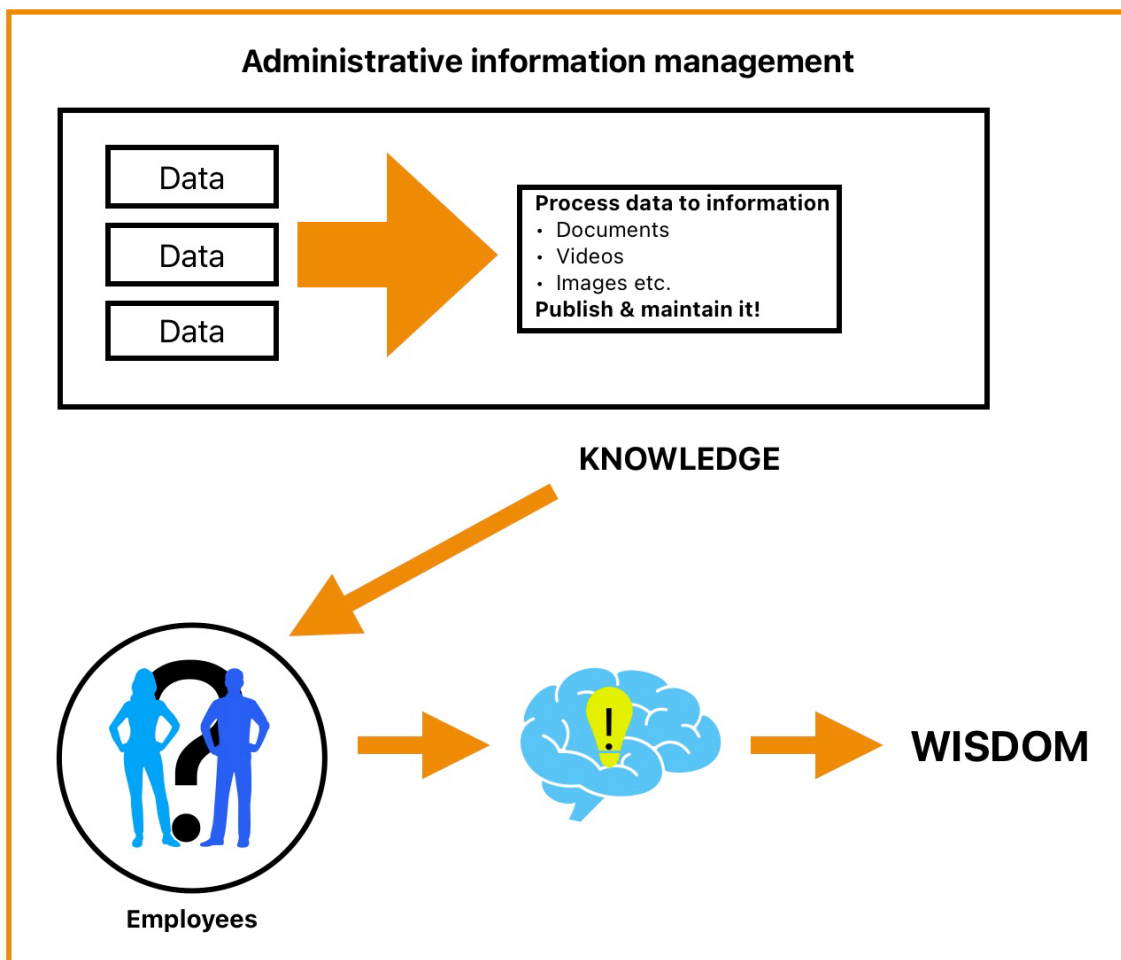


Figure 3. Administrative information management (Oksisto, 2024)

Information management (IM) is wide concept that can mean vastly different things depending on the context. The concept can also be used in the context of information resource and technology management, as well as information management of regulations and standards. (Jylhä 2017, 24.) Information management is an attempt to organize information processes throughout their life cycle in such a way that information can be found, it is accessible, and it can be utilized for various purposes (Finto 2018).

Knowledge and information management can occur in an organization in various matters and encompass many different areas. A person engaged in knowledge and information management can work with policy making, device management, organizational process development, organizational instructions, storage management, communications, office design, research & development, and all manner of facilitation of finding and organizing digital objects. Knowledge and information management encompasses a spectrum of systematic approaches aimed at empowering organizations to achieve success by harnessing the full potential of the knowledge and expertise at their disposal. (Schopflin & Walsh 2019, 3.)

Organizations can also look at knowledge management from three different perspectives, business perspective, management perspective or hands-on perspective. Each of these three perspectives has different purposes and prospects. Hands-on perspective concentrates on utilizing expertise to perform work and tasks associated with explicit knowledge, management perspective`s goal is to guide, define and organize operating models while same time monitoring organizations operations.

From a business perspective, the emphasis is on understanding the reasons, locations, and the extent to which an organization should invest in or leverage knowledge. Strategies, products, services, alliances, acquisitions, or divestments should be evaluated with a focus on knowledge perspectives (Dalkir 2005, 17-18).

In Finland, teaching of information management in the social welfare and healthcare, was launched at the University of Kuopio in August 2000. Since then, the content of the training has been based on the recommendations of the International Medical Informatics Association (IMIA). Today, the university is known University of Eastern Finland (UEF), and it is the only university in Finland where you can study information management in healthcare and social welfare and gain the skills to function as an information management expert in social welfare and healthcare (Saranto & Kinnunen 2019, 211).

Within healthcare organizations, knowledge management (KM) processes can be delineated into three subprocesses: knowledge generation or creation, knowledge codification or storage and retrieval, and knowledge transfer or application. Knowledge generation encompasses all processes related to acquiring and developing knowledge. Knowledge codification involves converting knowledge into formats that are accessible and applicable and knowledge transfer entails moving knowledge from its origin to the point where it can be utilized. (Ayatollahi & Zeraatkar 2020).

In the information management of the wellbeing services county of North Savo, information management processes also comprise all three of these described knowledge management subcategories. Knowledge is created, searched for, and shaped into an understandable form, knowledge is stored in such a way that it is accessible and, if necessary, transferred so that it can be utilized.

3 PURPOSE, AIM AND RESEARCH QUESTIONS

The purpose of this thesis is research how social welfare and healthcare organizations can improve dissemination and distribution of information systems work instructions in an interorganizational level.

The thesis aims to formulate practical recommendations for the organizations that can be used to improve these actions and bring research-based knowledge into daily operations and internal processes. Improving these practices might have an impact on the distribution of work instructions for external providers. Formulated recommendations for information management can be used to develop competence of ICT administration and the employees in managing information systems work instructions.

The study addresses the following questions:

1. How can organizations enhance the distribution of information systems work instructions in an interorganizational level in social welfare and healthcare?
2. What practical recommendations can be formulated for this purpose?

4 RESEARCH METHODOLOGY AND IMPLEMENTATION

4.1 Qualitative research

When qualitative research is conducted, it is always based on different datasets and the research is based on their analysis. The theory of qualitative research is the structured presentation of previously published scientific research publications and the methods and methods of analysis used in them (Juhila, 2021).

This thesis is a qualitative study, which was conducted as a literature review. The thesis examines existing publications on document management, the requirements of digital work instructions and dissemination of information in social welfare and healthcare. In this way, the literature review aims to describe the real-life requirements for secure and accessible document management of health care work instructions. The progress of an integrative literature review has similarities to a systematic literature review, and it is also at its best accurate, transparent and can be repeated using the methods used (Vilkka 2023, chapter 1.2.2).

The description of real life is a prerequisite for qualitative research, where the idea is that reality is complex but cannot be divided into different parts randomly. Events simultaneously shape each other, allowing for the discovery of multifaceted relationships. Studying the topic holistically is the goal of qualitative research. (Hirsjärvi, Remes ja Sajavaara 2009, s. 161).

Qualitative research was chosen as the method of implementation of the work, so that real-life could be studied extensively and diversely and at the same time an understanding of the studied subject area could be achieved. Lester & Cho (2022) says that qualitative research is commonly used to help researchers develop an in-depth and diverse understanding of a particular phenomenon. In doing so, the results of the research range from generating insights for real-life needs, providing detailed descriptions of a specific practical problem, and revealing insights about professional methods in a particular environment.

4.2 Integrative literature review

The integrative literature review is a research approach that examines, evaluates, and combines relevant literature on a specific topic in a cohesive manner, resulting in the creation of fresh frameworks and viewpoints on the subject (Torraco 2005, 1). There are several reasons for doing a literature review. An example is Baumeister and Leary's (1997) presentation of the objectives of a literature review, where the most ambitious argument is the goal of building a new theory and developing an existing one. A literature review also provides an opportunity to evaluate an existing theory, it can be used to build an overall picture of the desired set of issues, and it can be used to identify problems. The purpose of identifying problems is to uncover issues, shortcomings, inconsistencies, or disputes within a specific area of study. In addition to these, a literature review can occasionally aim to offer a historical narrative detailing the evolution of theory and research within a specific subject.

It is also worth noting what a literature review is not. A literature review is not a book review or a described bibliography. The requirements for a literature review usually include a critical examination of articles and books, for that reason lists alone with short summaries do not meet this requirement. (Salminen 2011, 5.)

The descriptive literature review is free from precise rules and the selection of its material is not limited by methodological rules and can therefore be considered an overview. However, if necessary, the characteristics of the phenomenon or subject being reviewed by the literature can be classified and identified extensively. Compared to a meta-analysis or a systematic literature review, the research questions are broader. Integrative literature review and narrative literature review are two somewhat different subgenres of descriptive literature review, of which the integrative literature review in particular, is very close to systematic literature review. (Salminen 2011, 6.)

The thesis has been implemented using the methods of an integrative literature review. The aim was to study the topic of the thesis using a diverse approach, and to use research material produced using different methodological research methods as the basis for the analysis. The aim of the thesis was to critically examine the research applied for and possibly produce new information related to the topic. Vilka (2023) explains, that the purpose of the study affects whether the researcher includes original studies which are qualitative or quantitative studies, or both. The author also determines whether the research is based on empirical observations or theoretical premises.

The integrative literature review provides a diverse picture of the research topic and produces new information from what has already been studied. It helps in reviewing, evaluating, and combining literature. An integrative review broadens the perspective of the topic compared to a systematic review, allowing for a larger sample of research. It allows the use of different research starting points in the analysis. Although an integrative review contains narrative features, it differs from a narrative review in terms of critical examination and the use of condensed research material, which is a methodological requirement of an integrative literature review. (Salminen 2011, 8.) In addition, it follows the stages of systematic review, and as Salminen (2011, 11) explains, Cooper (1989) summarizes these in five stages (Figure 4).

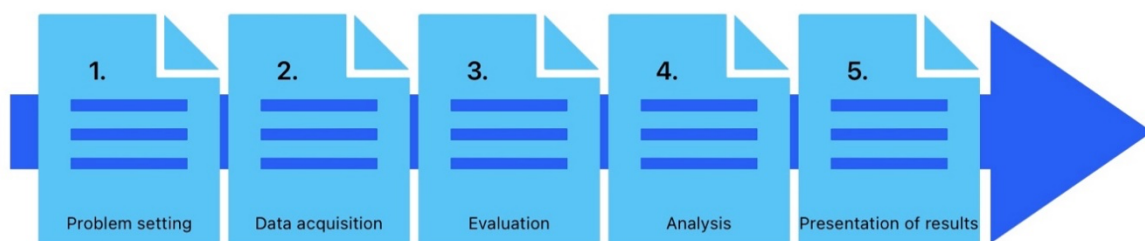


Figure 4. Five stages of integrative literature review (adapted from Steven Day 2018)

These stages are problem setting, data acquisition, evaluation, analysis, and presentation of results. Thus, an integrative literature review forms a combination between narrative and systematic review. (Salminen 2011, 8.)

4.3 Data collection

In all literature reviews, the data collection process should always be conducted transparently, accurately, structured and comprehensively, but still in such a way that it is proportional to the research question. The method of the data collection process must be well planned, justified, and repeatable if necessary. When the data collection advance plan is well prepared, it enables an application process that can identify representative, relevant, comprehensive, and impartial material. The methods refer to identifying keywords, defining research questions or question, limiting searches with justifiable exclusion and inclusion criteria, using at least Boolean search in databases, and understanding the differences between controlled and natural language in search planning. (Vilkkä 2023, chapter 2.1.2).

Data retrieval was first done through test searches using several different types of databases, such as Google Scholar, Sage Premiere, CINAHL Ultimate, Science Direct and PubMed database. In addition to research in the field of social welfare and health care, research from other fields was also considered in database searches due to the cross-sectional nature of the different disciplines of the thesis. The aim was to maintain responsible conduct of research by selecting only databases that are generally known and found to be reliable. Tapa-term bank and Finto-thesaurus & ontology service was used in the designing search terms for this thesis in preliminary stage and for test searches (Table 1). Tapa-term bank is maintained by the Finnish Terminology Centre and includes more than 365,000 terms and definitions of specialties. The most common languages in the term bank are German, English, Swedish and Finnish. (The Finnish Terminology Centre 2005.) Finto is a Finnish thesaurus and ontology service for the use and publication of classifications, ontologies and glossaries promoting interoperability (Finto 2024).

Table 1. Designing search terms with Tapa and Finto

Finnish term	English term
tiedonhallinta	information management, data management, knowledge management
ohjeet	instructions
tiedon jakaminen	dissemination of information
työohje	work instruction
saavutettavuus	accessibility

Clackamas Community College Library's Search string builder (CCC library) was used as a help for creating search strings for data collection. CCC library's search string builder is not a database, and it won't do searches on behalf of users, but it helps and teaches users to create search strings using Boolean operators (Clackamas Community College, 2021). With the help of this tool, the search string became "information management OR knowledge management OR data management AND instructions OR work instructions AND accessibility OR dissemination of information".

One of the most important stages of high-quality research is the creation of inclusion and exclusion criteria. These also define the nature of the elements or test subjects involved in the study. When making decisions about criteria, the aim is usually to ensure that there is a balance between generalizability to large populations and strong research (Connelly, Lynne M, 2020). Table 2. shows the intake and exclusion criteria used in this study. The criteria are the language of the publications, the date of publication and the availability of the publication, as well as whether the publication is original research, an article published on original research, a literature review, a doctoral dissertation, or a review.

Table 2. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Language of publications: English or Finnish	Languages of publications other than English or Finnish
Publication date between 2012 and 2024	Published before 2012
Full text available electronically	The full text is not available electronically
An article, thesis or research answers the research questions	An article, thesis or research does not answer the research questions
original research, an article published on original research, a literature review, a doctoral dissertation, original article, or commentary article	not original research, published article not based on original research, not original article, not commentary article

The first test search for CINAHL Ultimate was performed using a pre-designed search query "information management OR knowledge management OR data management AND instructions OR work instructions AND accessibility OR dissemination of information". Filters used for this search was full text available, publication date between 2012 and 2024, language selection English. This search returned fourteen results. Sage Premiere returned 268428 results with similar search criteria. A search in the PubMed database with similar search terms and a search query returned 3541 results.

Based on the test searches, the pre-designed search query had to be changed. In this stage of the thesis, Savonia University of Applied Sciences' information specialist helped in the reformulation of the final search query. In cooperation with the information specialist, the new search query formulated as: "Information management" OR "knowledge management" OR "data management" OR "Knowledge Bases" AND instructions OR directions OR manuals OR guideline* AND accessibility OR "dissemination of information" OR "Program Development" OR "Program Implementation" OR "Access to Information".

Different databases used the search query in slightly different order, with additional search words and with different Boolean operators, as described in Table 3. These are also the final search queries for the study and serve the basis of which the material included in the study has been selected.

Table 3. Search queries

Database	Search query	results
PubMed	"database management" AND "Information management" OR "knowledge management" OR "knowledge bases" AND instructions OR guidelines AND "access to Information" OR "dissemination of information" OR access to learning materials	983
CINAHL Ultimate + SocINDEX	Information management OR knowledge management OR data management OR Knowledge Bases AND dissemination of knowledge OR knowledge sharing	148
Science Direct	"data repositories" AND "database management" AND "requirements" OR "best-practices" AND "architecture" AND "healthcare"	311
Sage Premier	"Information management" OR "knowledge bases" AND "instructions" OR "guidelines" AND "sharing Information" OR "dissemination of information" OR "document storing" AND "shared repository" OR "shared repositories" OR "shared database" AND learning AND "employee orientation"	1691

In the PubMed database used search query was "database management" AND "Information management" OR "knowledge management" OR "knowledge bases" AND instructions OR guidelines AND "access to Information" OR "dissemination of information" OR access to learning materials". This search yielded 983 results. Twenty-one studies or articles were selected for the study after reading the abstract. In the end, after reading whole text and mirroring the text on the research questions, six articles or studies were accepted for the literature review.

The SocIndex database was also included in the CINAHL Ultimate database search due to the topic of a thesis that deals with both social welfare and healthcare. Search query for this combined database search was Information management OR knowledge management OR data management OR Knowledge Bases AND dissemination of knowledge OR knowledge sharing. This search query yielded a total of 148 results, of which, after reading an abstract, nine studies or articles were selected. Based on the research question, and after reading whole text, two studies or articles were accepted for the final study.

The search query used in the Science Direct database differed slightly from the others, being narrower than the others. The search query that was used, was "data repositories" AND "database management" AND "requirements" OR "best-practices" AND "architecture" AND "healthcare". This search with filter only research articles, yielded 311 results, of which nine studies and articles were selected based on abstract reading. Based on reading the entire text and based on research questions, three research articles were selected for the actual study.

Sage Premiere database also used a slightly different search query to narrow down the results. In this database, used filters were "only research articles", "only content that I have full access to", "social sciences and humanities" and "health sciences". Search query used was "Information management" OR "knowledge bases" AND "instructions" OR "guidelines" AND "sharing Information" OR "dissemination of information" OR "document storing" AND "shared repository" OR "shared repositories" OR "shared database" AND learning AND "employee orientation", produced 1691 results. After reading the abstract, eight studies or articles were selected. Two research articles were included in the actual study.

A total of thirteen studies or articles meeting the admission criteria were selected for the research material of the literature review (Figure 5.). Google Scholar was not included in the final databases used, since it does not allow full text filtering in its searches and the results quality is very variable.

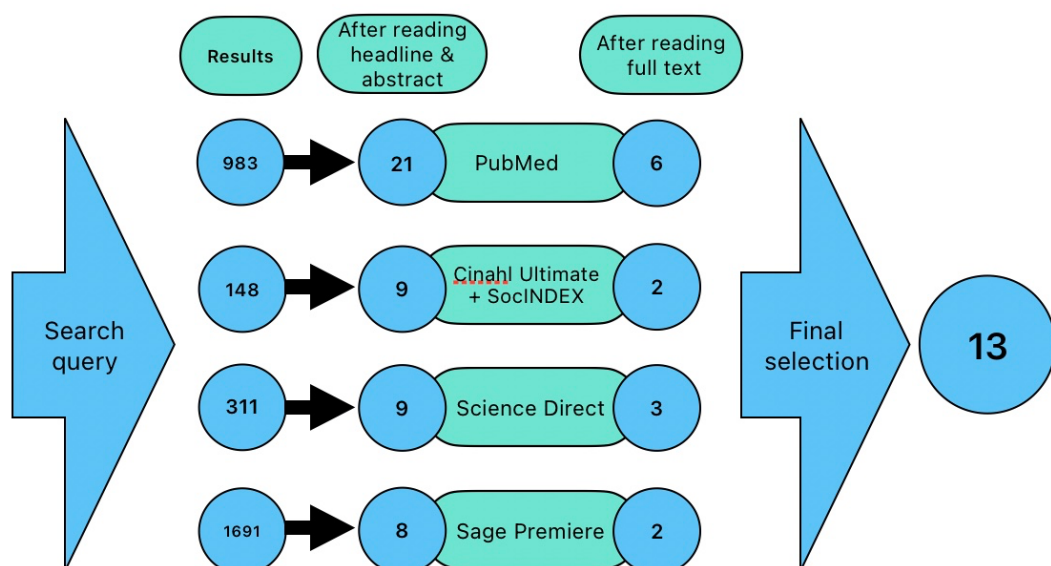


Figure 5. Number of accepted research and articles (Oksisto, 2024)

4.4 Quality & evaluation of the data

If the quality of the data has not been sufficiently assessed and it contains material that is inappropriate for the research, it may cause problems for the research. Research consisting solely of grey material used without a well-founded selection, and research without peer-reviewed scientific studies at all, creates a very problematic starting point. In integrative reviews, quality assessment means that selected studies are processed from the perspective of methodological application, concepts, use of theories or models, for example, from the perspective of methodological application, the use of concepts, theories, or models. Those studies that are relevant to your own research are subject to a detailed evaluation. The needs and rules of quality assessment differ in different review methods. The starting point for quality assessment is always how the selected research responds to the research question and the purpose of the review, and how the research has been conducted. (Vilkka 2023, chapter 3.2.1.)

The quality and suitability of the research data for this literature review was examined already at the application stage based on the admission criteria, and the material was excluded based on topic, availability, research methods, correspondence to research questions and time criteria. The first assessment took place based on the abstract, the second after reading the entire text. Following these steps, thirteen studies were included in the final study. All thirteen publications meet the criteria of the definition of scientific research. Among them are literature reviews, scoping reviews, technical reviews, scientific publications, mixed-method studies, auditing research and practice research studies.

4.5 Data analysis

There are no formulas, models, or guidelines for analyzing qualitative data that could be considered universally applicable operating methods. The aim of the analysis is to increase the information value of the studied data by making small to large by going deeper than the surface into the studied data. This is also often referred to as interpretation (Gunther & Hasanen 2021). The content analysis of this study included three main stages: the preparatory phase, the inductive analysis phase, and the reporting of the results. The unit of analysis decided during the preparation phase is a set of ideas. This research attempt to identify thought entities from the analyzed studies and publications that answer the research questions presented in the literature review. Vilkka (2021, chapter 6) says that the decision on where to start looking for a typical report and logic of action must be made after the data has been collected and before the actual analysis.

A set of ideas can consist of several sentences, but the most important thing is that it answers the research questions set. Thought sets can also contain several different things that answer research questions. It should be noted that one set of ideas can become several simplified expressions, but all these answer research questions from a slightly distinct perspective (Elo, Kajula, Tohmola & Kääriäinen. 2022, 219).

Data-driven, i.e., inductive, analysis does not use a ready-made classification framework, but the researcher produces their own classification based on the data, according to which the data is analyzed (Elo et.al 2022, 218.) The collected studies were analyzed using an inductive content analysis

method, because there was little material available on the topic essay studied. In this case, the data-driven approach is better suited for analysis than the deductive, i.e., theory-based approach.

The first selected research material was carefully read several times. The purpose of this was to obtain a reliable overall picture of the material and their content. The actual analysis began by identifying the original expressions that were identified in the data. All expressions that answered the research questions were classified as original expressions. After identifying and tabulating the original expressions, these expressions were formulated into simplifications. These forty-six (46) simplifications were tabulated in the same table as the original ones, so that the simplifications formed were recorded on the same line as the original expression. The original expressions and simplifications are shown in the Table 4.

Reducing research data means reviewing and pruning the collected research data in such a way that information that is irrelevant to the research questions is excluded. The research material is divided into parts and condensed, and this work is guided by the research questions and research problems presented. After reduction, the data is regrouped into coherent entities based on what is being searched for in the studied data. Groups are named with concepts that best describe the formed entities. This grouping thus forms a theoretical model, classifications or concepts that make it possible to understand the meaning of the research data as a whole. (Vilkkä 2021, chapter 6.)

When simplifications are made, all additional filler words are removed from the original expressions, and they are formulated into literary expressions. It should be noted, that when simplifications are made, the description and content from the original expression does not change, and the person forming the reduction does not make his own interpretation. One simplified expression always contains only one substance. (Elo et.al 2022, 220.)

Table 4. Original expressions & simplifications.

Original expression	Simplification
A key enabling technology for information sharing in the context of the Industry 4.0 settings might be International Data Spaces (IDS) and particularly the IDS Connectors and their capabilities on real-time data exchange.	Enabling technology International Data Spaces (IDS)
	IDS connectors
	Real-time data exchange
By building a high-level organizational model detailing the roles and governance rules.	Organizational model detailing the roles
	Organizational model detailing the governance rules
By modeling and providing efficient personalized access to very large collections of multi-version clinical guidelines, which can be stored	Providing personalized access to collections of multi-version clinical guidelines
	Modeling collections of multi-version clinical guideline collection

both in textual and in executable format in an XML repository.	Storing guidelines in executable format
	Storing guidelines in textual format
E-Learning tools like web-based education, social interactive platform and question-answer forum.	With question answer forum
	With web-based education
	With social interactive platform
The creation of an e-learning resource (website) did significantly contribute to a positive student experience and their transition to a practical model that interlinked academic support and self-directed learning.	The creation of e-learning resource contributes to positive user experience
	The creation of e-learning resource contributes to user's transition into a practical model that interlinked academic support
	The creation of e-learning resource contributes to user's transition into a practical model that interlinked self-direct learning
Identify available resources & expect changing technologies	Identify available resources
	Expect changing technologies
Three critical elements: clearly stated shared values and goals, active engagement, and trust and respect among partners.	Shared values
	Shared goals
	Active engagement
	Trust among partners
	Respect among partners
Generate an online repository of learning and assessment materials.	Online repository of learning
	Online repository of assessment material
Compiling learning products hosted from disparate locations in a single user-friendly online catalog may facilitate their implementation in public health agencies.	Bringing learning products together in one user-friendly online catalogue
Options include, but are not limited to, improve organizational identity and connectedness, align organizational culture with information and knowledge sharing goals and needs, develop information and knowledge sharing values, create incentives for information and knowledge sharing, promote boundary spanning, control information overload and improve levels of trust within and across units, sections, and departments.	Improve organizational identity
	Improve organizational connectedness
	Align organizational culture with information and knowledge sharing goals and needs
	Develop IM & KM sharing values
	Create incentives for information and knowledge sharing
	Promote boundary spanning
	Control information overload
	Improve levels of trust within and across units, section, and departments

Digital knowledge storages for the long-term storage of experiences, documents, reusable code etc., which should be easily accessible with reusable content. Wikis for example support employee collaboration and conversation. Organizations may use knowledge portal which typically integrates different repositories and supports knowledge management processes.	Digital knowledge storages for the long-term storage
	Easily accessible digital knowledge storages
	Reusable content in digital storages
	Wikis for collaboration and conversation
	Knowledge portal with integrated repositories
	Knowledge portals supporting knowledge management processes
Co-creative approaches with key stakeholders through a novel methodological approach inspired by design thinking.	Approach key stakeholders
	Design thinking inspired approaching
Technical and social factors need to be considered simultaneously.	Consider social factors
	Consider technical factors

Similarities and differences were formed and identified from the simplifications, and subcategories were formed based on these definitions. Subsequently, the subcategories formed were examined to identify possible overlaps. A total of five subcategories were formed, Collaboration and Engagement, Governance and Structure, Enabling Technology, e-Learning and Consideration Factors. Subcategories and their formation described in Figure 6.

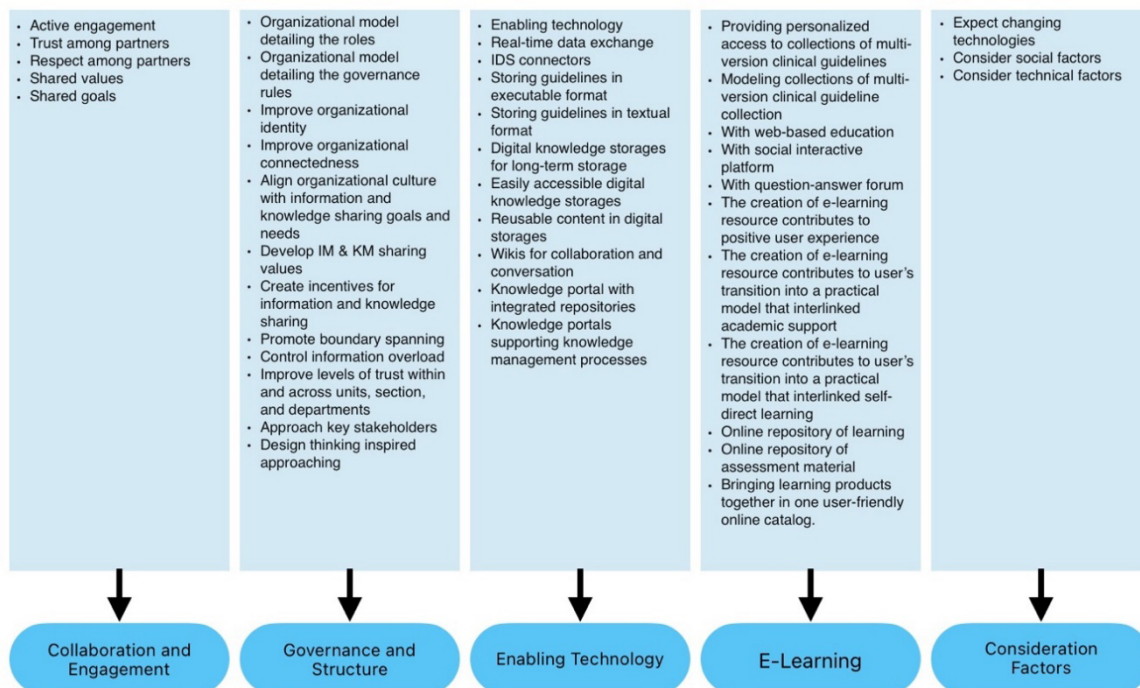


Figure 6. Sub-categories (Oksisto 2024)

The formed subcategories were then compared with each other and, based on the similarities identified from these subcategories, upper categories were finally formed. The three parent categories in

Figure 7 are: Organizational Development and Engagement, Digital Learning Infrastructure and Consideration Factors. The classification was not extended further. The concepts in these three main categories answered the asked research questions.

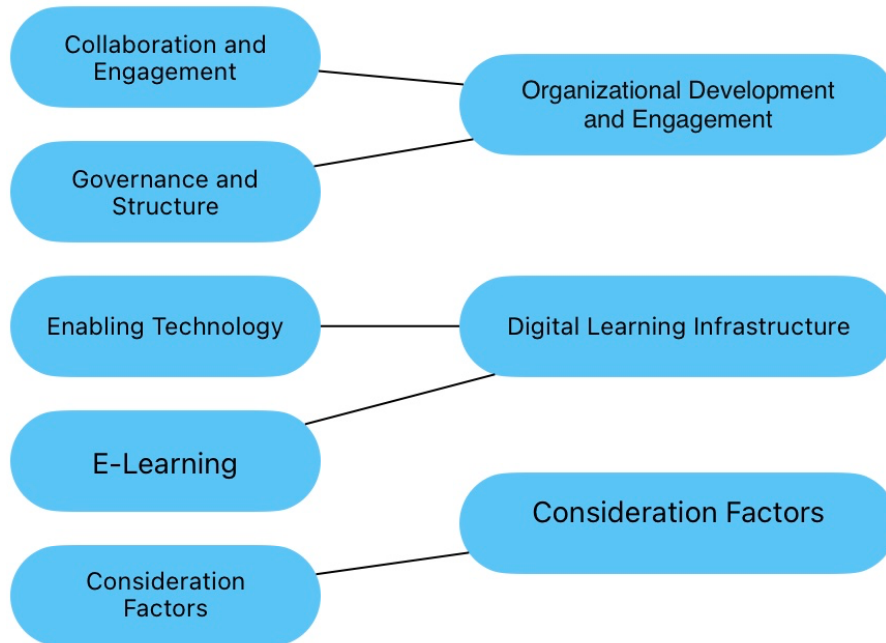


Figure 7. Formulation of parent categories (Oksisto 2024)

5 RESULTS

5.1 Organizational Development and Engagement

The two subcategories, Collaboration & Engagement and Governance and structure formed together the parent category and a concept Organizational Development and Engagement. Study revealed several key components related to the organizational models. Organizational development, engagement and organizational governance and importance of organizational models are highlighted in the studies. These elements ensure clarity and accountability among employees. Kornyshova, Boutal, Benramdane, & Kamal (2023, 4625-46256) says that traditional roles need to be redefined, and they described new digital business ecosystems model, in which business ecosystem actors can have several roles. By doing so, more flexible, and efficient data and resource availability is provided at their sources. They also proposed two level governance matrixes to summarize organizations rules and established functions. Basten & Haamann (2018) highlight the importance of the Chief Knowledge Officer (CKO) in their own research, as CKO oversees interactions with external information and knowledge providers and negotiates contracts with them, serving as a bridge between internal and external knowledge sources. In this role, the CKO facilitates learning from external entities. Additionally, by establishing a knowledge framework that allows knowledge employees to archive and access earlier understanding in a standardized manner, the CKO supports employees in learning from historical occurrences.

Efficient integration of Information and knowledge sharing can be affected by variation in used technology, organizational structure, and culture. Several choices exist for addressing the obstacles by enhancing the methods employed for coordination and the environmental setting for sharing. These possibilities encompass enhancing organizational identity and connectedness, ensuring alignment of organizational culture with information and knowledge sharing objectives, cultivating values that prioritize information and knowledge sharing, establishing incentives to encourage such sharing, fostering boundary spanning, managing information overload, and enhancing trust levels within and between units, divisions, and departments. (Abrahamson & Goodman-Delahunty 2014.) Benski, Zambruni, Stancanelli, Landinarisoa, Hantavololona, Rachel Andrianarisoa, Manjary, Capello, de Tejada, Reich & Guyer (2023) propose that establishing trust and respect among partners and organizations is paramount for successful collaborations and partnerships. These foundational elements enhance communication, facilitate cooperation, and foster mutual understanding. A good partnership relies on three essential components: clearly articulated shared values and objectives, proactive commitment, and trust and mutual esteem among partners.

Approaching key stakeholders is important for promoting collaboration and engagement within organizations according to studies. Actively engaging stakeholders and involving them in decision-making processes leads into more effective implementation of information and communication technology initiatives. Moreover, adopting a design thinking approach encourages creative problem-solving and innovation, enabling organizations to address complex challenges and adapt to changing technological environments. Laugaland, Akerjordet, Frøiland & Ingunn (2023) pointed out that by

involving registered nurse mentors from diverse backgrounds, new perspectives and valuable insights emerged in the collaborative process. The integration of all stakeholders in co-creating digital educational initiatives in clinical nursing education is essential. Design thinking, which challenges educator-centric approaches, has been suggested as a methodology to enhance student nurses' creativity, problem-solving, and empathy.

Furthermore, the integration of enterprise architecture has been found to positively impact organizational efficiency, quality, and cost-effectiveness. Amiyo, Alunyu, Nabukenya & Wamema (2023) says, that creating a standardized digital healthcare environment will enhance the integration of Digital Health systems, leading to more efficient, cost-effective, high-quality, and safe healthcare services, and these validated requirements can also serve as guidance for the development of Digital Health solutions. To counteract the adverse effects of inefficient communication in virtual environments and mitigate the resulting drawbacks for both employees and companies, it is crucial to take proactive measures and therefore, it is essential to consider both social and technical factors like social dynamics within the team, team climate, trust, and shared understanding. (Tietz & Werner 2022, 1758).

5.2 Digital Learning Infrastructure

This concept includes two sub-categories, which are Enabling technology and e-learning. In a large part of the selected studies, these topics were discussed as the main enabling factors in terms of information sharing and accessibility. According to studies, the data exchange and storage emerged as critical components within healthcare education. Approaches based on International Data Spaces (IDS) could potentially enhance technological democratization in the realm of interorganizational information exchange, but they noted also, that there is potential for enhancing the IDS Connector, its elements, and the International Data Space overall in the future (Pinheiro, Sousa & Toscano 2022, 616). Tietz & Werner (2022) noted at their study that the success of knowledge sharing is influenced by the use of rich media and clear technological requirements. When selecting communication tools, it is crucial to ensure they offer a high level of information richness and multiple communication channels (text input, sound, image) to enhance interactivity during the sharing process and to effectively convey complex ideas. Additionally, utilizing synchronous communication channels enables immediate feedback, which is beneficial for effective communication.

According to studies, storing clinical guidelines in both executable and textual formats ensure accessibility and usability, while digital knowledge storages provide sustainable solutions for long-term storage needs. Moreover, the availability of easily accessible digital knowledge storages, including wikis and knowledge portals, fosters collaborative learning environments and supports knowledge management processes.

As Grandi, Mandreoli & Martoglia (2012) implemented methods for modeling and facilitating efficient personalized entry to extensive selections of multi-version clinical guidelines. These guidelines can be stored in both textual and executable formats within an XML (Extensible Markup Language) repository. Many creators have recommended the use of the XML language and utilized it in various

research endeavors as a fitting medium for encoding and disseminating clinical guidelines over the Internet.

The technological frameworks furnish assistance for swift knowledge generation, storage, access, transmission, and implementation within the organizational context. This may encompass Information Technology systems like data warehouses, the Internet, intranets, knowledge directories, and/or portals. In general, the processes-technology aspect, encompassing the information dissemination mechanisms, systems, protocols, and technologies encompassing both internal and external domains within the organizational framework, was highlighted by numerous participants as the primary obstacle to the dissemination of information among the three police entities. (Abrahamson & Goodman-Delahunty 2014.)

According to research results, enabling technology plays a pivotal role in the technological adaptation process within healthcare education. By embracing web-based education, social interactive platforms, and question-answer forums, educational institutions enhance the learning experience and promote self-directed learning among students. As Jotwani, Srivastav, Tripathi, Deo, Baby, Damodaran, Singh, Suri, Bettag, Roy, Buser, Mehlitz, Lalwani, Garg, Paul, Prasad, Banerjee, Kalra, Kumar, Sharma, Shankar & Mahapatra (2014) present, Structured, designed, and verified modular courses are currently essential. These courses should be organized around specific topics to ensure seamless and effective knowledge transfer. E-learning platforms should not be perceived as simple online repositories; rather, they should be interactive platforms with incentives and virtual classroom capabilities. Acosta, Anstice, Brailsford, Bhargava, Jacobs, Sisley & Ross (2018) tells, that the implementation of an interactive iteration of the website notably enhanced the student experience positively and facilitated their shift towards a pragmatic model that integrated educational support and independent learning, but at the same time, they state that the availability of the interactive website didn't notably boost students' grades and there was some criticism that there was no support to with the use of the online tool.

Walsh, De Villiers & Golakai (2018) study introduced solution which objective was to transform the college into an electronic teaching and learning environment while enhancing the Information Technology skills of all staff, lecturers, and students. The aim was to provide access to electronic textbooks during studies and post-graduation. This necessitated access to email, verified login, cloud storage, Windows operating system, all Microsoft applications, and extra software. They discovered that the effectiveness of e-learning heavily relies on a robust infrastructure that offers accessible services, requiring significant investment and ongoing maintenance. As part of this solution, all learning materials can be stored in the cloud-service, Microsoft OneDrive.

Wood, Rogers, Frost, Revere, Rose & D'Ambrosio (2019) study states that public health professionals can make more informed decisions about selecting training programs and can better justify investing time and exertion in such selection when they have access to transparent details regarding a tool's content, intent, and advantages. Consolidating learning resources from various sources into an easy-to-use digital catalog may streamline their adoption in public health agencies. By offering multiple search options and presenting high-quality learning materials tailored to diverse agency requirements are likely to experience higher usage.

5.3 Consideration Factors

The researched studies also highlighted the dynamic nature of technology in healthcare, emphasizing the need for organizations to anticipate and adapt to technological advancements. Studies underscore the importance of shared values and goals among stakeholders in digital healthcare initiatives. Recognizing the influence of social factors on the design and implementation of digital healthcare environments is essential. Taking social factors into account ensures that digital healthcare solutions are tailored to the needs and preferences of diverse stakeholders.

Niebuhr, V. Niebuhr, B. Trumble & Urbani, (2014) recommend that it is essential to anticipate changes as technology continues to evolve. This means being ready to update instructional materials regularly. Identifying available technological resources is crucial for the development of your program. Understanding what tools and resources you have access to will help you effectively create and implement your online faculty development initiatives.

6 CONCLUSION AND DISCUSSION

This integrative literature review examined how social welfare and healthcare organizations can improve the distribution of work instructions in interorganizational environment. The study focused on finding best practices, recommendations, and experiences on improving the accessibility of information outside organizations. The studies included in the review answered the research questions in a diverse manner. The studies covered a wide range of topics related to e-learning, development of organizational models, information sharing between organizations, information management, database development, organizational learning models, document management, and work instructions management. All studies were published between 2012 and 2024. The literature review encompassed several key findings regarding organizational development, engagement, and digital learning infrastructure within healthcare and related sectors.

Regarding to organizational development and engagement, the study identified the importance of redefining traditional roles to adapt to new digital business ecosystem models. Collaboration, governance, and organizational structure were highlighted as crucial components in fostering clarity, accountability, and efficiency among employees. Moreover, trust, respect, and effective communication emerged as foundational elements for successful partnerships and collaborations within organizations. The integration of enterprise architecture was also noted to positively impact organizational efficiency and cost-effectiveness.

In terms of digital learning infrastructure, enabling technology and e-learning platforms were recognized as critical factors in promoting information sharing and accessibility within healthcare education. Storage of clinical guidelines in both executable and textual formats was emphasized for enhanced usability and sustainability. Additionally, the technical infrastructure, including data warehouses and knowledge directories, was highlighted as essential for swift knowledge generation, retrieval, and application.

Study also introduced the section consideration factors, which underscored the dynamic nature of technology in healthcare and emphasized the importance of anticipating and adapting to technological advancements. Stakeholder alignment and recognition of social factors in the design and implementation of digital healthcare environments were also deemed essential for tailoring solutions to diverse stakeholder needs.

The conclusion drawn from the literature review underscores the critical role of organizational development, engagement, and digital learning infrastructure in the healthcare sector. It highlights the need for redefining traditional roles to align with new digital business ecosystem models, emphasizing collaboration, governance, and organizational structure as key elements for enhancing efficiency and accountability among employees. Kornysheva et al. (2023) highlight the need for organizational change in traditional roles, while Benski et al. (2023) emphasize the importance of clear shared values and goals between organizations, as well as mutual respect and trust.

Regarding digital learning infrastructure, enabling technology and e-learning platforms are identified as essential factors for promoting information sharing and accessibility in healthcare education. Abrahamson et al. (2014) study highlight the use of versatile technology and its significance for the

production and maintenance of rapid information. Jotwani et al. (2014) define the requirements for a diverse online learning environment, which can promote learning and knowledge sharing. Walsh et al. (2018) highlight in their study the importance of technology competence when using online learning environments, while Acosta et al. (2018) also highlight in their study that online learning environments increase learning satisfaction and guide learners towards self-competence.

The storage of clinical guidelines in various formats and the utilization of technical infrastructure such as data warehouses and knowledge directories are recognized as crucial for facilitating knowledge generation and application. Pinheiro et al. (2022) had also reached this conclusion in their own study, which proposed international data spaces as a solution, and Grandi et al. (2014), who discussed XML in their study, and Abrahamson et al. (2014), who also highlighted the importance of data warehouses in their results. The dynamic nature of technology in healthcare and the necessity of anticipating and adapting to technological advancements also seem to play an important role. Niebuhr et al. (2014) highlight this well in their study, where they state that stakeholder alignment and consideration of social factors in the design and implementation of digital healthcare environments are vital for tailoring solutions to meet the diverse needs of stakeholders.

In summary, the study's findings are relevant and applicable to the context of interorganizational collaboration, offering valuable insights and practical recommendations for enhancing the distribution of information systems work instructions across organizational boundaries in social welfare and healthcare.

6.1 Recommendations

Based on the research results, it can be recommended that by developing a digital learning environment, introducing, and leveraging technological solutions and with organizational development, information sharing in an interorganizational context can be improved. Focusing on improving these themes, organizations can enhance their ability to disseminate work instructions across different entities within the social welfare and healthcare sectors. On a practical level, this means, for example, establishing the role of Chief Knowledge Officer within an organization responsible for overseeing all details related to information mobility and accessibility, as well as for related agreements and cooperation between organizations. It is also recommended to emphasize the importance of collaboration, trust, and effective communication in organizations.

The introduction of data repositories and a digital learning environment that enable easy access for users across organizational boundaries is also recommended. It is recommended that the data stored in the repositories is both textual and executable format. It is recommended to use cloud services. In addition to or alongside databases, it is recommended to build an online learning environment. E-learning platforms should not be built as static repositories, but rather as dynamic interfaces equipped with interactive elements, incentives, and virtual classroom functionalities. Learning materials should be well structured, modular, and include interactive elements. It is recommended that a feedback channel is available on the learning platform. When selecting communication tools, it is crucial to ensure they offer a high level of information richness and multiple communication channels.

It is also advisable to anticipate and be prepared for technological changes and technological developments. Therefore, purchases, plans and decisions should always be made with the future in mind, not only for the needs of the present. By emphasizing these recommendations, organizations can enhance their ability to disseminate work instructions across different entities within the social welfare and healthcare sectors, while promoting efficiency and effectiveness in information dissemination.

6.2 Research and development proposals

Based on the findings, sharing information with partners outside the organization, and its development consists of many different areas. Studying these different areas in the future will help social welfare and healthcare organizations improve and enhance information management and have an impact on the distribution of work instructions for external providers. Several research and development proposals can be formulated to address the identified challenges and opportunities.

Further research is needed to explore innovative approaches for redefining traditional roles and fostering collaboration within digital business ecosystem models. Development of frameworks and guidelines for establishing trust, respect, and effective communication among partners and organizations in healthcare collaborations. Investigation into the integration of enterprise architecture and its impact on organizational efficiency and cost-effectiveness.

Exploration of novel technologies and methodologies for enhancing information sharing and accessibility within healthcare education, including the development of user-friendly knowledge portals and repositories. Continued efforts to anticipate and adapt to technological advancements in healthcare, with a focus on stakeholder alignment and recognition of social factors in the design and implementation of digital healthcare environments.

Overall, the literature review provides valuable insights into the current state of organizational development, engagement, and digital learning infrastructure in healthcare and offers directions for future research and development efforts.

6.3 Ethics of thesis

Reliability, honesty, respect, and responsibility form the cornerstones of good scientific practice in the European Research Integrity Guidelines. For these good scientific practices to become a reality, they require different procedures that ensure that scientific research is conducted in accordance with these practices from start to finish. (Finnish National Board on Research Integrity, 2023).

In accordance with fundamental ethical principles, research should uphold the human dignity, privacy, autonomy, and rights of participants. A crucial ethical guideline is to prevent significant risks, harm, and adverse effects to individuals, communities, and other subjects involved in the research. Ultimately, researchers bear responsibility for the advancement of science. They must refrain from impeding scientific progress through actions that infringe upon participants' rights, manipulate results, or engage in unethical conduct. Research violating participants' rights or distorting results may

hinder subsequent research within the same target group or on the same topic for an extended period. Ethical research and foundational values include the aspiration to generate novel and meaningful insights into areas where knowledge is lacking. When planning research, it is vital to consider the specific usefulness of the study and for whom it is intended. Good scientific practice entails honesty, diligence, and precision throughout all stages of research. In qualitative research, researchers carefully reflect on their ethical choices when presenting the study. They openly discuss, justify, and evaluate these decisions' impact on the final results. (Vuori 2023.)

This thesis was not a medical study and did not target nor address data related to customers, patients, or staff, and therefore a research permit from the North Savo Regional Research Ethics Committee was not required. The guidelines of the Finnish National Board on Research Integrity strongly guided thesis preparation from the planning stage to research itself and publication. Following the structures of scientific writing, a report was drawn up on the research.

6.4 Reliability and validity of the thesis

Reliability and validity constitute the foundational principles in research, serving to evaluate the quality of research. These concepts collectively determine the effectiveness of a methodology, data collection technique, or data analysis in measuring study variables or parameters. In research validity pertains to what an instrument measures in a way that the results genuinely measure what they are intended to measure and its effectiveness in doing so, while reliability focuses on the accuracy and consistency of the data obtained, considering the degree of reproducibility of the results if the study is repeated under similar conditions. The assessment of research validity holds greater significance and poses a more challenging task compared to reliability. To attain valuable outcomes, it is crucial for data collection methods to be valid, ensuring that the research measures precisely what it intends to measure. This guarantees that the conclusions drawn from the results are also valid. Enhancing data reliability and validity requires employing diverse methodologies during data collection. Employing a methodology with high validity and reliability enhances research quality, ensuring comprehensive, replicable, and accurate results. The primary goal of establishing research validity and reliability is data accuracy. Validity and reliability, while distinct in meaning, are closely interconnected. (Ahmed & Ishtiaq, 2021).

Quotes and/or quotations from original publications have been used in the thesis, and in their use, it has been considered that they have been made in accordance with good practice and the scope is required by the purpose. This policy is in accordance with the Copyright Act. (The Copyright Act 1961/404, 22§.)

The reliability of the thesis might be weakened by the fact that the author of the thesis is one person. This has been considered so that the thesis was implemented throughout the process in accordance with the instructions and principles set for it, and the reliability of the thesis was maintained by clearly and accurately explaining all the stages related to the work in the report. The use of several databases and the comprehensive data retrieved from them also improves the reliability of this research. The language admission criteria for the publications included in the study were only

Finnish and English-language publications, and this enabled a large amount of material in the databases. Only electronic publications were included as exclusion criteria, but this is not expected to exclude a large number of publications. Authors professional experience and personal work in information and communication management sector is considered in the conduct of the study. Author has maintained clear boundaries between roles as an employee and as a researcher, and diverse range of sources and perspectives has been used for the study. The author has made a conscious effort to avoid using source materials based solely on his own experience and interests.

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APPENDIX 1. STUDIES AND THESIS SELECTED FOR THE LITERATURE REVIEW

AUTHOR(S), NAME AND PUBLICATION DETAILS OF THE STUDY	PURPOSE OF THE STUDY	RESEARCH METHOD	MAIN RESULTS
<p>1. Wood, Susan J. Rogers, Megan H. Frost, Madeline C. Revere, Debra. Rose, Barbara A. D'Ambrosio, Luann. 2019. Enhancing Access to Quality Online Training to Strengthen Public Health Preparedness and Response.</p>	<p>Enhance access to high-quality online training resources created between 2010 and 2015 by 14 preparedness and emergency response learning centers (PERLCs) and establish new web-based public health training catalog. This initiative aims to establish quality standards and improve searchability, making it easier for individuals to find relevant training materials in the field of public health.</p>	<p>Practice research, full report</p>	<p>Study established quality guidelines, identified strengths and weaknesses in PERLC resources, and improved accessibility to trainings.</p>
<p>2. Niebuhr, Virginia. Niebuhr, Bruce. Trumble, Julie. Urbani, Mary jo. 2014. Online faculty development for creating e-learning materials.</p>	<p>Create an online experience in which faculty could learn to produce e-learning materials.</p>	<p>Development project, which contains mixed method study (qualitative data collection and analysis + quantitative data collection and analysis)</p>	<p>Due to a successful project, participants evaluated the program instructions as easy to access, engaging and logically presented. Participants reported increased confidence in new skills and increased awareness of copyright issues.</p>

<p>3. Benski, Caroline. Zambruni, Monica. Stancanelli, Giovanna. Landinarisoa, Tsiriniaina. Hantavololona, Abeline. Rachel Andrianarisoa, Vonimboahangy. Manjary, P. Ramasy. Capello, Cecilia. de Tejada, B. Martinez. Reich, Michael. R & Guyer, Anya. L. 2023. Lessons Learned from Building a Global Health Partnership on Obstetric Care in Madagascar.</p>	<p>Reflect experiences about creating a 4-institution global health partnership and identify elements that support equity.</p>	<p>Commentary article</p>	<p>Study offers 4 overarching lessons that raised from participants experience.</p>
<p>4. Acosta, Monica L. Sisley, Aran. Ross, Jacqueline. Brailsford, Ian. Bhargava, Anuj. Jacobs, Robert & Anstice, Nicola. 2018. Student acceptance of e-learning methods in the laboratory class in optometry.</p>	<p>Investigate the suitability of a static website for teaching ocular anatomy and physiology and compare it to an interactive version of the website with quiz and self-assessment activities and the usefulness of a blended online and in-lab environment to teach in optometry</p>	<p>Cross-sectional study using a mixed methods approach which allowed capture data from multiple sources (examination results, surveys, and focus groups)</p>	<p>Study concluded that there is acceptance of online learning methods due to the technologically 'savvy' environment of students in the first year of the optometry programme, but there is still dependence on the educator as the main administrator of their learning.</p>

<p>5. Walsh, Steve. De Villiers, Marietjie R & Gopalak, V. K. 2018. Introducing an e-learning solution for medical education in Liberia.</p>	<p>Article`s objective is to outline the development and implementation of an e-learning solution for the College of Health and Life Sciences (COHLS) and describes the challenges met, the key successes achieved, and the lessons learnt.</p>	<p>Scoping review</p>	<p>Successfully made-up intranet based on internet connection and SaaS service. Created an e-learning strategy aimed at improving learning and teaching, as well as increasing the number of qualified doctors, being scalable and reducing in the future the number of lecturers required.</p>
<p>6. Jotwani, Payal. Srivastav, Vinkle. Tripathi, Manjul. Deo, Rama. Chandra. Baby, Britty. Damodaran, Natesan. Singh, Ramandeep. Suri, Ashis. Bettag, Martin. Roy, Tara. Sankar. Buser, Christoph. Mehlitz, Marcus. Lalwani, Sanjeev. Garg, Kanwaljeet. Paul, Kolin. Prasad, Sanjiva. Banerjee, Subhashis. Kalra, Prem. Kumar, Subodh. Sharma, Bhavani. Shankar & Mahapatra, Ashok Kumar. 2014. Free-access open-source e-learning in comprehensive neurosurgery skills training.</p>	<p>Study focuses on the concept, formulation, development, and impact of web-based learning platforms dedicated to neurosurgery discipline to disseminate education, supplement surgical knowledge, and improve skills of neurosurgeons.</p>	<p>Technical review</p>	<p>Interactive open-source, global, free-access e-learning platform of NETS (Neurosurgery Education and Training School)</p>

<p>7. Grandi, Fabio. Mandreoli, Federica. Martoglia, Riccardo. 2012. Efficient management of multi-version clinical guidelines.</p>	<p>Study aims to introduce techniques to model and to provide efficient personalized access to very large collections of multi-version clinical guidelines, which can be stored both in textual and in executable format in an XML repository.</p>	<p>Scientific article</p>	<p>Study introduced novel solutions to represent and to provide personalized access to multi-version clinical guidelines, supporting multiple temporal and semantic versioning coordinates. Introduced proposal involves the definition of a multi-version XML data model and the introduction of data structures and algorithms underpinning a new concept of personalization engine.</p>
<p>8. Pinheiro, Pedro. Sousa, Cristoao. Toscano, Cesar. 2022. Industrial Information Sharing 4.0</p>	<p>Article describes the International Data Spaces (IDS) as a disruptive model for sharing information inside a network. To this purpose, an architecture based on IDS was developed to support secure and real-time data exchange between organizations, promoting I4.0</p>	<p>Scientific article</p>	<p>Paper discussed International Data Spaces (IDS) as a key enabling technology for information sharing in the context of the Industry 4.0 settings.</p> <p>After Needs-Means-Ends analysis, results revealed that IDS-based approaches might contribute to greater technological democratization in the context of inter-organizational information sharing.</p>

<p>9. Kornyshova, Elena. Boutal, Laurent. Benramdane, Mustapha Kamal. 2023. Digital Business Ecosystems: Organizational Model, Roles, and Governance Towards Flexibility.</p>	<p>Study aims to describe how organizational models should be defined to improve flexibility in digital business ecosystems (DBE).</p>	<p>Qualitative study. Interviews and literature review.</p>	<p>A high-level organizational model comprising two levels: Digital business ecosystems (DBE) and DBE actors, three lists of DBE and DBE Actors' functions and requirements, and a governance matrix, which qualifies the relationships between a DBE and DBE actors and between DBE actors themselves was developed. Established hypotheses were also validated.</p>
<p>10. Abrahamson, Douglas Edward. Goodman-Delahunty, Jane. 2014. Impediments to Information and Knowledge Sharing Within Policing: A study of Three Canadian Policing Organizations.</p>	<p>Article aims to elaborate on previous research on organizational information culture and its impact on information use outcomes in policing by examining perceived impediments to information sharing of 134 officers in three Canadian police organizations</p>	<p>Inductive qualitative analysis</p>	<p>Analysis revealed seven mutually exclusive impediment themes: processes/technology, individual unwillingness, organizational unwillingness, workload/overload, location/structure, leadership, and risk management. Viewed from the knowledge management infrastructure perspective, organizational structure was the single most common impediment identified, followed closely by organizational culture.</p>

<p>11. Basten, Dirk. Haamann, Thilo. 2018. Approaches for Organizational Learning: A Literature review</p>	<p>Identify organizational learning (OL) approaches and linked these approaches to OL theories.</p>	<p>Qualitative study. Narrative literature review.</p>	<p>Study established an overview of organizational learning approaches that stems from diverse research domains concerning knowledge and learning.</p>
<p>12. Laugaland, Kristin A., Kristin Akerjordet, Christina T. Frøiland, and Ingunn Aase. 2023. Co-creating Digital Educational Resources to Enhance Quality in Student Nurses' Clinical Education in Nursing Homes: Report of a Co-creative Process.</p>	<p>Develop an interactive digital educational resource to enhance the quality of student nurses' clinical education in nursing homes and to elucidate the lessons learned from that approach</p>	<p>Empirical qualitative research. Co-creative approach between student nurses, nurse educators, registered nurse mentors and e-learning designers.</p>	<p>Paper facilitates knowledge exchange and documents vital aspects to consider when co-creating digital educational initiatives incorporating multistakeholder perspectives.</p>
<p>13. Tietz, Stephanie & Katja Werner. 2022. Influencing Factors on Knowledge Sharing in Virtual Teams.</p>	<p>Study aims to address the gap between studies, which focus only on technical or only on human influencing factors for effective knowledge sharing in virtual teams by exploring success-critical factors for knowledge sharing by using the socio-technical systems-approach</p>	<p>Qualitative study. Partially structured interviews based on Critical Incident Technique. Deductive analysis.</p>	<p>The results of the study underline the importance of an integrated socio-technical view on knowledge sharing in virtual teams. Technical and social factors need to be considered simultaneously.</p>