TOO MUCH KNOWLEDGE TO HANDLE

DIAGNOSIS OF KNOWLEDGE RETENTION ON ONLINE EDUCATION AT RADBOUD UNIVERSITY

mr. Anne de Graaf

4596196

30-06-2021

a.c.degraaf@student.ru.nl

Written under supervision of drs. L.G. Gulpers
2nd examiner: dr. B.R. Pas

Radboud University, Nijmegen
Master: Organizational Design and Development
Research topic: Knowledge processes for online and hybrid education

Preface and acknowledgment

This thesis is the final requirement for graduating in Business Administration from the Radboud University after six years of studying Law and Management. The topic of this thesis is knowledge retention at RU concerning online education. I have chosen this topic because I started teaching online at RU myself this year at the faculty of Law. This work is super satisfactory, although digital education is sometimes a challenge. Therefore, I was curious about how to contribute to making this a little easier and thereby more fun.

However, simultaneously finishing a master's and teaching was quite a lot of work, and I would not have been able to do it alone. Therefore, I would like to thank those who had an essential role in my writing process. First of all, I would like to thank my supervisor, drs. L.G. Gulpers, for the enthusiasm, mental support, fast and reliable communication, and clear feedback. This supervision contributed to a great atmosphere in our thesis circle. I would also like to thank Volker and Sterre for thinking along, commenting on my thesis, and providing a stimulating environment in the thesis meetings. Additionally, I would like to thank dr. B.R. Pas as the second examiner of this research.

Besides that, I would like to thank my family for their unconditional support. Moreover, I would like to thank my roommates, who were going through a similar process. Furthermore, I would like to thank Jordy for the mental support and for providing me the energy to work on my thesis.

Anne de Graaf

July 2021

Abstract

The boost in the digitalization of education due to COVID-19 increased knowledge on online education. Universities are reconsidering their teaching methods and, in advance of the end of the pandemic, evaluating which online methods should stay and which old methods teachers should use again. Knowledge retention plays a crucial role in maintaining critical knowledge on online education to improve the quality of education. This case study diagnoses knowledge retention and three conditions for adequate knowledge retention at Radboud University (RU). This diagnostic analysis is performed based on a deductive, practice-oriented case study. Teachers at the selected faculty function at a low level of knowledge retention because they prefer face-to-face communication to the usage of IT. However, while working from home, interactions between teachers have been reduced, which decreases knowledge retention. Besides that, the TLC and Teaching Information Points function at a higher level of knowledge retention since they better document and store online. The implementation of a knowledge retention strategy could contribute to a higher level of knowledge retention. This strategy should focus on people and technology. When implementing new technologies in faculties with a social culture, the technology should match the employees' preferences, such as more social-oriented technologies.

Key terms

"Knowledge management", "Knowledge retention", "Conditions for knowledge retention", "Online education"

Table of content

1. Introduction

1.1 Relevance

In line with the digital transformation in society, online education has been slowly increasing in recent years (Andrews Graham, 2019). Before the COVID-pandemic, almost all Dutch higher educational institutions worked with digital learning environments. Technical developments made it easier for Dutch students to follow courses at foreign higher education institutions. This expansion in options for students led to more internal competition for Dutch higher institutions, and innovations were needed to keep track of their competitors (Jongeneelen, 2015). However, Dutch higher institutions did not yet use the full potential of the wide variety that ICT can offer (Versteijlen, Perez Salgado, Janssen Groesbeek & Counotte, 2017). The challenge was and still is in opening up new education methods using technology (Versteijlen et al., 2017).

The COVID-19 outbreak forced the incremental nature of the digitization of education into a radical transformation (Garcia-Morales et al., 2021). Educational institutions had to move their teachings online as employees and students were obliged to work from home (NOS, 2020). The increase in digital methods caused educational institutions to rethink their working methods (Van Looy, 2021). This transformation resulted in multiple challenges for teachers, such as decision-making on what online tools to use, working with ICT tools that support these tools, and making online education personal (Delcker & Ifenthaler, 2020). These challenges continue to this day since the development of students requires high-quality education and effective learning techniques (Bokde et al., 2020, p. 31).

At the moment of writing this thesis (24 June 2021), almost all teachers at Radboud University (hereafter: RU) have had to improvise with online teaching since it was mandatory to work from home during the past year. Whether face-to-face education will be possible again in the coming academic year depends on the number of infections and the spread of new variants. Based on the experiences of, among others, teachers in the online environment and the scenario of a continuing obligation to provide distance education, the RU has to answer two essential questions (Programma onderwijsdagen RU, 2021): 1. What are the adequate online teaching methods to use in the current situation? 2. What online methods ('good practices') should be maintained when face-to-face education becomes possible again? In answering the preceding questions, knowledge gained on online education in the past year plays an important role. The type of knowledge ranges from experiences of teachers and feedback from students that teachers have received to research on online education at the Teaching and Learning Centre (hereafter: TLC) and educational advice and insights from support staff.

This knowledge forms a key asset of the university. The university's effective knowledge management could provide a source of competitive advantage (Society for Human Resource Management, 2009, p.1; Swart, 2011; Andreeva & Kianto, 2012). However, in many institutions of

higher education, for example, universities, there is no organized knowledge management system in place (Kidwell, Vander Linde & Johnson, 2000; Serban & Luan, 2002). This is striking when knowing that higher education at its core is about the creation, transformation, and transmission of knowledge (Laudon & Laudon, 1999). In the case of RU, the competitive advantage lies in the realization of its mission, namely the improvement of the quality of education for its students (Wamundila & Ngulube, 2011). In addition, handling this transition well offers the opportunity to stand out from other universities, passing up the potential benefits of online education.

One of the processes in knowledge management is the retention of knowledge (Wiig, 1997; Levy, 2011; Walsh & Ungson, 1991). Adequate knowledge retention can benefit universities by facilitating better decision-making capabilities, improving education, reducing costs (Wamundila & Ngulube, 2011). These benefits illustrate the importance of knowledge retention (Hislop, Bosua & Helms, 2018, p. 140; Cronin et al., 2018). In this research, **knowledge retention** is defined as: "the processes, systems, storage mechanisms and interactions that are used together to hold on to critical employee knowledge so that it can be readily accessed and used" (Cronin et al., 2018, p.73). Furthermore, it refers to knowledge management strategies designed to minimize knowledge loss within an organization by determining the most effective way to preserve knowledge (Lin, Chang, Tsai, 2016).

At this moment in time, the RU lacks insight into 1) the current state regarding knowledge retention on online education and 2) the extent to which organizational conditions for knowledge retention are in place. Without these processes, systems, mechanisms, and interactions, the risk of loss of critical knowledge is too high. The loss of critical knowledge could result in teachers reinventing the wheel (Bratianu & Leon, 2015). Adequate knowledge retention could benefit universities in multiple ways, for example, reducing work pressure (Wamundila & Ngulube, 2011).

One year has passed since the start of online education, and a lot of knowledge is being developed on online education. Teachers, support staff, researchers, and the Teaching and Learning Centre (TLC) have learned numerous lessons about the advantages and disadvantages of multiple online methods. Intending to return to campus with the experiences on online education that have been gained, this is the right moment for diagnosis of the current state of knowledge retention and recommendations for improving knowledge retention on online education. For all these reasons, the loss of knowledge on online education should be prevented as much as possible. At this moment in time, it is essential to focus on methods and systems on adequate knowledge retention on online education at RU to have the critical knowledge available based upon which the RU can answer the two questions mentioned above.

1.2 Goal of the research

This research aims to **gain insight into the actual and desired state of and ways of knowledge retention on online education of members at RU - by looking at the Faculty of Social Sciences (FSS), TLC, and support staff -** to contribute to **improving knowledge retention for purposes of**

education's quality and **efficiency**. Within the scope of this research, knowledge retention at RU is diagnosed based on a framework derived from literature. At first, a diagnosis is made of the current state of knowledge retention at RU. After that, the presence and status of conditions for knowledge retention are analyzed. Next to that, it is examined whether these conditions explain why knowledge retention does or does not occur sufficiently. Finally, the solution space emerges, which is discussed to strengthen knowledge retention in the future.

1.3 Research question

The two main practical questions at RU and the importance of knowledge retention in that context result in the following research question:

'*To what extent is knowledge on online education retained at Radboud University? And what are options to improve knowledge retention on online education at Radboud University, considering conditions for adequate knowledge retention?*'

To answer these questions and to make a diagnosis of the current situation at RU, the sub-questions are:
- What is knowledge?
- What is knowledge retention?
- What are the conditions for adequate knowledge retention?
- To what extent is knowledge on online education retained at the RU?
- To what extent are the conditions for adequate knowledge retention on online education present at the RU?
- In what ways can knowledge retention on online education be improved based on adequate knowledge retention for education's quality and efficiency?

1.4 Approach

To perform this diagnosis, the RU will be examined based on a qualitative study. It is practice-oriented research because it diagnoses to what extent the RU retains knowledge on online education and how it can be improved. It accomplishes this through a deductive approach that uses conditions for adequate knowledge retention derived from literature as a theoretical framework to analyze the current knowledge retention methods. It comprises a case study, as its research domain is the organization 'RU'. In the methodology section, knowledge retention and the conditions are operationalized to be measured at the FSS and the TLC at RU. The choice of faculty and the relevance of the TLC is explained in more detail in the methodology section (chapter 3). The qualitative data is obtained via interviews, observations, and documents. This data is analyzed via descriptive-thematic-pattern codes (Braun & Clarke, 2006). Providing a structural overview of knowledge retention and its conditions clarifies where

the strengths and weaknesses of the organization lie and opens up opportunities for improvement. Insight in these improvement points contributes to preventing future loss of knowledge and ensures that (online) education can keep gradually improving in the future. Furthermore, the points of improvement are relevant for other educational institutions for future improvement.

Within this research, specific attention will be paid to the fact that I am part of my own research project as a student, researcher, and teacher at RU. This close relation to the RU opens doors but could also influence the results of this research. Furthermore, attention is paid to ethical considerations as respondents have to be aware of my role as a researcher while possibly communicating with me as a student or teacher.

1.5 Scientific relevance

Knowledge retention is an important concern in practice and knowledge management literature (Ensslin et al., 2020; Heisig, 2009; Liyanage et al., 2009; Martins & Meyer, 2012; Lin et al., 2016, Hislop et al., 2018). Knowledge can be seen as an object, controllable for management, and positively influencing the performance of an organization (Hartmann & Dorée, 2015). Knowledge retention is of great importance to prevent the loss of critical knowledge. Knowledge retention and knowledge loss have been studied in the context of educational institutions (Bratianu & Leon, 2015; Wamundila & Ngulube, 2011; Wamundila, 2008; Bui & Baruch, 2011). Furthermore, multiple authors have written from different perspectives about conditions for adequate knowledge retention (Delong, 2004; Hayward-Wright, 2009; Liebowitz, 2008; Slagter, 2007; Doan, Rosenthal-Sabroux & Grundstein, 2011). This wide variety of literature allows to deductively derive a framework from literature based upon which the researcher can diagnose knowledge retention on online education at RU.

This research elaborates on existing knowledge retention measurement instruments by applying them to an interesting case study (Arif et al., 2009, p. 106), namely to the education sector. Education is one of the most critical sectors, and also economic prosperity is measured by the level of education (Centraal Bureau voor de Statistiek, 2020). Besides the fact that education is an important sector worldwide, it is also one area that suddenly had to get used to a 'new normal' and was heavily impacted by the COVID pandemic (Barnes, 2020). This case of an educational institution during the COVID pandemic provides a fascinating case as this creates a whole new, transformed research context (Barnes, 2020). Within this context, the increase in the use of IT in the last years was stimulated even more, which was eminently the case in education (Barnes, 2020). This research in the context of a new environment with IT as a hot topic might give new insights into drivers and barriers from the user's perspective of IT systems (Arif, Khalfan, Barnard & Heller, 2012) - by the in-depth exploration of such a situation given the fact that advantages and disadvantages of working from home have become more

visible and are more openly discussed (Ispen, van Veldhoven, Kirchner, 2021) -. Thereby, it may contribute to the literature on the role of IT in knowledge retention.

1.6 Research outline

At first, the theoretical background is discussed (chapter 2). Based on this, the framework of conditions for adequate knowledge retention is constructed to study knowledge retention at RU. Hereafter, the methodological choices are justified (chapter 3). Via collecting documents and interviewing, the data will be collected. After analyzing the data, the results are displayed in chapter 4. The conclusions are formulated based on the results, and the research question is answered (chapter 5). The conclusion is followed by a discussion and some recommendations (chapter 5).

2. Theoretical background

In diagnosing knowledge retention at RU, it is essential first to address my perspective on knowledge-intensive organizations (hereafter: KIO), which contributes to understanding where knowledge is present in universities. Secondly, the concepts of knowledge and knowledge management come into play. Subsequently, the idea of knowledge loss is discussed as it is strongly associated with knowledge retention, but one should have a clear view of the differences. Hereafter, the concept of knowledge retention, its importance, and how it occurs in an organization will be discussed. Finally, this chapter ends with a theoretical framework including conditions for proper knowledge retention, which will be used to diagnose knowledge retention at RU.

2.1. Organizations; Knowledge-Intensive Organizations

High levels of knowledge intensity characterize the current society (Hislop et al., 2018). Within this society, the KIO is one type of organization. KIOs rely heavily on professional knowledge by supplying products and services that are knowledge-based (Den Hertog, 2000). Examples of knowledge products and services are consulting, training, education, research, and planning (Nurmi, 1998). Universities are knowledge-intensive organizations (hereafter: KIO). Universities process what they know into knowledge services for their 'customers' (Nurmi, 1998) and do this by providing education and research. The performance of these tasks requires highly educated employees as a significant part of the workforce, which is another reason to consider universities as KIO (Alvesson, 2000, p. 1101). A good workforce is needed in achieving the organizational goals, and knowledge can be regarded as a primary asset for organizations to gain competitive advantage (see also: Grant, 1997). This last fact results in an increased importance of adequately managing knowledge - such as storing, organizing, making accessible, and sharing knowledge - in KIO (Millar, Lockett & Mahon, 2016). Because knowledge is the primary asset of a KIO, the following paragraph defines knowledge.

2.2 Knowledge

In academic literature, a diversity of perspectives on knowledge and knowledge management is present (Schultze & Stabell, 2004, p.151). For that reason, it is important to explicitly mention the perspective on knowledge and knowledge management within this research. The dominant discourse in knowledge management literature is the neo-functionalist discourse (Schultze & Stabell, 2004), which is also the discourse from which this research will be executed. The diagnosis will be made so that RU can optimally allocate its resources and improve organizational efficiency, effectiveness, and competitiveness. Such a diagnosis would be hard to provide from a practice-based approach because knowledge cannot be managed as a separate object of human action. These discourses do not reason that optimal allocation of resources will improve efficiency, effectiveness, and competitiveness. The

role of knowledge in this research is progressive enlightenment, from which potentially all organizational members could benefit (Schultze & Stabell, 2004), which is in line with the reasoning in par. 2.1. Furthermore, providing a diagnosis by looking at conditions for proper knowledge retention suites the construction of the world in terms of dualism, in which phenomena are seen as independent objects and mutually exclusive categories can be created (Schultze & Stabell, 2004).

With this discourse in mind, knowledge will be defined as Davenport and Prusak (1998, p.5) do: "*'a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in document or repositories but also in organizational routines, processes, practices, and norms"*. This definition is more specific in comparison to the definitions of Nonaka and Takeuchi (1995, p. 21) or Grant (1996, p. 110) as it provides clear guidance to the embeddedness of knowledge in specific places. Furthermore, this definition does not view knowledge as a form of information in contrast to an earlier definition of Davenport, De Long, and Beers (1998). While knowledge refers to beliefs, commitment, and action, information does not (Jakubik, 2007). Although literature points out that information and knowledge are not the same (Stenmark, 2002), authors use the terms relatively casually. Therefore, the definition of Davenport and Prusak (1998, p. 5) is preferred over the definition of Davenport, De Long, and Beers (1998) to be able to better distinguishing both concepts. Another important aspect of this definition is that it recognizes the importance of people in the phenomenon of knowledge, who are one of the repositories in which knowledge can be stored (See par. 2.6). Moreover, this definition points to knowledge embedded in documents, repositories and embedded in routines, processes, practices, and norms.

This ties in with the distinction made by Polanyi (1966), further elaborated upon by Nonaka and Takeuchi (1995), who divide knowledge into two categories of knowledge: explicit knowledge and implicit/tacit knowledge. According to Nonaka and Takeuchi (1995, p. 8), explicit knowledge entails knowledge that "...*can be expressed in words and numbers and can be easily communicated and shared in the form of hard data, scientific formulae, codified procedures, or universal principles*". Explicit knowledge refers to the 'know-what´ (Hislop et al., 2018; Smith, 2001) and is seen as more objective (Schultze & Stabell, 2004). Examples of explicit knowledge in the context of universities are general policies at the university and documentation on the intranet. On the other hand, tacit knowledge is "...*highly personal and hard to formalize*" (Nonaka and Takeuchi (1995, p.8). This category of knowledge consists of, for example, subjective insights, intuitions, and hunches, which are conditioned by the culture in the organization. Therefore, tacit knowledge is more abstract and context-specific, making it hard to express in words (Hislop et al., 2018; Smith, 2001). The core of tacit knowledge is personal and action-oriented (Choo, 2006). This kind of knowledge comes to life and must be studied in practice because that is the moment that it becomes observable. An example of tacit knowledge is

the teacher's gut feeling that the students have not adequately understood the material. Such knowledge is seen in practice when observing a lecture.

By converting implicit knowledge into explicit knowledge, it becomes amenable to managerial control. Following the previous example about the gut feeling of the teacher, one could convert the tacit knowledge on how to recognize that you should slow down or repeat a sentence into explicit knowledge by asking a colleague how they do this. This colleague's response, based on experiences of the past, is then converted to explicit knowledge as he tells or writes back what should be done in this situation. Both explicit and tacit knowledge can be of great importance to an organization. Explicit knowledge is capable of articulation and can be easily transferred and is important because it provides the building blocks of the organization. Explicit knowledge can be easily shared and has great potential for enhancing the efficiency of a process, yielding performance improvement (Schoenherr, Griffith & Chandra, 2014). The tacit knowledge manifests in practice, and the individuals are, in the case of tacit knowledge, the repository (Grant, 1997). Tacit knowledge is not easily transferable, which is what forms the basis for the competitive advantage of this type of knowledge. Schultze & Stabell (2004) mention that tacit knowledge is unmanageable. However, this is not entirely true. When tacit knowledge cannot be converted to explicit knowledge since it then loses its scarce character, it needs to be managed indirectly by managing knowledge processes, knowledge work and individuals, such as human resource management. Therefore, specific attention needs to be paid to the situation that individuals leave the organization and could take their tacit knowledge to another organization.

Lastly, only critical knowledge needs to be retained. Critical knowledge is the knowledge that is fundamental to the organization or operational processes of the organization and supports mission delivery and mission success (Kaplan, 2010). Among others, in universities, it is about the knowledge that is fundamental to teaching to provide high-quality education. In the context of online education, this results in the essential knowledge to deliver high-quality online education, which can be in the form of experiences by teachers, feedback from students, or knowledge created by doing research.

2.3. Knowledge Management

Definitions of knowledge management from a neo-functionalist discourse vary in literature (Hartmann & Dorée, 2015). Davenport and Prusak (1998) view knowledge management as "*the establishment of an environment and culture in which knowledge can evolve*". The norms and values within the organization should support the creation and sharing of knowledge, and knowledge repositories should be maintained. Hislop et al. (2018, p. 50) mention that knowledge management is a broad concept that refers to leveraging knowledge assets to benefit the organization. This could, for example, be done by preventing the reinvention of the wheel at different places in the organization, which increases innovativeness (Von Krogh, 1998). Dalkir (2005, p.3) states that knowledge management is "*the deliberate and systematic coordination of an organization's people, technology, processes, and*

organizational structure to add value through reuse and innovation. This coordination is achieved through creating, sharing and applying knowledge as well as through feeding the valuable lessons learned and best practices into corporate memory to foster continuous organizational learning". Hedlund (1994, p. 76) describes knowledge management as "*the generation, representation, storage, transfer, transformation, application, embedding and protecting of organizational knowledge*".

The previous definitions show that knowledge management can be seen as management of knowledge processes and knowledge work (Hislop et al., 2018), in contrast to the management of knowledge itself (Newel, 2015). Knowledge processes mentioned in the previous definitions are 'creation', 'sharing', 'applying', 'transferring', 'transforming', 'storing', 'embedding'. After studying 117 knowledge management frameworks, Heisig (2009) concluded that the number of knowledge processes ranges from two processes to a maximum of nine. The appendix (Appendix 2´Overview knowledge management processes´) provides an overview of knowledge management processes distinguished in literature based on the research of Benbya et al. (2004, p.203). Most of the frameworks start with the phase of knowledge creation. After that, created knowledge needs to be identified/selected/organized to capture/store it so that critical knowledge will not be lost. After that, knowledge has to be made available to be accessed by members of the organization to share it. Finally, when knowledge is shared, one can apply or use it. Based on this overview of knowledge management processes, knowledge retention indirectly returns in the broadly recognized processes, such as storage and retrieval, to make knowledge management successful.

2.5. Knowledge loss

One of the characteristics of knowledge retention is that it could be seen as a knowledge management strategy designed to minimize knowledge loss by determining the most effective way to preserve knowledge (Lin et al., 2016). The prevention of knowledge loss contributes to maintaining critical knowledge to keep the competitive advantage (Hislop et al., 2018). In discussing knowledge loss, three concepts need to be explained, namely 'unlearning', 'intentional knowledge loss', and 'unintentional knowledge loss'.

Unlearning is defined a the 'purposefully initiated process of discarding knowledge and forgetting as involuntary knowledge loss' (Klammer & Gueldenberg, 2019, p. 862). This definition shows that unlearning reasons both purposefully and involuntary knowledge loss. Intentional knowledge loss can be a part of an organization's strategy regarding knowledge management. When knowledge has become irrelevant for future decisions or causes errors in the processes, organizations can intentionally forget knowledge (Levallet & Chan, 2019). Unintentional knowledge loss can be qualified as the failure to capture knowledge at the organizational level and the inability to maintain stored knowledge or organizational memory (Holan & Philips, 2004; Levallet & Chan, 2019). This definition shows that unintentional knowledge loss can be partly placed under the umbrella of

unlearning. The second part of that definition shows that 'forgetting as involuntary knowledge loss' can be seen as unlearning. This research will focus on unintentional knowledge loss, as knowledge retention can be a strategy to prevent this from happening (Lin et al., 2016).

Different drivers of unintentional knowledge loss are addressed in the literature (Daghfous, Belkhodja & Angell, 2013). A first driver is ineffective organizational routines and memory (Holan, de, & Philips, 2004). For example, lack of documentation (Wamundila & Ngulube, 2011). When losing proper routines, the primary processes within an organization could be at risk and lose efficiency. However, when unlearning the useless practices, it prevents keeping inadequate memory systems in place (Holan, de, & Philips, 2004). A second driver is employee turnover (Martins & Meyer, 2012). When leaving an organization, employees take with them their expertise, e.g., explanations as to why decision-making happens in a certain way, awareness of work practices, and knowledge about successes and failures of an organization. Furthermore, a high turnover disrupts established social relations (Pennings, Lee & Witteloostuijn, 1998). A third driver is the reluctance of staff to engage in knowledge sharing or heavy employee workloads (Winkelen & McDermott, 2008). At last, layoffs could threaten an organizations' capabilities because, by frequent restructuring, regular staff interactions and networks are let go off (Daghfous et al., 2013). At the same time, it could discourage employees as they have to learn new tasks, with a future of being reassigned and not being able to perform these newly discovered tasks.

2.6. Knowledge retention

Knowledge retention is an essential aspect of knowledge management. Every organization faces the challenge of losing critical knowledge, which could negatively affect organizational performance (Bessick & Naicker, 2013). For that reason, critical knowledge should be retained (Hislop et al., 2018, p. 140; Cronin et al., 2018). In the context of knowledge loss, knowledge retention refers to the knowledge management strategies designed to minimize knowledge loss within an organization by determining the most effective way to preserve knowledge (Lin et al., 2016, p.1758). This research, and according to Cronin et al. (2018, p.73), knowledge retention defines as:

'*the processes, systems, storage mechanisms and interactions that are used together to hold on to critical employee knowledge so that it can be readily accessed and used*'.

A strength of this definition is that it explicitly focuses on only critical knowledge and not all knowledge. Furthermore, it is very explicit in 'what' knowledge retention is in contrast to other definitions. For example, Wiig (1997), Doan et al. (2011), and Walsh and Ungson (1991) all explain knowledge retention by describing areas or phases to manage to retain knowledge. However, these descriptions merely focus on the processes: 'how' knowledge retention happens. Next to that, this definition captures both explicit and implicit knowledge (Nonaka & Takeuchi, 1995), by, on the one

hand, focusing on the systems and documents in which knowledge can be captured and explicitly displayed. On the other hand, it mentions interactions should be held on to, focusing on the relationships between individuals in the organizations. Furthermore, the definition consists of two key elements. First of all, knowledge should be held on to and, thereby, kept inside the organization through, for example, people, culture, and standard processes. Second, knowledge exhibits persistence over time by embedding it in a repository (Argote, McEvily & Reagans, 2003). In this context, the repository should be given a broad interpretation. Regarding knowledge retention repositories, the explanation of Walsh & Ungson (1991) will be followed, who mention five repositories:

> a) individual members, who retain knowledge based on their own direct experiences and observations and could also store it via the use of technical applications;
>
> b) roles and organizational structures, which contain implications for the individual role behavior and link to the environment as it creates particular expected behavior by incorporating it in an infrastructure;
>
> c) the organization's standard operating procedures and practices, which reflect past information from transformations and create a mechanism for impounding and preserving knowledge;
>
> d) the organization's culture as the learned way of perceiving, thinking, and feeling about problems that is transmitted to members in the organization and embodies experiences that can be useful for dealing with the future;
>
> e) the physical structure of the workplace, which is about the actual physical design or workplace ecology and encodes and reveals a lot about, for example, the hierarchy and helps shape and reinforce behavior and influences organizations employees' interpersonal experiences.

Not only should these repositories hold on to knowledge, but critical employee knowledge should also be retained in such a way that it can be readily accessed and used, focusing on the usability of knowledge in the future. By just capturing and not making the knowledge available, the organization will not be able to use it in their advance, which is the core argumentation of the importance of knowledge retention. In this sense, knowledge retention consists of the availability of repositories to store knowledge and the accessibility of knowledge within these repositories for others as well.

2.7. Conditions for knowledge retention

This paragraph provides a framework of knowledge retention and its conditions for proper knowledge retention to determine to what extent knowledge is retained at RU. These conditions can influence knowledge retention at RU and, therefore, contribute to the two main benefits of knowledge retention: 1) knowledge retention to maintain critical knowledge to realize the organizational goals and gain competitive advantage and knowledge retention as 2) a strategy to prevent knowledge loss. Multiple

conditions for adequate knowledge retention are distinguished in literature. A general overview of the most critical conditions and factors of/for knowledge retention is provided and followed by a separate description of each condition. At this place, the 'how'-aspect of knowledge retention of par. 2.6 regains relevance. The paragraph ends with a framework of knowledge retention and its conditions, in which the conditions are the independent variables of knowledge retention and knowledge retention is the dependent variable.

The starting point of most models about knowledge retention is a proper **knowledge retention strategy** (Doan et al., 2011; DeLong, 2004; Hayward-Wright, 2009), which can be best illustrated by figure 1:
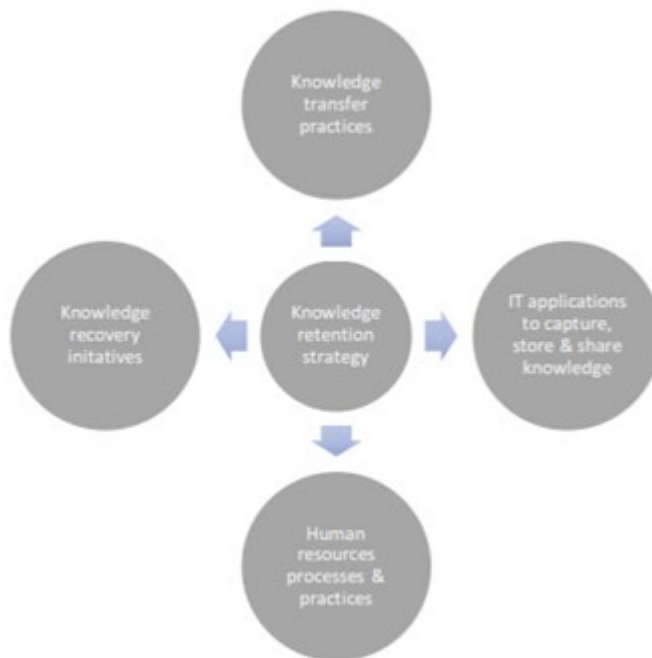
Figure 1: DeLong, 2004, Strategic framework for action

Based on a deliberately created strategy, suitable activities can be performed to hold on to knowledge. In general, all universities should have a knowledge retention strategy as a starting point to steer the other mechanisms that can condition knowledge retention (DeLong, 2004). Such a strategy should include at least two components, which form the two other conditions for knowledge retention (Frigo, 2006). On the one hand, the strategy's focus should be on **HR, processes, and practices** within organizations (Doan et al., 2011; DeLong, 2004; Liebowitz, 2008; Hayward-Wright, 2009; Slagter, 2007). On the other hand, **IT applications** have an essential role in retaining knowledge and return in most frameworks (Doan et al., 2011; Liebowitz, 2008; Hayward-Wright, 2009; DeLong, 2004). The description of the two components is in line with the distinction made by Hayward-Wright (2009) between the system-based approach and the people-based approach. The first enabler – the system-based approach – is oriented towards document management, procedures repositories, so about more documented sources of knowledge. The second enabler – the people-based approach – focuses more on

the human way of holding on to organizational knowledge by, for example, mentoring, coaching, networking, and communities of practice.

The condition of IT applications increases in relevance in the context of RU, as more communication has to be done during the pandemic since everyone is working from home. Furthermore, it enables to reach the second maturity level of Arif et al. (2009) by making digital documentation possible. It can provide a storage system to reach level 3. When being easily accessible for individuals to search for knowledge, IT can help achieve the fourth maturity level in knowledge retention. Figure 2 displays the whole figure about the four levels and the features of each level:

Requirements	References (authors)	Level-1 shared at individual level	Level 2 codified/documented	Level 3 stored/retained	Level 4 retrieved/used
Face-to-face communication meetings (formal and informal)	Nonaka and Newell et al.	How often meetings are held?	Are they minuted?	Are they stored? If yes, where?	Are they accessible? Is it retrievable?
Sharing thinking process: brain-storming session	Nonaka (1994)	How are problems solved? (individually/collectively?)	Are the problems and solutions recorded?	Is it stored? If yes, where?	Is it accessible? Is it retrievable?
Lessons learned (at the end of the project phases, or at the handing over?)		Are the project problems discussed at the end?	Are those lessons learned documented?	Where is it stored?	Are people aware of its existence?
Job rotation (between different branches in different cities and countries)	Bender and Fish (2000)	Does the org. support job rotation system?	N/A	N/A	N/A
Renewing knowledge	Bender and Fish (2000)	Is the retrieved knowledge discussed before using?	Is the feedback/new knowledge documented?	Is the stored knowledge updated?	Is the updated knowledge accessible?
Self-organised teams	Nonaka (1994)	Do they exist? Is trust among employees built?	Are the created knowledge and ideas documented?	Is it stored? If yes, where and how?	Is it accessible? Do people know how to retrieve it?
Training and coaching system		Are trainings held regularly?	Are the trainings/new knowledge documented?	Are they stored? If yes, where and how?	Is the training manual accessible for all employees?
Competition and award system		Is there is any award for knowledge sharing?	Is there is any award for documenting knowledge?	Is there a system which allows people to store documents?	Is it accessible? Is it retrievable?

Figure 2: Arif et al., 2009, Levels of knowledge retention in an organization, p. 103.

However, one cannot forget HR, processes, and practices because the highly educated employees form a key characteristic of universities as a KIO. Slagter (2007) elaborates on this by defining factors that create the willingness to share knowledge to be retained. Within the scope of this research, these three conditions – a knowledge retention strategy, IT applications, HR, practices, and processes - for adequate knowledge retention will be used to diagnose the identified organization. To operationalize the conditions (par. 3.5) the three conditions for adequate knowledge retention will be addressed separately in the following.

The presence of a complete **knowledge retention strategy** is the first condition and the starting point for adequate knowledge retention. While most organizations do not have a systematic knowledge retention strategy and rely on ad hoc and reactive approaches (Daghfous et al., 2013), a deliberate strategy can help prevent knowledge loss. Furthermore, these strategies can be focused on the areas of critical knowledge that are at risk (DeLong & Davenport, 2003). A first step in creating a knowledge retention strategy is recognizing the priority for knowledge retention within the firm (Levy, 2011). This research defines a knowledge retention strategy as a multifaceted and customized approach, including

people and IT solutions, to retain knowledge (Frigo, 2006). This definition contains a link to the two other essential conditions that are required to retain knowledge.

The **IT applications** have an important place in organizations and are part of the infrastructure of the organization (Achterbergh & Vriens, 2019). They are present in organizations to capture, store and share knowledge (Delong, 2004). The system-based approach forms the basis of this aspect of the framework (Hayward-Wright, 2009). One can think about hardware technologies, such as an Intranet, and software and database tools, such as a database for good practices (Bollinger & Smith, 2001). However, these digital tools can also be collaboration tools, such as zoom to enable video meetings (Bollinger & Smith, 2001). Another tool for organizations to use is the portal, which can support the effective management of knowledge processes (Benbya et al., 2004). These IT applications contribute to codifying and sharing, mapping internal knowledge, and creating knowledge networks (Lin et al., 2016). Based upon the description above, the condition of IT applications in this research refers to 'the extent to which IT applications can be used to facilitate the process of knowledge retention' (Doan et al., 2011). Six items can be used to measure this condition (Wong & Aspinwall, 2005): 1. use of an appropriate KM system, 2. Application of technological tools, 3. Utilization of the intranet or internet, 4. Appropriate knowledge structures or categories for a repository, 5. Ease of use of the technology, and 6. Suitability of the KM system to users' needs. However, only the presence of IT applications is not enough for an organization to make knowledge retention work. The employees also need to be willing to codify their knowledge into these applications, search the systems, and trust them (Hislop, 2018).

The **HR, processes, and practices** as a condition focus merely on the 'human' repositories on organizational levels (Walsh & Ungson, 1991). As explained earlier, organizational knowledge is retained through employees (Schmitt, Borzillo & Probst, 2012), which implies that this part of the framework is based on the people-based approach (Hayward-Wright, 2009). At the same time, this HR-dimension is responsible for fostering a learning culture in the organization (DeLong, 2004). Such a learning environment stimulates flexibility and the desire to innovate (Agarwal & Marouf, 2014). When HRM practices are not done adequately, workers can become less committed and loyal to their organization, risking the loss of knowledge that these workers possess through, for example, staff turnover (Hislop et al., 2018). The employees take their tacit knowledge to another organization. In this research, and based on the previous literature discussion, the HR, processes, and practices are explained as 'the utilization of knowledge retention mechanisms in human resource management'. Five constructs can be used to measure this condition (Doan et al., 2011): 1. Staffing, 2. job design, 3. performance appraisal systems, 4. reward and compensation systems, and 5. Training and development. Staffing refers to 'the extent to which companies consider person-environment fit to ensure congruence of individual and organizational values and goals' (Doan et al., 2011, 310; Cabrera & Cabrera, 2005). Job design is about the degree to which employees have interesting, challenging jobs, consisting of high autonomy and encouraging and requiring interpersonal collaboration (Hislop et al., 2018). These

aspects influence employees' motivation and create opportunities for employees to use their knowledge (Kelloway & Barling, 2000; DeLong, 2011). Team-based work design could, for example, stimulate communication between different generations (Slagter, 2007; Levy, 2011). Performance appraisal systems refer to the extent to which companies evaluate individual performance when considering knowledge-sharing ability as one of the leading performance criteria (Doan et al., 2011). Reward and compensation systems refer to the degree to which people involved in knowledge transfer activities will be recognized and rewarded (Doan et al., 2011; Levy, 2011). Training and development refer to the extent to which employees will be provided great opportunities for personal growth and career advancement (Doan et al., 2011).

In the framework applied in this research, the conditions for adequate knowledge retention are brought back to these three main characteristics, resulting in the following conceptual model:
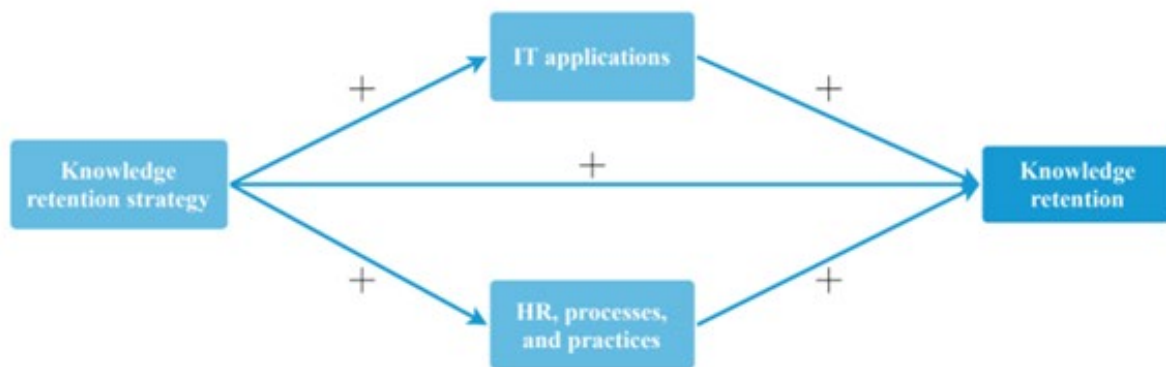
This conceptual model illustrates the following: 1. A multifaceted, customized knowledge retention strategy has a positive influence on how an organization does knowledge retention. The presence of a strategy creates awareness that knowledge retention is an important task of the organization 2. Moreover, a knowledge retention strategy - which entails the aspects of IT and HR, processes, and practices to realize its goals- could increase the presence of proper IT applications and HR, processes, and practices regarding knowledge retention. 3. When the extent to which IT applications are available to facilitate knowledge retention and the willingness of the employees to use the available applications are great, the amount of knowledge retained is high. 4. When the utilization of knowledge retention mechanisms in human resource management is high, the amount of knowledge retained is high.

For these reasons, organizations should incorporate proper IT applications and mechanisms in human resource management based upon a deliberate knowledge retention strategy to gain competitive advantage and prevent knowledge loss. Knowledge loss is not the main focus of this research. Therefore, it has no place in the conceptual model. However, as explained in paragraphs 2.5 and 2.6, knowledge loss is closely related to knowledge retention and could appear in the data that is being collected.

3. Methodology

This chapter elaborates on the methods of the study conducted. At first, it discusses the research strategy. Paragraph 3.2 addresses the research design, followed by a rich case description in paragraph 3.3. Paragraph 3.4 explains the data collection, including the research methods of this research. Hereafter, paragraph 3.5 provides the operationalization of the key concepts. Paragraph 3.6 consists of the data analysis. The chapter ends with the consideration of ethical research conduct in paragraph 3.7.

3.1 Research strategy

This research entails practice-oriented research and is qualitative. The practice-oriented study aims to contribute to a solution for a practical problem (Boeije, 2005). In solving a practical problem, four stages need to be pursued: a) diagnosis, b) design, c) implementation, and d) evaluation (Van de Westelaken & Peters, 2011). This research focuses on the diagnostic phase. Diagnostic research is concerned with analyzing the causes of a particular phenomenon in an organization and provides three main insights (Bleijenbergh, 2015, p.23). First of all, it reveals which problems are most current and need an immediate solution. Secondly, it determines what the causes of the issues are. Finally, it indicates the solution space (Verschuren & Doorewaard, 2007). A diagnostic approach is relevant in this study because it can reveal problems, causes, and improvement points concerning knowledge retention on online education at RU. These insights are helpful for RU to retain the critical knowledge based upon which future decisions on online education can be made.

This research aims to gain insight into the desired and actual status at RU concerning knowledge retention on online education. Therefore, a qualitative approach is chosen to collect rich and nuanced data (Barrett & Twycross, 2018). Furthermore, and in comparison to a quantitative approach, a qualitative approach enables the researcher to ask additional questions for clarification during the interviews (Barret & Twycross, 2018). Moreover, knowledge retention is a complex phenomenon, as proven by the variety of definitions in literature (Par. 2.6). Knowledge can also be implicit and, therefore, making it more appropriate to be studied by a qualitative - for example, qualitative case study - approach (Hitomi & Black, 2018).

Furthermore, this research entails a deductive approach. A deductive approach implies that existing literature is used as a starting point to study a phenomenon in the empirical field (Bryman, 2012). A lot of research already has been done on knowledge retention and, for that reason, entails sufficient concepts to construct a theoretical framework (Armat, Assarroudi, Rad, Sharifi & Heydari, 2018). Therefore, knowledge retention and its conditions distinguished in chapter 2 are operationalized (Par. 3.5) to the context of this research to investigate whether and to what extent these conditions are present at RU.

3.2 Research design

This research is done by the use of a case study. A case study is "*an empirical inquiry, which investigates a contemporary phenomenon in depth and within its real world context*" (Yin, 2014, p. 16). In this research, a case study is appropriate as the aim is to diagnose a real-world case, assuming that the understanding is involving contextual conditions (Yin, 2014). In this case, it is about the diagnosis of knowledge retention and the conditions for adequate knowledge retention to prevent knowledge loss on online education (the contemporary phenomenon) at RU. Inadequate knowledge retention could result in the situation of reinventing the wheel. Knowledge retention is described in the context of RU during the COVID-19 pandemic, as discussed in chapter 1 and involved in the analysis of chapter 5. This specific context cannot be left out in the analysis of knowledge retention. It makes the research context more complicated and is essential to understand the studied phenomenon (Darke, Shanks & Broadbent, 1998). This allows for in-depth analyzing the phenomenon of knowledge retention and its conditions at RU, which is needed to perform the diagnosis and fulfill the research goal of this research (Vennix, 2011). The RU is the research unit of this research. Within this case, the data is collected at the Faculty of Social Sciences, including its Teaching Information Points (hereafter: TIP), and the TLC, which choice is further explained in paragraph 3.4 about data collection.

3.3 Case description

A rich case description contributes to the transferability of the research (Guba & Lincoln, 1989). This paragraph discusses the RU as the overarching organization and also the researched faculty and TLC. Founded in 1923 in Nijmegen, RU is one of the thirteen universities in the Netherlands. It is a broadly oriented, classic university (Mission and identity 2021 RU). The RU aims to achieve its mission of bringing together high-quality research and high-standard education during a pandemic, which resulted in online education as teachers and students all work from home (Mission and identity RU, 2021; Strategy RU, 2021). The RU is achieving its mission by implementing the established strategy titled 'A significant impact' (Mission and identity RU, 2021; Strategy RU, 2021). The board of directors is responsible for the university and is the administrative body that sets the overall policy for seven faculties (College van bestuur RU, 2021). Appendix 1 (1 'Organizational chart RU') displays the entire organizational chart of RU. The seven faculties have a lot of freedom in organizing their activities to achieve the educational goals set in the university's mission.

The FSS is one of the seven faculties of RU, which recently moved to the new Maria Montessori building. This is the most sustainable building at the university (Faculty of Social Sciences RU, 2021). The faculty consists of educational programs and research institutes. It has six teaching fields, namely 1) Psychology, 2) Artificial Intelligence, 3) Pedagogical Sciences & Education, 4) Communication Science, 5) Sociology, and 6) Anthropology & Development Studies. All these fields have in common that they study 'human behavior, feeling and thinking, sometimes at an individual level, and sometimes

considering the behavior of large groups' (About the FSS RU, 2021). The FSS has formulated a strategy. This strategy consists of ten priorities for 2021 till 2026 (Strategy FSS RU, 2021). The third principle of the strategy is that 'quality, commitment, and flexibility are at the heart of our education' (Strategy FSS RU, 2021). The FSS wants to achieve high-quality education through I) interconnection of education and research, II) interaction between science and practice, III) a curriculum that pays attention to both knowledge acquisition and skill development as well as utilization, IV) timely educational innovations, and V) further professionalization of lecturers. To achieve professional development and teaching innovations, the FSS encourages lecturers to use the support offered by the Teaching & Learning Centre. As FSS explicitly mentions the support of the TLC in the overview of the spearheads and ambitions for the coming years (Strategy FSS RU, 2021), this is one reason to research this faculty. The choice for FSS is further explained in paragraph 3.4.

The TLC is a facilitating entity at RU in terms of quality of education and lecturer development (Vision and ambition TCL RU, 2021), officially opened on 30 January 2020. TLC has four ambitions regarding improving education, working conditions for lecturers, innovative strength of lecturers, and visions regarding learning and teaching. The TLC has appointed lecturer ambassadors of every faculty to link the faculties and TLC (TLC Lecturer ambassadors RU, 2021). With the implementation of the TLC and the appointment of the lecturer ambassadors, all faculties got their own Teaching Information Point (TIP) (TIP 2021, RU). The TIP is a starting point for questions for teachers about educational design and ICT in education (TIP FSS RU, 2021).

3.4 Data collection

The data is collected at the FSS and the TLC. First of all, the FSS is chosen because they do not teach knowledge retention methods in their courses. When researching, for example, the Nijmegen School of Management, the fact that they teach knowledge management could be of an influence while interviewing the respondents. Furthermore, since the pandemic started, many initiatives within the FSS have been developed, showing great flexibility, which could be an example for other faculties concerning the diagnosed strengths in retaining knowledge. From that perspective, the FSS is an extreme situation compared to other faculties, which is a reason to select it (Symon & Cassel, 2012; Eisenhardt, 1989; Pettigrew, 1990). The TLC is founded to have a centralizing goal and connect people. Thereby, the TLC aims to retain critical knowledge at RU and help to gain competitive advantage. The FSS also differs from other faculties in using the support offered by the TLC. The strategy of FSS explicitly mentions the TLC's support. As other faculties may still have a strategy from before the TLC's foundation, a nuance must be made.

At the FSS and TLC, data is collected by the use of interviewing and gathering documents. The use of these methods will result in different types of data to analyze. Data triangulation improves the credibility and, thereby, the quality of this research. It provides the ability to ask in the interviews about

what is observed in the orientation phase and read in the documents (Guba & Lincoln, 1989). Observations are made by joining several sessions in the orientation phase of this research (Appendix 6 'Sessions joined Orientation-phase'). These findings are not included as data because these sessions were joined to get a first good overview to deliberately decide upon which methods to use and who could be interviewed. The research diary includes notes about the joined sessions.

Data is gathered via semi-structured interviews, which allows limiting the interview scope while still having the flexibility for participants to bring their perspective to the discussion (Barret & Twycross, 2018). Within the semi-structured interview, a good balance is found between open-ended questions, which allow for direction while being flexible and closed questions to start with and limit the interview scope (Appendix 5.1 and 5.2). The operationalization of concepts in paragraph 3.5 (Appendix 3) forms the basis for these questions. The interviews are conducted at the FSS and the TLC. Via joining zoom sessions in the orientation phase, the connection was made with employees of the FSS, which opened up the opportunity to get in touch with them and other employees. Teachers, a lecturer ambassador of the TLC, TLC members, and a TIP employee have been interviewed on knowledge retention on online education. Lecturers know online education by teaching their courses online. When they have questions regarding education or IT systems, they can ask TIP employees to help them. Being a collector of questions makes the employees of the TIP a good source of data. As the FSS aims to work closely with the TLC, which focuses on improving education at RU, employees from the TLC will be interviewed. An extra interview was added with a TLC member, who was the project leader of two knowledge retention strategies that are currently developing. The following table 1 'Respondent list' displays a complete list of the (anonymized) respondents and a description of their tasks:

Number	Respondent number	Task description	Duration
1	R1	Member of the TIP at FSS	48 minutes
2	R2	Lecturer at study program C of the FSS	49 minutes
3	R3	Lecturer of study program D of the FSS	47 minutes
4	R4	Coordinator of the Teaching Support Unit in the TLC	50 minutes
5	R5	Lecturer of study program D of the FSS	38 minutes
6	R6	Lecturer ambassador of the FSS and lecturer at the FSS	61 minutes
7	R7	Education and teacher developer at TLC	54 minutes
8	R8	Lecturer at study program A of the FSS and member of the core team of the TLC	53 minutes
9	R9	Communication employee at the TLC and leader of the two projects: 1. Lessons learned and 2. Education community.	25 minutes

Table 1 'Respondent List'

Due to the COVID-19 pandemic and a lockdown that was in place in the Netherlands in spring 2021, it was not possible to conduct interviews face to face at RU. Therefore interviews were held online via

Zoom, which allowed seeing facial impressions of the respondent (Janghorban, Roudsari & Taghipour, 2014; Deakin & Wakefield, 2014). In addition, seeing facial impressions enabled the researcher to see whether respondents understood the questions.

Document analysis is a relatively low-cost, however, time-consuming method within qualitative research (Symon & Cassel, 2012). In an increasingly digitized society, online documents are relevant to organizational research, especially with an eye on the condition of IT applications within this research (Ingold & Vanoirbeek, 2003). From four online sources, several documents have been gathered: 1. the strategy of the FSS, 2. the Brightspace page of FSS, 3. the Brightspace page of TLC for teachers, and 4. the website of the TLC for teachers. During the interviews, respondents provided access to the Brightspace pages. Next to that, the aim was to incorporate a document on gathering and sharing the lessons learned. However, since this strategy has been developing during this research, data were collected using an interview to capture the developments. Tabel 2 'Document List' provides a clear overview of all the collected documents:

Number	Document number	Name	Description	Number pages
1.	D10	FSS Strategy 2021/2026	The general strategy of the FSS	24
2.	D11	EDD- content	A Brightspace page - Exchange of digital didactics - for teachers of the whole university made by the TLC to provide tips for online education. The content page of this platform	3
3.	D12	EDD- course home	The course home of the Brightspace page- Exchange of digital didactics - for teachers of the whole university, made by the TLC	3
4.	D14	EDD- table of contents	The table of contents of the Brightspace page- Exchange of digital didactics - for teachers of the whole university, made by the TLC	3
5.	D15	EDD- total users	The number of total users of the Brightspace page- Exchange of digital didactics - for teachers of the whole university, made by the TLC	1
6.	D26	EDD - Discussions	The discussion page of the Brightspace page- Exchange of digital didactics - for teachers of the whole university, made by the TLC	4
7.	D16	FSS Teachers - content	The content page of the Brightspace page for teachers of FSS was made and updated by the TIP to provide tips for teachers and a platform to discuss.	3
8.	D20	FSS Teachers - total users	The number of total users of the Brightspace page for teachers of FSS made and updated by the TIP of the FSS to provide tips for teachers and a platform to discuss.	1
9.	D28	FSS Teachers - Discussions	The discussion page of the Brightspace page for teachers of FSS was made and updated by the TIP to provide tips for teachers and a platform to discuss.	6

10.	D29	FSS Teachers - Course home	The course home of the Brightspace page for teachers of FSS was made and updated by the TIP to provide tips for teachers and a platform to discuss.	8
11.	D30	FSS Teachers - Table of content	The table of content of the Brightspace page for teachers of FSS was made and updated by the TIP to provide tips for teachers and a platform to discuss.	15
12.	D21	TLC.ru.nl teachers ICT education all tools	The TLC website with an overview of tools that can be used for education	2
13.	D22	TLC.ru.nl teachers ICT education	The TLC website with a page for digital education and how to use ICT in education	3
14.	D23	TLC.ru.nl education learning from a distance; experiences of teachers with online education	The TLC website for online education on with teachers tell about their experiences with online education	1
15.	D24	TLC.ru.nl Teachers education from a distant	The TLC website for teachers about education from a distant	2
16.	D25	TLC.ru.nl teachers	The TLC website for teachers	2

Table 2 'Document list'

3.5 Operationalization

Knowledge retention and the conditions for knowledge retention are operationalized to research in the context of RU. Chapter 2 provided the theoretical definitions of the concepts, and this section will give the operational definitions assigned to RU.

3.5.1 Knowledge retention

In this research, knowledge retention is defined as "the processes, systems, storage mechanisms and interactions that are used together to hold on to critical employee knowledge so that it can be readily accessed and used" (Cronin et al., 2018, p. 73). In the context of RU, this theoretical definition is translated to the operational definition '*the processes, systems, storage mechanisms and interactions at RU that are used together to hold on to critical employee knowledge on online education so that it can be readily accessed and used*'. This definition can be split up into the repositories to store/capture and, in that way, hold on to critical knowledge and the accessibility of knowledge within these repositories. The repositories to store knowledge are distinguished by using the five repositories of Walsh & Ungson

(1991). The same distinction is used in the dimension of the accessibility of critical knowledge (See Appendix 3.4 Operationalization tree 'Knowledge retention').

One must realize that the items distinguished to measure knowledge retention overlap with the operationalization of the conditions used. The definitions of knowledge retention within the field of study are relatively broad, and most conditions are measured under the label knowledge retention. In the analysis, several questions will be used to measure the state of the conditions and knowledge retention itself. The headings show this in the interview guide. However, within the questions, the focus on knowledge retention is mainly on: ´is knowledge retained in the five repositories and is this knowledge accessible´, whereas the conditions are more focused on the ´how it is done´. Hence, the conceptual model is not a clear line from the conditions to knowledge retention but a blurry, overlapping arrow.

3.5.2 Knowledge retention strategy

A knowledge retention strategy is a 'multifaceted and customized approach, which includes people and IT solutions, to retain knowledge' (Frigo, 2006). In the context of RU, this theoretical definition is translated to the operational definition '*a multifaceted and customized approach to the context of RU, which includes people at RU and IT solutions, to retain knowledge on online education at RU*'. Three stages will be distinguished (Levy, 2011) to measure whether the Radboud University has a multifaceted, customized knowledge retention strategy: a) whether decisions are made about whether and at what level vertical knowledge transfer is required, b) whether the planning what knowledge needs to be retained and how this should happen is made, and c) whether the implementation of the planning is done. Appendix 3.3 shows the operationalization tree.

3.5.3 HR, processes, and practices

The condition of HR, processes, practices is described as 'the utilization of knowledge retention mechanisms in human resource management'. In the context of RU, this theoretical definition is translated to the operational definition of '*the utilization of knowledge retention mechanisms in human resource management at Radboud University*'. Five constructs are used to measure human resource management (Doan et al., 2011): 1. Staffing, 2. job design, 3. performance appraisal systems, 4. reward and compensation systems, and 5. Training and development. These items are partly constructed by Doan et al. (2020) based on the study of Cabrera and Cabrera (2005). Appendix 3.2 includes the operationalization tree.

3.5.4 IT applications

The condition of IT applications is described as 'the extent to which IT applications can be used to facilitate the process of knowledge retention' (Doan et al., 2011). In the context of RU this theoretical definition is translated to the operational definition: *the extent to which IT applications at RU are used to facilitate the process of knowledge retention of knowledge on online education.*

The definition is divided into two dimensions: the availability of IT applications (Wong & Aspinwall, 2005) and the willingness to use them (Hislop, 2018). The availability of IT applications can be measured by three of the six items of Wong & Aspinwall (2005), namely applications of technical tools, intranet or internet use, and ease of use of this technology. The willingness to use the applications can be divided into the willingness to codify knowledge and search these systems for knowledge (Hislop, 2018). The operationalization tree can be found in Appendix 3.1.

3.6 Data analysis

The qualitative data is obtained via interviews and documents. This data is analyzed using template analysis. It provides the flexibility to use a priori themes; however, it remains open for developing these a priori themes and the development of new possible themes (Symon & Cassel, 2012). Descriptive-thematic-pattern codes were used (Braun & Clarke, 2006). The literature has provided the pattern and thematic codes. Subsequently, the descriptive codes were based on the items of the operationalizations in the previous paragraph (Braun & Clarke, 2006). This analysis method enables the researcher to highlight similarities and differences across the data set. Moreover, this method ensures a certain amount of consistency in the analysis, contributing to coding reliability (Symon & Cassel, 2012). The same codes are used for every transcript, and new codes that were found in the data were, when possible, added to the template to create a hierarchical coding. This way, the initial template was expanded and used for all the data again. In this analysis process, ATLAS.ti was used to get a clear overview of where data came from and how it can be presented in findings, which increases the confirmability of this research (Guba & Lincoln, 1989). Appendix 7 includes both the initial and the final template.

3.7 Research ethics

One of the ethical principles in qualitative research is that the respondent should be given a certain amount of autonomy (Orb, Eisenhauer & Wynaden, 2001). Respondents were given multiple options in choosing the date, and the interviews were conducted via Zoom as all Radboud employees have a Zoom account. At the start of each interview, a statement (Appendix 4) was made that no names would be included in the transcripts. Respondents were offered the option to withdraw from the research at any time. Furthermore, permission was asked to record the interview. During the interviews, the

researcher tried to interrupt respondents as little as possible to give respondents the freedom to answer their answers.

        After conducting and transcribing the interviews, the verbatim transcripts were sent back to the respondents for member-checking to increase the credibility of the research (Lincoln & Guba, 1985). Simultaneously, respondents were told to highlight fragments that they did not agree upon or felt sensitive about. When these fragments would be useful for the results, these respondents were explicitly asked for their permission to use the fragments. When not agreed upon, these fragments were, depending on the respondent's reaction, not included in this research as citations or removed from the transcripts. However, these options were hardly used, and respondents preferred to read a page about particular subjects. During the mail conversations, participants were comforted and supported if they became distressed during collecting the data (Dickenson-Swift, James, Kippen, & Liamputtong, 2007; Birt, Scott, Cavers, Campbell & Walter, 2016).

        As the researcher is submerged in the research object, it is crucial not to lose awareness that one can influence the research object. Within this research, this issue gains extra attention. The researcher is currently working as a lecturer at RU; however, not at the FSS. Furthermore, the researcher is studying at RU, however, not at the FSS. Both elements play a role in the possibility of influencing the research object. To prevent this, the researcher will keep a research diary to judge why particular decisions were made (Symon & Cassel, 2012). Using a research diary increases the dependability of the research. Keeping a research diary can, at the same time, increase the credibility as it allows to check whether the participant's views have been accurately captured (Symon & Cassel, 2012).

4. Results

Three steps must be followed to provide a diagnostic analysis of the current way of retaining knowledge on online education at RU. At first, the current state of knowledge retention at FSS and TLC is described (Par. 4.1). The second step is to determine to what extent the conditions for adequate knowledge retention are present. The third step is whether they cause why knowledge is (not) retained adequately (Par. 4.2). Finally, the room for improvement that emerges is discussed to strengthen the retention of knowledge in the future (Par. 4.3). This solution space constitutes the basis of the practical recommendation to improve knowledge retention at RU.

4.1 Current state knowledge retention

In the first paragraph of the results, the current state of knowledge retention at RU is described based on the interviews and document analysis at the FSS and TLC. This will be done by answering the following sub-questions:

- "To what extent is knowledge on online education retained at the faculty of Social Sciences?"
- "What is the role of the TLC in knowledge retention on online education at the RU?"

The role of the TLC will be incorporated in the analysis of the extent to which knowledge on online education is retained at the FSS. The extent to which knowledge on online education is retained at the FSS will be discussed by a display of the five repositories of Walsh & Ungson (1991): 1. individual members, 2. culture, 3. physical structure of the workplace, 4. standard procedures and processes, and 5. organizational roles and structures. After that, the results will be summarized and displayed in Tables 3 and 4 as overviews.

4.1.1 Individual members

Universities can be qualified as KIOs, which have highly educated employees as a significant part of the workforce (See par. 2.1). These highly educated employees can be found at several places at RU and form the most extensive repository of knowledge on online education. Three major groups can be distinguished: teachers, TIP members, and members of the TLC.

After one year in the corona crisis, "*there are at least many people who are experienced by doing it themselves*" (R7; Connected to TLC and faculty advisor), referring to teachers.[1] Almost every teacher has experienced online teaching because they had to change and provide their courses online. When changing the courses, a teacher had to make choices. Therefore, they gained different experiences with online education. These differences can lie in the type of course or preferences of these teachers. Furthermore, differences in knowledge occur because people within faculties, study programs, and even

---

[1] Er zijn in ieder geval veel mensen ervaringsdeskundigen door het zelf te doen.

within courses of study programs worked their way through this change quite individually. '*Teachers have taught themselves a lot, but I think that they got their information from the TIPs and TLC'* (R6: lecturer ambassador FSS).[2] In making that transformation, teachers were not appointed to autodidact but could seek help from TIPs and the TLC members.

Members at the TIP of the FSS are education experts *who have an important role in securing online knowledge, as they provide excellent support for teachers at their faculties* (R4: TLC coordinator). They support teachers in designing their courses, organize training courses and answer the questions of teachers. A coordinator at TLC (R4) explains that the members at the TIP slowly become a source of knowledge on what teachers struggle with by performing this task. On top of that, they have insights from a theoretical, educational perspective. The TLC has a role in centralizing knowledge on online education '*by looking at the lessons learned from the past years and what that means for the upcoming years in designing education'*[3]. Next to that, TLC has a role in connecting people (R4: coordinator at TLC). From this perspective, TLC should be seen as a '*network organization'*[4] (R4: coordinator at TLC). Members at the TLC gain knowledge by placing themselves as this centralizing actor at RU. While knowledge from teachers remains mainly in their heads - because of the culture that is explained in par. 4.1.2 -TIP members and TLC members tend to move towards documentation using a site, newsletters, and Brightspace pages (See par. 4.2.1).

4.1.2 Culture

At FSS, the TIP, and TLC, the individual members take a central place in storing knowledge on online education. However, besides individual members, knowledge can be stored in the culture of organizations. The culture retains knowledge when it is present so that people, in this case, value knowledge about online education and value the aim of sharing their critical knowledge. Otherwise, these experiences could be forgotten, and individuals' knowledge is not accessible at all, while the accessibility of knowledge is one of the dimensions of retaining knowledge (See Appendix 3.4 'Operationalization of Knowledge Retention').

A common thread in the data is the assumption that *education will remain at least partly online*' (R3: teachers FSS; see also D29: FSS teachers course home), which illustrates that teachers are aware of the value that online education can bring for the quality of education.[5] While teachers view online education as a part of the future, they do not explicitly value the aim of knowledge retention, and it should, moreover, not be added as an extra task. The workload is high, and, therefore, knowledge

---

[2] Dus dan denk ik dat heel veel mensen zichzelf heel veel geleerd hebben en dan denk ik dat zij de informatie die zij. Die zullen ze gehaald hebben, ik vermoed bij de TIP'ers en de TLC'ers.
[3] Dus we zijn nu wel ook vanuit het TLC aan het kijken naar, leuk wat leren we ervan en ook wat betekent het dan eigenlijk voor het onderwijs zoals dat moet vorm krijgen in het komend collegejaar.
[4] In de organisatie is het de bedoeling dat het werkt als een netwerkorganisatie.
[5] Nu zoveel online is, verwacht ik dat, voor zover ik de sfeer kan proeven, voel ik die dan een beetje, het zal voor een deel online blijven.

retention on online education is not prioritized in the division of tasks of teachers and remains at a lower level. A phrase of a teacher can illustrate this: '*I just don't have the time. I am constantly running out of time. The short summary is that this is typically something like ooh gosh, this has to be done too, oh well that will come another time*' (R2; Teachers FSS).[6] Furthermore, reasoning can be identified that by making use of "*good mutual relationship between employees, knowledge on online education will be shared and in that way retained*" (R3; teacher).[7] Another respondent mentions that ´*knowledge must be shared before it can be retained as well*´ (R6; lecturer ambassador).[8] Combining the storage of knowledge in the individuals at FSS and the preference for contact with colleagues, there is a willingness to retain knowledge by interacting with RU members. Respondents describe the culture at RU as open. People know each other and are approachable. The FSS wants to be "*inclusive*" and everyone '*needs to feel welcome and at home*' (D10; FSS Strategy 2021-2026).[9] However, it is currently hardly possible to engage in knowledge retention by interacting face-to-face, which is related to the fact that employees work from home and moments to interact are drastically reduced, which is explained in the next paragraph (Par. 4.1.3.). Therefore, knowledge stored in teachers is harder to access.

Like teachers, members at the TIP and TLC agree upon the importance of connecting people and interacting with each other (R2: TIP; R4: Coordinator TLC). At the same time, they are working more widely with digital applications to document knowledge. The creation of a website, two Brightspace pages, sending of newsletters, and the fact that they are currently developing an education community (Par. 4.2.1 and 4.2.3) illustrate the use of digital applications. Furthermore, within the TLC, employees communicate via a platform named 'Slack' (R7: TLC), which allows them to chat and share files. By documenting and connecting online, they try to centralize information and make it available for teachers.

4.1.3 Physical structure of the workplace

The physical structure of the workplace can be distinguished by the past, the current, and the future physical structure of the workplace, as the FSS recently moved to a new building, 'the Maria Montessori-building' (D10: FSS Strategy 2021-2026).

---

[6] En ik heb gewoon voortdurend geen tijd voor. Ik kom voortdurend niet uit met mijn tijd. Dat is de korte samenvatting, dus dit is dan typisch zoiets van god moet dit ook nog, ohja, naja.. dat komt nog wel een keer.

[7] Als je nu gebruik maakt van goede onderlinge contacten, dan gaat die kennis gedeeld worden en bewaard blijven.

[8] Bij kennisbehoud. Jij zei in het begin ook hoe wordt die kennis vastgehouden. Ik denk ook, hij wordt in eerste instantie zegmaar gedeeld en dat delen is omdat iemand iets heeft uitgezocht en gemaakt en dan wordt het gedeeld.

[9] De faculteit wil inclusief zijn: (potentiële) werknemers en studenten moeten zich onafhankelijk van hun achtergrond bij de faculteit welkom en thuis voelen. Juist de universiteit zou een plaats moeten zijn waar afkomst, geloof, geaardheid en kleur geen rol mogen spelen.

Before the COVID crisis and in the old building, teachers worked relatively near to each other. They were often housed on the same corridor, making contact easy (R2: teachers; R8: teacher). On this subject, one respondent (R8: teacher) mentions that both lecturers and students quickly walked into a colleague's or teacher's room and that she hopes that this will return after the corona crisis.

During the COVID crisis, the FSS and TLC employees work a vast amount of time from home, and the contact with colleagues has been reduced. Only a maximum amount of people is allowed to be in a room. Furthermore, it is not attractive to go to the university. When employees would go to RU, they '*would go there for the people, but not if they are not there*' (R5: Teacher).[10] Teachers have to '*actively call people, which creates a certain threshold*' (R8: Education coordinator, teacher, TLC core team).[11] Other options are to meet each other in a zoom or gather town. Most employees only meet for functional purposes, so meetings, sessions, or training courses. Informal events are organized. However, the willingness to join these events is relatively low because it remains pretty distant by looking at a screen. About this, one teacher mentions that '*there is a Friday afternoon drink once a month. But then again, I don't like the online drinks* ' (R3: Teacher).[12] The TIP tries to digitally communicate via FSS teachers, a Brightspace, including a discussion forum in which people can interact. Furthermore, a member of TIP (R1: TIP) mentioned: '*announcements in the course are used, and I try to write them each Friday with a few things that are important to know for people*'.[13] The TLC communicates via newsletters and its website, confirmed by a core team member (R8).

In the new Maria Montessori building, '*employees can find each other more easily due to the physical proximity within the building*' (D10: FSS Strategy 2021-2026).[14] Teachers confirm this by mentioning that their 'study program members *will have an office near each other*' (R8: Education coordinator, teacher, TLC core team).[15] This new environment will stimulate individuals to interact. Therefore, the knowledge stored in the individuals will be accessible. Next to that, just before the COVID-crisis started, the TLC had set up a teachers' lounge in TvA1, '*which is intended as a meeting place*' (R4: Coordinator TLC).[16] Furthermore, at the Maria Montessori-building, '*flexible and online education is stimulated by the opportunities to use digital tools and innovations*' (D10: FSS Strategy 2021-2026).[17] This is in line with the feeling of employees that online education will remain part of education in the future and allows for more intensive use of IT. The presence of such facilities retains knowledge so that people see and can provide online education. By providing a facility for online

---

[10] Ik zou er naartoe gaan voor de mensen, maar als de mensen er niet zijn.

[11] Nu moet je dan heel actief mensen gaan bellen en dat geeft dan toch een drempel.

[12] We hebben wel een vrijdagmiddagborrel een keer in de maand. Ja, ik vind dat online borrelen maar niks

[13] En sowieso gebruiken we wel die announcements in die cursus, die probeer ik op vrijdag te schrijven met een paar dingen voor mensen die belangrijk zijn om te weten.

[14] Mederwerker kunnen elkaar gemakkelijker vinden door de fysieke nabijheid binnen het gebouw.

[15] Dus we zitten als groep [opleiding A] helemaal bij elkaar.

[16] Daar hebben we ook een docenten lounge, die bedoeld is als ontmoetingsplek.

[17] Tegelijkertijd bevorderen we via digitale tools en innovaties mogelijkheden tot flexibel en digitaal onderwijs, en mogelijkheden tot toekomstbestendig gedeeltelijk thuiswerken door medewerkers.

education, knowledge about online education is captures, stored, and made accessible in the physical structure of the new workplace of the FSS.

4.1.4 Standard procedures and processes

As interaction, mostly between teachers, is lower than before the COVID crisis, standard procedures and procedures can show that knowledge is still retained in the way activities are happening. This is of increased importance because many new experiences and knowledge on online education have been created in the past years. Before the pandemic, courses at the FSS had a more or less standard course design. There were '*general lectures, workgroups, and work lectures. That is about the variation we had in working forms*' (R4: TLC coordinator).[18] Because of this straightforward setup, there were not many standard ways of codifying how people provided education by using these methods, besides making course guides, setting up the Brightspace page, and incorporating the feedback of the education policy committees. However, these kinds of documents often do not contain the rationale behind choices for specific education methods. The mere fact that course designs differ little from each other does not make the presence of a standard procedure for storing how courses were delivered irrelevant. Codification remains just as crucial as it can help in improving the existing methods. Moreover, courses differ from each other concerning the content and, therefore, the course's goal. Codification should, therefore, still happen so that critical knowledge is retained from which can be learned when creating new courses and modifying existing courses.

When the COVID crisis started, everyone had to work from home, and courses had to be transformed into online alternatives, which created a whole new spectrum of working forms. However, because previously there had been no procedure for documenting the rationale behind methods - because the same methods were used across courses -, there was no method of documenting the rationale behind choices on the methods used in online courses. A TIP session provided general training on how to transform a course into a proper online course. However, one respondent made the following nuance to this observation: '*I disagree with presenting it that way because I prefer that people look at the learning goals and course design. However, when people have no time and things have to move fast, this is the most practical manner of presenting it*' (R1: TIP FSS).[19] Furthermore, during the year, insights kept developing, which influenced the view on what online aspects worked in practice and what online elements did not. These aspects were taken into account by changing the topic of the training courses based on these developments (R1: TIP), for example, changing from interaction with students to bonding with students and after that online examination.

---

[18] Voor de corona crisis kreeg het onderwijs vrij op een standaard manier vorm. En je hebt hoorcolleges, werkcolleges, werkgroepen, dat is ongeveer de variatie die we in werkvormen hadden.

[19] Ik ben het niet eens om het zo te presenteren, want het liefst wil ik dat mensen hun leerdoelen en ontwerp kijken. Maar mensen hebben geen tijd en het moet snel, dan toch maar zo want dat is wel heel praktisch voor ze.

Besides the training courses of the TIP, the TLC is thinking about a general blended course design model that reflects the experiences of the past years. However, to create this, cooperation of teachers is necessary - access to their knowledge - to contribute to developing the design. Currently, teachers have a high workload and '*from all sides TLC gets the response 'not now'* (R4: TLC coordinator).[20] As teachers are not available now, they must be available later to access their knowledge on providing online education. However, this cannot be guaranteed because employees leave organizations. This increases the importance of an adequate out-boarding procedure. One teacher mentioned (R2): '*Someone has left us, several people in a row. I then took over someone's course myself. I thought that was a real gap. It was someone I did not know very well, and it was not obvious that it was being transferred adequately, so no, I do not have the idea that it is institutionalized*'.[21] This fragment shows that there is no general out-boarding procedure, and employees' knowledge will no longer be available to colleagues, TIP, or TLC. The only knowledge that remains is the knowledge within the course guide and Brightspace pages, which – as mentioned above – often does not contain the rationale behind particular choices in course design or content. Furthermore, the focus seems to be more on hiring new adequate employees and gaining new knowledge (R8: Teacher and education coordinator). However, it is never possible to replace the lost knowledge of a departing teacher in its entirety with the knowledge of a new employee. When knowledge of the departing teachers is adequately retained, and knowledge is brought in through the hiring of new employees, it provides the opportunity for the overall knowledge within the organization to grow.

4.1.5 Organizational roles and structures

Organizational roles and structures can provide repositories in which organizational information can be stored as well (Walsh & Ungson, 1991). This repository is where the position of teachers, TIP, and TLC becomes evident. Teachers all provide education. However, courses, study programs, and faculties are working relatively autonomously. Teachers plan meetings with the colleagues with whom they functionally need to work and, in doing so, organize their courses. Beyond that, the collaboration between teachers is scarce in the context of providing education. It was partly because of this fragmentation that the TLC was established. TLC wants to centralize fragmented knowledge and connect people. As a consequence, employees also expect the TLC to gather and retain knowledge. R8 (Teacher FSS) mentions: '*I think within the TLC, not as an individual task, but there are three people as driving forces of the core activities…. And implicitly, all three try to preserve, anchor and retain*'. The lecturer ambassador of the FSS mentions: '*I think that we as ambassadors have that task. If you*

---

[20] Omdat wij inzet van docenten nodig hebben en van alle kanten te horen krijgen 'nu niet'.
[21] Er is iemand weggegaan bij ons, meerdere mensen vlak achter elkaar. Ik heb toen zelf een vak van iemand overgenomen. Ja, naja, dat was wel echt een gat vond ik. Dat was iemand die ik niet heel goed kende en niet vanzelfsprekend dat dat nog adequaat overgedragen werd, dus nee, ik heb niet het idee dat dat geïnstitutionaliseerd is.

hear, then you will join in the thinking process. But we have as a task to store that information (R6: Lecturer ambassador, teacher).[22] However, since the TLC is relatively new, the role of the TLC is still ambiguous for teachers and seems to overlap with that of the TIPs. This overlap aligns with the fact that the TLC is a network organization, and the '*TIP is part of that network*' (R4: TLC coordinator).[23] TIP and TLC expect to continue intensive cooperation (R4: TLC coordinator) in, among other things, gathering knowledge from teachers. However, the idea remains that teachers are busy, and TLC cannot approach them to collect knowledge. It remains questionable whether this high workload will disappear once the crisis is over or whether this is a more systematic problem.

4.1.6 Summary current state knowledge retention

The previous paragraph shows that individuals - teachers at FSS, members of the TIP, members of TLC- are essential in the retention of knowledge on online education. In Table 3 'Overview results structured according to the repositories of Walsh & Ungson (1991) is provided as a summary of the results:

		Repositories				
		Individual members	**Culture**	**The physical structure of the workplace**	**Standard procedures and processes**	**Organizational roles and structures**
RU actors	**Teachers FSS**	Teachers are experienced by changing to online education and teaching it. Knowledge in the heads of teachers.	They are very open to interacting and sharing on a small scale face-to-face. However, there is no culture for making knowledge explicit in documents. Furthermore, there is no time to document it.	During the pandemic, teachers work from home and lack connection with colleagues, which does not allow for optimally interacting. This causes that critical knowledge in the heads of teachers is not shared face-to-face.	There are no clear standard procedures and processes on online education + focus on keeping education running in a crisis. As situations change a lot during the crisis, teachers have not thought about standard procedures to retain knowledge.	Teachers view teaching as their task and see no explicit task for them to retain knowledge. Instead, they see this as a task for TLC and TIP. However role in relation to TLC and TIP still ambiguous.
	TIP FSS	The TIP has knowledge from teachers by functioning as a question point for teachers at the faculty (during a pandemic). In addition, they have knowledge from a theoretical, education perspective by their own educational background and by	Open to face-to-face interaction by which knowledge can be shared + and open to documentation. This documentation is mainly done via a Brightspace page.	TIP works from home and digital communication of critical knowledge on online education via Brightspace FSS Teachers during the pandemic.	A training with standard format for going to online education set up. Gathering ideas as a question point and incorporate these ideas in training courses that are provided for teachers.	Role as educational support by being question point and advisor, however not much viewed as a retainer. TIP does retain by documenting on the Brightspace page and providing training courses.

---

[22] Ja, die taak hebben wij ook als ambassadeur. Als je ergens dingen hoort, dan ga je meedenken. Maar heb ik als taak om die informatie zegmaar zoals wij het nu hebben, zo praktisch hè, om die ergens op te slaan.
[23] De TIP'ers horen wat mij betreft net zo goed bij het netwerk van het TLC.

		doing research.				
	TLC	TLC positions itself as a centralizing actor at the RU to bring online education knowledge together and focus on connecting people. TLC wants to do this by being a network organization in which people who have knowledge of online education come together. However, therefore TLC first needs to localize where knowledge on online education is present. This seems to be in the heads of the teachers. Therefore, TLC needs to connect with teachers, which is hard to establish because teachers are very busy.	TLC is open to face-to-face interaction and to documenting knowledge. The TLC has a relatively flexible culture in which new things are seen as promising developments. Furthermore, it is nonhierarchical and focused on working together. Regarding the documentation of TLC made use of Brightspace, newsletters, and a website.	During the pandemic, TLC is working from home and has internally digital communication via Slack. In addition, TLC externally communicates and documents knowledge on online education via a Brightspace, newsletters, and a website.	TLC is setting up a general blended course design model. However, to fully develop this critical knowledge from teachers is necessary, which is hard to access as teachers do not have the culture and time to document this and send it to the TLC.	The TLC has a role in retaining knowledge. The TLC acknowledges this responsibility in retaining critical knowledge online education. They are dependent on teachers in performing this task, but TLC's role for teachers is still ambiguous. Therefore the TLC is still missing some of the critical knowledge.

Table 3 Overview results

Knowledge of online education is retained at a low level by teachers of FSS. Before COVID, knowledge retention happened by making stored knowledge in the heads of teachers accessible by face-to-face interaction with each other. Since knowledge sharing happened mainly face-to-face, there is no culture for making knowledge explicit in documents. Due to working from home, possibilities to interact are drastically reduced. Most of the knowledge is stored only in the heads of the teachers. Whereas teachers are willing to share their knowledge, they lack time to document their knowledge. Critical knowledge may have left the organization when people changed jobs.

TIP gains knowledge from teachers by functioning as a question point and advisor for teachers. They store this knowledge in training courses, which are made available for teachers. Furthermore, they document this knowledge on the Brightspace FSS Teachers, which is accessible for employees of the FSS. The TLC gathers knowledge from teachers and TIPs by functioning as a network organization. The TLC document knowledge in their internal Slack platform and externally on the site and in newsletters. The TLC has a role in the retention of knowledge. However, their role remains ambiguous as a relatively new actor. Due to this ambiguity, they cannot capture all critical knowledge from teachers and, therefore, cannot document it. Furthermore, both TIP and TLC cannot capture it as critical knowledge remains stored inside of the heads of teachers who do not have the time to share it with TIP

or TLC. Therefore, TIP and TLC retain knowledge at a medium level as they document knowledge and try to make it accessible. However, they are not able to gather all critical knowledge.

Based on the data, it is possible to analyze the current state of knowledge retention by assessing it in terms of maturity (Arif et al.,2009; See also par. 2.7). This framework builds upon the five repositories by Walsh and Ungson (1991), and therefore the data fits partly within this framework. The levels of the framework consist of the following: Level 1: The knowledge is shared amongst the organization's employees; Level 2: The shared knowledge is documented; Level 3: The documented knowledge is stored and; Level 4: The stored knowledge is accessible, can be retrieved and used easily. The following table 4 displays the analysis of the results in terms of the maturity levels of Arif et al. (2009):

		Maturity levels			
		level 1	level 2	level 3	level 4
RU Actors	**Teacher FSS**	Teachers prefer sharing knowledge on online education at an individual level in the organization via face-to-face interaction. Teachers have knowledge in their heads and prefer to make it accessible by interaction. This interaction is possible due to the open culture and trust between teachers. However, getting in though with colleagues is more challenging due to working from home.	The fact that teachers function partly on the first level does not mean that teachers do not document. On the contrary, they document in course guides and set up the Brightspace pages of their courses. However, these documents do not contain knowledge about the rationale behind the use of specific online methods.	-	-
	TIP FSS		The TIP acts at both the second and third maturity levels. The TIP gathers knowledge by its role in the organization, namely as a point for teachers' questions and by providing advice. The TIP documents this knowledge to use for their Brightspace page FSS Teachers and to incorporate in the training courses that it develops.	Critical knowledge is stored on the Brightspace page of FSS Teachers. This page is updated each Friday. Furthermore, knowledge is stored in the training courses provided by TIP, which are developed based on the interests of teachers.	-
	TLC		The TLC functions at both levels as well, however, more on the second level. The TLC is trying to gather a lot of knowledge on online education. When they achieve collecting it, they document it on an internal Slack channel. However, not all knowledge is present due to a lack of time on the part of teachers to make their knowledge explicit and that TLC relies on teachers in its knowledge provision.	The TLC functions partly at the third level as they store their available critical knowledge on the site and in newsletters. How well these IT applications are used is discussed as the condition 'IT application' in par. 4.2.1.	-

Table 4 Overview results

4.2 Conditions knowledge retention

In the second paragraph, the focus is on the extent to which the conditions for adequate knowledge retention are present and whether they cause why knowledge is (not) retained adequately. By doing this, the following sub-questions will be answered:

- "To what extent are the conditions for adequate knowledge retention on online education present at the FSS in combination with the TLC?"
- "In what ways does the current state of these conditions cause whether knowledge is (not) retained adequately?"

Although the literature and the conceptual model (See chapter 2) indicate that IT application and HR, practices, and processes follow the formulated knowledge retention strategy, these two conditions are discussed before the condition of a knowledge retention strategy. This order is used because the data illustrated that no clear knowledge retention strategy was implemented before and at the start of the COVID pandemic. As a result, today's IT applications, HR, practices, and processes were created without the guidance of such a knowledge retention strategy. For this reason, they are discussed separately. Paragraph 4.2.3 discusses the presence of a knowledge retention strategy.

4.2.1 Condition IT applications

At the FSS and the TLC, four general IT applications were mentioned where knowledge on online education could be codified and searched: TLC-website (D21-25), FSS teachers Brightspace (D16, 20, 28-30), TLC digital didactics (D11, 12, 14, 15, 26), and TLC newsletters. There are multiple opportunities to make use of IT systems in retaining knowledge on online education. However, not all IT applications are actively used. The TLC Brightspace page on digital didactics, which has been deployed university-wide, has only 188 users (D15). This lack of users contrasts with the Brightspace page of the FSS, which has a total amount of users of 637 (D20). That the TLC's Brightspace is no longer used is also confirmed in the interviews (R2: TLC). This may lie in the fact that '*Brightspace-pages are relatively hard to access because you have to be registered and think about looking in it*' (R2: TLC).[24] When a teacher is registered, it can still be challenging to find the page among all the open courses in the overview in Brightspace. The FSW teacher Brightspace is well maintained and updated every Friday with new announcements on online education (R1: member TIP). Furthermore, teachers more actively use this page, as evidenced by the fact that the discussion forum is more actively used than at the TLC's page (D26; D28). However, there are still teachers who do not know of the existence of the pages, so not everyone is being reached (R5: Teacher). Teachers only scan the TLC newsletters (R3: teacher). Overall, the TLC's website seems to be the most used platform of all four IT applications.

---

[24] Dat is natuurlijk best moeilijk vindbaar. Je moet al ingeschreven staan en eraan denken om erin te kijken en dan je weg vinden in de structuur, dus niet zo makkelijk.

The site includes a specific page on education from a distance (D24). Almost all teachers are familiar with the site (R3; R5; R6; R8), and a coordinator at TLC mentions that the site is visited and searched quite well (R4: TLC coordinator). However, through a one-way website, people do not have the opportunity to interact digitally, which is possible on a discussion forum on a Brightspace.

Interaction online is found on a smaller scale. Study programs have a '*G-disc*' (R6) and an '*H-disc*' (R2).[25] That is an online place where teachers can put their course materials. However, one teacher (R6) mentions that he would not see this as knowledge retention due to the small scale. They work with a broader channel at the TLC, named '*Slack*' (R7: TLC). However, the usage of Slack is a bit limited because '*older colleagues find it difficult that they have to use email ánd WhatsApp ánd Slack én Brightspace courses*'(R7: TLC).[26]

The overview above shows that there are many opportunities to use IT applications to store and access knowledge on online education, but that these IT applications are not used at their optimum. For that reason, it is interesting to look at the willingness of members of the FSS and TLC to use IT applications. A general red line can be found, which is best explained when using the following quotation: "*I think that there really are people who, when they have time left, would be interested, definitely when they could make use of it themselves, but the reality is that there is just no time and there are a hundred other things that can be done, which people prefer and find more important than handing over information for others*" (R8: teacher; education coordinator; core team TLC).[27] This phrase illustrates that the willingness of employees to codify knowledge could be there. However, there is no time, and the workload is high. During busy times, employees prioritize other tasks that are closely related to their primary activities, namely educating or conducting research. When there would be time, a second question is whether employees would be willing to search the IT applications. Otherwise, the applications would lose their usefulness. Although the willingness to search IT applications varies, most people would be willing to search IT applications when they are well-structured, easy to search, and easy to access. This brings forward the difficulty that whether an application is well-structured depends on the view of the person because everyone has different preferences (R6: Lecturer-ambassador, teacher). Furthermore, teachers prefer communicating in real life about experiences over putting it online. These stories stick and are easier to apply to their own courses. '*As a teacher, I appreciate it to hear a lived experience, from someone in person*' (R3: Teacher).[28]

---

[25] G-schijf en H-schijf.

[26] maar ik merk bij mijn wat oudere collega's dat die het lastig vinden dat je én mail én whatsapp én slack én een Brightspacecursus.

[27] Ik denk dat er echt wel mensen zijn, die als ze echt nog tijd over zouden hebben dat wel interessant zou vinden, zeker als je er zelf ook nog gebruik van maakt, maar de realiteit is gewoon dat je echt tijd tekort komt en dan zijn er nog honderd andere dingen die mensen dan liever doen en belangrijker vinden dan eigenlijk vooral informatie aanleveren voor anderen.

[28] Ik vind het als docent ook fijn om een geleefde ervaring te horen, echt van iemand persoonlijk.

The section above shows that there are several IT applications available, which are not actively used. This lack of utility is caused by teachers' lack of time to codify and search for knowledge on these applications. In times of working from home, IT applications could facilitate interaction between people and provide a way to document, store and create accessibility of knowledge on online education. However, teachers do not make active use of IT applications. This lack of usage results in the fact that knowledge on online education remains in their heads, which is why their knowledge retention functions on level 1 of Arif et al. (2009) framework. They do not use the application to document or to get in touch with other teachers. TLC and TIP use IT applications, which can be related to the fact that they have a higher grade in retaining knowledge. However, to make these applications work, they must be used by teachers as well. Otherwise, accessibility cannot be guaranteed. At this moment in time, teachers are not making the best use of the capabilities of those applications, which results in the fact that knowledge is still not available. This why TLC and TIP are not yet functioning at the highest level of the framework of Arif et al. (2009). Thus, more investments need to be made in the use of IT applications.

4.2.2. Condition HR, processes, and practices

Knowledge retention is not explicit in the task description of teachers (R5; R1; R2) (See par. 4.1). It should be something that teachers should be aware of to develop their courses. The responsibility of storing and making knowledge on online education -such as lessons learned - accessible is placed at the TLC (R8: Education coordinator, TLC, core team), lecturer ambassadors of the TLC (R6: Teacher, lecturer ambassador), and education coordinators (R7: TLC). However, teachers should realize the importance of retaining knowledge, and contributing to this should be recognized and rewarded. When asked, helping in processes to retain knowledge is not rewarded at this moment. One respondent describes that supporting in processes to retain knowledge is not rewarded by the following illustration: "*Yes, that is very poorly arranged. That is just simply not the case. It pays off to the extent that you provide better education as a study program, faculty, or teacher, and that it pays off because that is what we want. Still, in my opinion, it hardly ever happens that someone gets extra hours, for example, because someone from the study program is really going to figure out how we want to do this or really going to innovate their own courses. That is something that people often do in their own time, unfortunately*" (R7: TLC).[29] Teachers are performing their primary tasks and provide education. Furthermore, the topic of retaining knowledge does not explicitly return in yearly evaluation conversations, only possibly slightly under the heading of education. Without recognition, rewarding

---

[29] Ja, dat is heel slecht geregeld. Dat is dus gewoon niet zo. Ja, het loont in die mate dat je beter onderwijs verzorgt als opleiding, faculteit of docent en dat dat loont, want dat is gewoon wat we willen, maar ja, volgens mij het komt bijna niet voor dat bijvoorbeeld iemand extra uren krijgt, omdat dat degene is van de opleiding die eens echt goed gaat uitzoeken van hoe willen we dit nu of zijn eigen cursus heel erg gaat innoveren. Dat is iets wat mensen vaak in hun eigen tijd gaan doen, helaas.

and evaluation on this subject, it is challenging to create a stimulating climate for knowledge retention on online education.

As explained above, knowledge on online education inside individuals becomes accessible when individuals interact. This means that when employees work team-based, the chance of better knowledge retention is higher. All teachers mention that they work together with at least one colleague in providing their courses (R2; R3: R5: R6). About this, one teacher appoints: '*People must not be like islands. If you want to work on the quality of your education, you can't only work on your own stuff*' (R6: Teacher, lecturer-ambassador).[30] The importance of working together is recognized. Furthermore, working together is more manageable when people have shared norms and values. Of course, all people are different, but in the interviews, it often comes forward that employees of the FSS have *´a heart for education´* (R7: TLC), are *´very passionate about their job´* (R5: teacher), and are '*happy with their job*' (R1: TIP).[31] However, the collaboration between teachers stops at a certain level and does not exceed the borders of the study programs. Although the study programs belong to the same faculty, one teacher and educational coordinator mention: '*I think, and almost know for sure, that we as study programs within FSS have worked separately for a long time. Even though we are in the same faculty, everyone did their own thing, and nobody had any idea what other study programs were doing, so we do not learn from each other*' (R8: Teacher, educational coordinator).[32] Moreover, the faculties work very autonomously as well (R1: TIP). A coordinator at TLC mentions that '*the faculties themselves, but also within the faculties at the level of the study programs, are separate unities, where everyone reinvents the wheel*' (R4: Coordinator TLC).[33]

Besides the relationship between the faculties, there are three other relationships present, namely the relation teacher-TIP, TIP-TLC, and teacher-TLC. The bond between teachers and the TIP is quite good. Teachers approach the TIP with questions and have the possibility to join TIP support sessions. The TIP is '*approachable*', '*but there always remains some kind of unknown group that you do not have contact*' with (R1: TIP).[34] The TLC sees the TIP as a point of contact for teachers. Therefore, TLC assumes TIP to have a lot of knowledge. A member of the core team of the TLC mentions: '*And what you would like to see, and I think it goes very well in this case, is that they work closely with the TLC and coordinate that as well as possible*' (R8: Teacher, education coordinator, member core team TLC).[35] The fact that TLC sees the TIPCs as part of their network illustrates that the ties between these

---

[30] Ik het belangrijk vind dat mensen niet als eilandjes. En je wil aan de kwaliteit van de onderwijs werken, dan zul je niet alleen met je eigen ding bezig moeten zijn.

[31] R7: Hart voor het onderwijs; R5: zeer gepassioneerd voor zijn vak; R1: blij zijn met hun baan.

[32] Ik denk, weet ik bijna wel zeker, dat we binnen de FSW als opleidingen heel lang toch allemaal een beetje los van elkaar gewerkt hebben, dus ondanks dat je in een faculteit zit, deed iedereen zijn eigen ding en niemand had eigenlijk een idee wat een andere opleiding deed, dus we leren niet van elkaar.

[33] Omdat het toch vaak, toch de faculteit an sich, maar ook binnen de faculteit bij de opleidingen een soort afgesloten eenheden zijn, waar iedereen het wiel zelf aan het uitvinden is.

[34] Dat was best laagdrempelig….Maar er is altijd een soort achterhoede die je niet spreekt.

[35] En wat je het liefst zou zien en ik vind dat dat in dit geval heel goed gaat, is dat zij nauw samenwerken met het TLC en dat ook zo goed mogelijk afstemmen.

two actors are close (R4: TLC coordinator). The previous two relationships are crucial to managing that knowledge from teachers reaches the TLC as the relationship between teachers and TLC is still quite distant. A lecturer-ambassador mentions that '*the TLC is still too little noticed*' (R6: Lecturer ambassador FSS), and a member of the TIP adds to that that '*the TLC still feels a bit more distant*' (R2: TIP).[36] This distance increases the importance of the TIPs as a connector between teachers and the TLC.

Another way to connect individuals and to make knowledge on online education accessible is via training and development. During the past year, multiple training courses have been organized by the TIP, called TIP support sessions. On an organizational level, the TLC organized, for example, sessions on how to use zoom, workshops, and inspiration sessions to meet each other and see what everyone is doing (R2: TIP; R7: TLC/FSS). These sessions were announced via the FSS teachers' page and via newsletters. Multiple teachers joined these training courses. However, there always remains a group that is not reached or lacks time to join these courses. For example, one teacher mentions: '*Somehow I know it is there. There are things, but time doesn't really allow you to attend them. That's what I think, and I don't always like the programming either*' (R3: Teacher).[37] One other general training course is the one that is called '*University Teaching Qualification*' (R8: Education coordinator).[38] The trajectory contributes to the development of teachers. However, by teachers, the trajectory is often experienced as 'jumping through hoops' and teachers '*just focus on getting the certificate*' and not on the content and the development (R8: Education coordinator).[39]

The description above shows that aspects of the condition HR, processes, and practices vary. Joining knowledge retention activities is not recognized, rewarded, or stimulated at the level of the Faculty. However, the TLC jumps in to take on this task on a higher level. Much knowledge is stored in the heads of individuals and is shared on the level of the study programs. This is a positive note. TLC has an important task to access that knowledge of different study programs, which can only be reached by working together or meeting teachers from different study programs during training courses. The connection between the TLC and teachers is still weak but runs via the TIP. However, it is not possible to reach every employee. The relatively low level of knowledge retention on online education could be caused by the fact that joining knowledge retention activities is not stimulated. In addition, team/based working has not been reached on all levels. When teachers would work together beyond the scope of their courses or study programs - this also entails working together with TIP and TLC - knowledge is accessible in a broader scope. As these relationships are still relatively weak, team-based working remains on the level of the courses and study programs, and joining in knowledge retention activities is

---

[36] R6: Het TLC is nog te weinig voelbaar; R2: Het TLC voelt wat afstandelijker in die zin
[37] Op een of andere manier weet ik dat het er is. Er zijn dingen, maar de tijd laat het eigenlijk niet toe om ze bij te wonen. Dat vind ik en ik vind ook de programmering niet altijd even,
[38] Basiskwalificatie onderwijs
[39] Moetje; Het gaat om het halen van het papiertje.

not recognized or rewarded at the level of the teachers. This could contribute to the fact that knowledge retention on online education does not reach a high level.

4.2.3. Condition knowledge retention strategy

Before the COVID-pandemic, there were no strategies implemented on how to retain knowledge on education at the FSS or TLC. Thereby there was no strategy on how to retain knowledge on online education. There was an interest by the FSS in providing more varied education. However, the momentum was not found to start a plan to gather and retain knowledge on education (R9: Project leader plan at TLC). In line with the reasoning of how knowledge is retained at FSS, it happened by face-to-face interactions between teachers. During the COVID-pandemic, two main strategies started to develop: 1) the project 'lessons learned', and 2) the development of an education community (R9: Project leader plan at TLC).

The project lessons learned entails the plan '*to display which successful educational design and examination design have been applied in the past year in the COVID-time. And in that context, what the experiences are of the teachers and students*' (R9: Project leader plan at TLC).[40] The previous will be done by displaying it in a thematic newsletter sent to all the teachers at the RU on the 8th of July (R9: Project leader plan at TLC). At first, the plan was to analyze the findings - lessons learned from teachers in the past years, which also entails their view on students' experiences - of the past years. However, the aim to share knowledge as quickly as possible required the change to just display the past year's successful education and examination designs. The earlier plan might be picked up again later. In the meantime, the negative experiences with online education must not be unintentionally lost by mainly focusing on the positive perspective. Critical knowledge on online education does contain not only the success stories but also the unsuccessful stories. Furthermore, it is not clear when educational experiences are measures as successful and when not. This may result in missing out on successful experiences. The newsletter will probably be structured using several '*pillars for blended education design*' (R9: Project leader plan at TLC). The focus is thus on blended education and not just online education (R9: Project leader plan at TLC; R7: TLC). The next step is to think about what it brings for the readers of the newsletter. To make the message easily readable and ready to be used in practice is to concretely formulate, preferably in a limited amount of steps, how teachers can translate these good examples to their education (R9: Project leader plan at TLC). In the newsletter, audio, video, and text will be used to make the knowledge as accessible as possible.

The development of an education community comes with introducing Microsoft 365 at RU, which will most likely be implemented in August. The implementation of Microsoft 365 makes it possible to use Microsoft Teams. Microsoft Teams a proprietary business communication platform. '*In*

---

[40] Dat we in ieder geval zichtbaar maken welke succesvolle onderwijsontwerpen en ook toetsontwerpen afgeloopen jaar in corona tijd zijn toegepast. Wat de ervaringen zijn ook van docenten en studenten.

Teams, you can make thematic channels and bring people together to work together and stimulate exchange' (R9: Project leader plan at TLC). Employees will be put in groups within Microsoft Teams based on their function at RU, for example, in the group of one course or a faculty. Next to that, the TLC has the plan to introduce one particular, customized group, in which they can bring all the teachers at RU together to start a close community in which experiences can be shared (R9: Project leader plan at TLC; R7: TLC; R6: Lecturer ambassador). '*At this moment, there is no infrastructure for something like that*' (R9: Project leader plan at TLC), and it, thus, could fill an existing gap. Another reason that potential is found in Microsoft Teams' introduction is that the platform has proven itself at other educational institutions (R9: Project leader plan at TLC). However, this is an existing plan for now, and there are still doubts about the moment of implementing the plan, as September is a relatively busy month for teachers. For that reason, it could be more attractive to start the education community a bit later.

At the level of the study programs, a precise knowledge retention strategy does not seem to be present. One teacher mentions: '*This is a discussion that we are now going to have at our study program, what we want to keep from the current courses and what does and does not function*' (R2: Teacher).[41] Teachers still have the feeling that '*at the level of the study programs and at the faculty level, everyone is still very busy. A sort of in the crisis… we are still delivering some sort of emergency education, so until that period is ended, there is just not enough room to think about the future. Still, it is about time to think about it*' (R8: Teacher, educational coordinator, TLC core team).[42] This fragment illustrates that teachers did not yet find the time to think properly about a knowledge retention strategy. One could ask whether the time to think about a strategy would be available after the crisis as the workload could remain high. Furthermore, the question could be asked whether a knowledge retention strategy is needed at the teachers' level when the TLC strategy is implemented well. Therefore, employees must take responsibility in implementing the knowledge retention strategy (See Par. 4.3.3; Daguma, Ragsdell & Murray, 2014)

The section above shows that projects have been started - in the planning phase - during the COVID-crisis at the TLC. However, a knowledge retention strategy has not yet been thought about at the level of the study programs. During the corona crisis, no clear strategy was implemented to retain new or existing critical knowledge on online education. As a result, the knowledge was mainly in the heads of teachers and forgotten or not accessible. If there had been a clear strategy at the start of switching to online education, teachers would have had some guidance and procedures, which would help them later to make deliberate choices in their education. However, given the corona crisis, it makes sense that RU

---

[41] Dat is een discussie die we nu gaan voeren binnen de eigen opleiding en wat willen we dan meenemen van welke vakken. En wat werkt eigenlijk wel en wat niet goed.

[42] Dus ik heb het gevoel dat we zeker in de opleidingen en in de faculteit nog zo druk mee bezig zijn, als het ware zitten we nog steeds in die crisis….. maar uiteindelijk leveren we natuurlijk nog steeds een soort noodonderwijs en zolang dat er is, is er gewoon weinig ruimte om echt over de toekomst na te denken, maar dat wordt wel tijd.

did not expect to shift to online education in such a short time and, therefore, did not incorporate it in a strategy about online education. However, it would be easier to learn about the past years' experiences with a knowledge retention strategy. At this point, the battle still has to be fought to systematically do knowledge retention - to primarily make steps at the level of the teachers - and chances are there that knowledge has already been lost. Implementing a clear knowledge retention strategy could quickly close this gap of a relatively low score on the condition of a knowledge retention strategy and help in systematically bringing knowledge retention to a higher level and achieving to make knowledge on online education accessible. The available plans of the TLC could contribute to this, which will be further discussed in par. 4.3.3.

4.3 Solution space

This third paragraph in the diagnosis is to elaborate on the solution space. The following sub-question is answered:

"In what ways can knowledge retention on online education be improved based on the conditions for adequate knowledge retention for purposes of education's quality and efficiency?

4.3.1 IT applications

Paragraph 4.2.1 clarifies that IT applications at RU are not used at their optimum. The lack of use is mainly caused by teachers who do not have time to codify and search the IT tools, which results in poor usage. When they would have the time, teachers prefer face-to-face interaction to communication via IT applications. This preference for interacting is in line with the social culture at the FSS. People want to interact and speak with each other. Digital communication does not provide such a personal feeling. Therefore, even though the RU has a lot of room for improvement concerning IT applications, the solution space seems relatively small, doubting whether people will ever structurally start codifying their knowledge and searching for it online. However, this is not entirely true. While a database might not work (R3: Teacher), there are still opportunities for developing more interactive IT platforms that are more focused on connecting people instead of displaying knowledge to provide additional support (Van Der Meer & Kautz, 2016). As TLC and TIP are further in their level of knowledge retention and make more intensive use of IT, they could take the lead in the development of such interactive IT platforms.

An example of a more social-oriented IT application is being described by Willems (2009) and entails a connection system. Employees from the described organization were required to create an extensive personal profile. They were asked to provide all relevant information that may be of interest to colleagues within the company. Using this system, all users can search for colleagues who possess specific skills, contacts, or personal interests. Such an overview could benefit knowledge management (Kidwell, Van der Linde & Johnson, 2000), which could be done in the internal portal. On the website

of RU, most employees can be found under the heading 'employees' on the page of their study program. However, an internal platform with more information about educational experiences would help in learning from each other's experiences with online or hybrid methods. Furthermore, creating a collaborative environment could facilitate that people work together online and thereby create and share tacit knowledge while having the possibility to store explicit knowledge. One example of such a platform was discussed in paragraph 4.2.3 since it is still being developed. Paragraph 4.3.3 will further elaborate upon this topic.

4.3.2 HR, processes, and practices

Paragraph 4.2.2 illustrates that the low level of recognition and reward concerning knowledge retention on online education could cause a low level of knowledge retention among the teachers at FSS. This gap belongs to the solution space. Creating a spirit and attitude by all employees that knowledge sharing and retention is good, will lead to employees being committed to ensuring that what is known by each person is made known to others (Baguma, Ragsdell & Murray, 2014). In this, education coordinators and lecturer-ambassadors (R9: Project leader plan at TLC) could influence by stimulating, complimenting, and rewarding. This will create a more positive climate around doing knowledge retention instead of seeing it as an extra task. This can be done through workshops, seminars, meetings, publishing achievements, failures, and lessons learned (Baguma, Ragsdell & Murray, 2014).

Furthermore, explaining that knowledge retention could be in the interaction with other people and not only by time-consuming typing on a laptop, could create a broader image. Team-based working is already happening at the scale of the study programs. Working together on a larger scale could further increase the number of interactions and, thereby, increase knowledge retention. This is not only a task for the TLC - who already have a focus on centralization and connecting people -, but also for teachers themselves. They have to be open to ideas and get the time to be involved in training courses or education initiatives to develop themselves further. By that, they help the university create a more varied and better education. Support by their management could contribute to realizing this (Doan et al., 2011). In doing so, this may also help achieve a good level of recognition regarding participating in activities around knowledge retention.

4.3.3 Knowledge retention strategy

As mentioned in paragraph 4.2.3, there is no knowledge retention strategy implemented. At the same time, there is a low level of knowledge retention at the level of the teachers at FSS and a low/medium level at the level of TIP and TLC. Not reaching the highest level leaves a big gap that can be filled relatively quickly by developing a strategy. This gap can be filled quite quickly because there are plans in development that contribute to knowledge retention. The plan lessons learned can make individual

knowledge accessible in the form of the newsletter. This plan is concrete and has a high potential to be implemented. On a bigger scale, higher expectations can be placed on the big project of developing an education community facilitated by Teams. This plan must be implemented on a large scale and with great attention to detail to fill the needs of teachers. By the implementation, this will be the first infrastructure in which knowledge can be retained by interacting with people and placing documents online that others can access. When the strategy of the education community fills the gap of a knowledge retention strategy, chances are higher that the knowledge retention on online education will reach a higher level. The fact that the platform makes interacting online more easily for everyone is in line with the social culture at the FSS. At the same time, it is via digital medium and teachers were not willing to use digital medium and preferred face-to-face interactions. Therefore, joining the education communication should be well-facilitated, and teachers should be supported by joining the communication to keep the barrier as low as possible. Performing as a mentor could help make this a success as this fits with a more human-based method of knowledge retention (Van der Meer & Kautz, 2015), while retaining knowledge on using an IT application that will contribute to knowledge retention. The fact that the plan must include HR, processes, and practices is consistent with the reasoning in Chapter 2. The use of IT must also be trained on, stimulated, and rewarded. Otherwise, the plan is not likely to succeed.

This still leaves room for developing other knowledge retention strategies, which are more focused on the situation that employees will work at the university and can meet in real life. Furthermore, on a smaller scale - the level of the study programs - strategies for retaining knowledge on online education should be started as soon as possible. When decision-making does not start in a short amount of time, the chances of people losing knowledge might increase (Davis & Zhong, 2017).

5. Discussion and Conclusions

In this chapter first, the conclusion of this research is provided. The methods, theory, and the role as a researcher are then reflected upon to place this conclusion in context. This is followed by practical and theoretical relevance and recommendations.

5.1 Conclusion

The research question of this research is:

'*To what extent is knowledge on online education retained at Radboud University? And what are options to improve knowledge retention on online education at Radboud University, considering conditions for adequate knowledge retention?*'

Firstly, the extent to which knowledge on online education is retained at FSS is low concerning the teachers and medium concerning the TIP and TLC. However, before unwrapping this answer, the results show that a social culture distinguishes the FSS. This social culture might set the FSS apart from other faculties at RU and makes it difficult to generalize the results to RU as an organization. Therefore, when a statement applies specifically to the FSS, this will be explicitly mentioned.

Knowledge retention on online education is low concerning teachers at FSS. Their experiences about teaching online remain in their heads. Even though they are willing to make their knowledge accessible by sharing it and interacting with colleagues, the work environment does not allow this since currently all teachers are working from home, which has reduced interaction with colleagues. Next to that, teachers at FSS do not have the time and do not prefer to document their knowledge by using IT. Thereby, their knowledge remains stored mainly inside their heads and is only shared through a minimal amount of interactions and minimal use of documentation, resulting in a low level of knowledge retention. Therefore, teachers at FSS function just at the first and partly at the second maturity level of the four levels of knowledge retention.

The knowledge retention level is different for the TIP and TLC. Both actors acknowledge the importance of interactions, but they use documents, training courses, a website, and Brightspace pages to document and store knowledge to make it accessible for teachers. Therefore, they function at a higher level of knowledge retention, namely the second-third level of the maturity model. TIP gains knowledge from teachers by functioning as a question point and advisor for teachers. However, not all teachers use the TIP support, and their critical knowledge is not stored, and they do not have access to the TIPs knowledge. Next to that, the bridge between TLC and teachers is still relatively big, which causes that teachers cannot find all the knowledge in the IT applications, which still makes the knowledge hard to access. Furthermore, TLC is gathering knowledge from teachers and TIPs by functioning as a network organization. Since their role is still ambiguous and teachers have a high workload, they cannot capture

all critical knowledge from teachers and, therefore not able to document it. Regarding both actors, they retain knowledge at the second-third level because they interact with teachers and each other, document and store knowledge, and try to make it accessible. Still, they are not able to gather all critical knowledge and reach all teachers.

These non-optimal knowledge retention levels can be caused by the fact that IT applications are not used at their optimum; joining in knowledge retention activities is not recognized, rewarded, or stimulated at the faculty level; and no knowledge retention strategy has been implemented yet on any level. A lot of IT applications are made available by the TLC and TIP. The TLC has a website, Brightspace, and newsletter. The TIP of FSS has a Brightspace. The lack of utility of these applications is caused by teachers' lack of time to provide knowledge, codify knowledge, and search knowledge in these applications. In times of working from home, IT applications could facilitate interaction between people and provide a way to make documented knowledge accessible for others. While the current applications might not work at their optimums, there are still options for developing more interactive IT platforms, which better suit the needs of a faculty or organization with a social culture. As TLC and TIP are further in their level of knowledge retention and make more intensive use of IT, they could take the lead in the development of such interactive IT platforms.

Currently, joining in knowledge retention activities is not recognized, rewarded, or stimulated at the level of faculty. In this, education coordinators and lecturer-ambassadors of the TLC could influence by stimulating, complimenting, and rewarding. This will create a more positive climate around doing knowledge retention instead of seeing it as an extra task. This can be done by workshops, seminars, meetings, publishing achievements, failures, and lessons learned. To make it possible for the TLC to have this influence, the lines of communication with teachers must be shorter. In the FSS, teachers are willing to cooperate, which is shown by the team-based working at the level of the study programs. As TIPs are closer to the teachers, they could have a role in strengthening the relationship between TLC and teachers as well.

A last cause of the fact that knowledge on online education is not retained at its highest level is the absence of an implemented knowledge retention strategy on any level in the organization. Implementing a clear knowledge retention strategy could contribute to quickly closing this gap of a relatively low score on the condition of a knowledge retention strategy and help in systematically bringing knowledge retention to a higher level and achieving to make knowledge on online education accessible. This gap can be filled quite quickly because TLC is developing plans regarding knowledge retention. A plan with high potential is the plan of a university-wide education community facilitated by Teams. This plan needs to be implemented with great attention to detail to fit the needs of teachers. These needs could differ per faculty as faculties work relatively autonomously from each other. When this is done, there will be a first infrastructure in which knowledge can be retained by interacting with people and placing documents online that others can access.

Regarding the above three points, a general obstacle is the high workload on teachers. It is not clear whether this workload will decrease with the end of the COVID crisis. It is crucial for the health of employees and the quality of education that this workload is reduced. The success of implementing the educational community also depends on the time of teachers to invest in participating in this community. If that does not happen, there is a good chance that the plan will not succeed and IT applications will remain poorly used. Since this study did not include teachers' workload, no firm conclusions can be drawn in this regard.

5.2 Discussion, practical and theoretical relevance, and recommendations

5.2.1 Methodological reflection

This diagnostic research was performed by the use of a qualitative, deductive case study. Interviews were conducted, and documents were collected to gather data at the FSS. This faculty was chosen because it seemed to have many initiatives around online education and, therefore, was expected to perform well on knowledge retention. However, in the current situation (See par. 4.1), knowledge retention was relatively low at the FSS, which was related to the fact that the faculty is characterized by a social culture in which knowledge is usually shared in face-to-face interaction between lecturers. Furthermore, the FSS cannot be treated as an extreme case in which knowledge retention is outstanding (Symon & Cassell, 2012), as the results show that knowledge retention on the level of teachers is low. Moreover, faculties are very different and autonomous, making it hard to generalize these findings to the RU. However, this does not make the findings of this research irrelevant. On the contrary, it provides insights into knowledge retention in a social context. Furthermore, RU is often seen as a social-oriented university, making it possible that the findings apply to other faculties that identify with the FSS description (Par. 5.2.4). Moreover, it contributes to the literature on knowledge retention, clearly identifying barriers to knowledge retention in an organization that transitions towards a virtual organization while having a social culture (Par. 5.2.5). The TLC is an actor on an organizational level, and for that reason, results about the TLC can be better generalized to the RU. At the same time, this influences the overall transferability, and the social culture needs to be taken into account.

Within the faculty, the researcher selected respondents after asking for adequate respondents to the TIP and a TLC member, who were the first contact members. This made it likely that the recommended respondents used facilitation - for example, training courses or advice - of the TIP or TLC, which could have caused a bias in the view on the relationship between teachers and TIP and TLC. The researcher tried to compensate for this by approaching random teachers from FSS that TIP or TLC had not recommended. However, often teachers did not respond to emails, whereas respondents recommended by the TIP did. Moreover, a lack of response was shown at particular study programs, which resulted in the fact that within the FSS, respondents from not every study program were

interviewed, which could influence the results. Within the TLC, people were very willing to cooperate. It was possible to draw a robust conclusion on knowledge retention at and through TLC through the interviews with a lecturer ambassador, a member of the core team, a member, and a coordinator.

Moreover, the interview questions were based on the items of the operationalization of the variables (Appendix 3 and 5). As the operationalizations were quite large, this also led to a large number of questions. Therefore, many questions had to be asked in a short time during the interviews, which may have made the interviews less open and less in-depth. The first interviews were used to test whether time was too short, which was not the case. Because the questions were very interrelated, many topics were covered in detail. However, the interview guide itself is, at first glance, lengthy.

Another aspect that could have influenced the data is from the interviews is the fact that the researcher was part of her own research project as a student in Business Administration and Law at RU, researcher of this thesis, and teacher at the Faculty of Law at RU. During the BKO-trajectory, connections were made with people who later became respondents. This might have created a blurry view for these respondents on the role of the researcher. This could be illustrated by the question of a respondent whether the researcher wanted to join a session later this year as a teacher. The role of the researcher was highlighted multiple times, more specifically, during the interviews to prevent confusion around the role of the researcher. Still, respondents may not have explained everything to a great extent as they assumed that a teacher or student at RU was familiar with certain information, such as on the BKO-trajectory. This could have led to shorter answers in the interviews and, therefore, less rich data.

At last, reactivity during diagnostic research had a role in this research. Many developments were going on as the pandemic seemed to end and preparations for the new academic year are underway. The knowledge retention strategy about lessons learned was still under development, and the research itself may have influenced the development of this strategy by talking about it with the respondent. Furthermore, due to the progression of the strategy, data collection was adjusted, as a document analysis could not capture this development and would already be outdated by the time this research was completed.

5.2.2 Theoretical reflection

In this research, a framework was deductively constructed based on an overview of knowledge retention frameworks. The conceptual model included three conditions. Knowledge retention was measured using the definition of Cronin et al. (2018) and a further extension using the five repositories of Walsh and Ungson (1991). This approach resulted in a lot of specific data on individuals as repositories, which fitted well with the social culture at the FSS. While these five repositories do a good job of identifying where knowledge and how knowledge is retained, it does not guide in determining the level of knowledge retention. Furthermore, one can ask himself whether these repositories capture all elements of knowledge retention as, for example, documents – in IT systems or not – as a repository are missing.

When it came to determining the status of knowledge retention, Arif's et al. (2009) framework proved more useful in measuring the level of knowledge retention. The lack of documentation and the preference of sharing knowledge amongst the organization's employees fit the majority model's first level. However, the second level of the model on documenting knowledge and making tacit explicit was not in line with the theoretical assumption that tacit knowledge can better be managed indirectly (See Par. 2.2). When made explicit, it would lose its rare character, which provides the competitive advantage. The repositories of Walsh and Ungson (1991) leave more room for tacit knowledge. For these reasons, both frameworks were used to map the results in Chapter 4.

In addition to the previous point, it was challenging to construct a conceptual model since conditions for adequate knowledge retention, and the concept of knowledge retention itself seem to be intertwined. Therefore, the current choices were made to create mutually exclusive variables. However, a side note was made of the possibility of overlap. During this research, the researcher wondered whether thinking from such a standpoint is good. It would have been interesting to look at the causality and correlation between these variables to better understand the overlap (Par. 5.2.5).

As explained in chapter 2, this research has a neo-functionalist discourse. However, during the study, one aspect led the researcher to reflect on her epistemological assumption, namely the interchanging use of the words 'knowledge retention' and 'knowledge sharing' by respondents during the interviews. Most respondents thought about knowledge sharing and retention in sequential order, however, not being sure about what happens first or second. On the other hand, the concepts were used interchangeably during the interviews by respondents, which shows that they possibly cannot be treated that distinct from each other. A discourse that reasons from duality might have been practical when analyzing such blurring concepts more thoroughly as it applies '*both/and* thinking' (Schultze & Stabell, 2004, p. 553).

5.2.3 Reflexivity

As a relatively young teacher and student at two faculties, the researcher had multiple assumptions at the start of the research. First of all, the researcher is pro multidisciplinary collaboration. Therefore, the researcher views collaboration as a strength on the level of the study programs, between study programs, between faculties, and with supporting actors. Furthermore, the researcher assumed that IT was not used intensively to retain knowledge, although it could help increase the quality of education as employees can find knowledge. During the interviews, the researcher explicitly tried to focus on what the respondents said, not interrupting them and not steering respondents. During the data collection, IT applications were mentioned that the researcher did not know existed, which caused her assumption to be revised. Furthermore, during the analysis, the researcher explicitly tried to focus on what IT tools are used instead of only focusing on the negative. Thereby, both aspects were tried to take into account in the analysis. The same goes for the assumption that collaboration is always good. The researcher

tried to be open to different perspectives and was surprised by one respondent who rightly some people are only willing to make their knowledge accessible towards a smaller group in which they feel comfortable (R6: Lecturer-ambassador). Therefore, extensive collaboration does not always seem to support knowledge retention.

Furthermore, the researcher was unknown with the TLC and became known by it based on the topic description provided by the master thesis supervisor. When discussing certain thoughts and findings during thesis circles, it was hard to stick to the data of the research as the supervisor is a lecturer-ambassador of the TLC as well. This creates a particular view, and sometimes new information was provided by the supervisor, which created ideas about the research content. To deal with this, the researcher tried two approaches at the same time. The researcher tried to be open towards the supervisor for new information about places and people to gather data and new information on broad topics. At the same time, the researcher tried to filter facts from supervisor opinions, thereby not creating a distorted view. When a respondent started talking about a topic that the supervisor had previously addressed, this was further questioned if necessary for data collection to incorporate information into the data to see an opinion from a respondent available to base the researcher's opinion on.

5.2.4 Practical relevance and recommendations

This research was a practice-oriented study, diagnosing the state of knowledge retention. Therefore, the practical contribution for RU is, first of all, to be found in the recommendations in the solution space (Paragraph 4.3). The following recommendations – to improve knowledge retention on online education at RU and thus increase the quality of education - are made since, given the current situation, they can make the most impact and are the most workable. The recommendations are mainly focused on teachers and how the TLC and TIP can support them. This approach was chosen because, at this moment, TLC and TIP function at a higher level of knowledge retention than the teachers. Furthermore, the recommendations start with the knowledge retention strategy as this forms the starting point of adequate knowledge retention and can condition the other two conditions.

Knowledge retention strategy: there is no central knowledge retention strategy at RU regarding online education. Two plans are in development by the TLC. Concerning both plans, the authors of the plan should first of all clearly define what they consider to be critical knowledge since this sometimes remains unspoken. Concerning the plan of the education community, two important notes can be made. First, the TLC should take the autonomy of faculties into account, and each faculty should be approached differently. In doing this, the TLC could use their close connections with the TIPs of the faculties. Second, when faculties have a social culture, it is more likely that there will be some form of resistance to using an IT application. Therefore, when introducing the IT system, it is preferable to explain the use of the system in small, simple steps through human contact. This could be done by intensively involving a few teachers from multiple faculties - starting with the lecturer ambassadors or

education coordinators - in the implementation. They could form a bridge towards the other teachers and explain the use of the education community at the level of the study programs. Furthermore, involvement in the implementation of new technologies results in less resistance among employees (Hyclak & Kolchin, 1986). However, it is a question of whether such a plan succeeds when teachers' workload remains high.

In general, but more specifically considering the high workload of teachers in this case, knowledge retention strategies should also focus on the employees and not only on IT in organizations. A new part should be added to the plans that focuses on retaining knowledge while people are working at RU through HR - for example, in terms of reward and compensation and top management support (Doan et al. 2011) - and what should be done when employees leave the organization. This part of the strategy could also be developed on the level of the faculties or study programs and not necessarily on a central level. Developing such a strategy might require a new diagnosis, which includes the workload of teachers. Such an approach is also relevant because the university is a KIO, and its employees' knowledge is the organization's key asset.

IT applications: IT applications can provide support in the retention of knowledge. However, it is important to know under which conditions employees are likely to use the applications - which can differ between faculties - to make them work in favor of the organization. IT applications come in all forms, ranging from a database to a collaboration environment. In general, they should be well-structured and easy to access. Furthermore, the focus should be on getting familiar with the IT applications. A one-page guide would most likely work. This guide should not be too long. In that case, employees lose the motivation to read it all and just quit trying. When faculties have a social culture, the choice of IT application can be adjusted to the preferences of these employees by choosing an IT application that focuses on displaying which people have what knowledge, connecting people, and working together. It could be that a guide would not work in this case, as people prefer to learn about the IT application through human contact.

HR, processes, and practices: First of all, well-organized training courses on IT can contribute to making the strategy, and the usage of IT applications work. As teachers contain a lot of knowledge on online and hybrid education, their involvement is critical in providing good courses. The level of reward and recognition is low at RU concerning contributing to knowledge retention activities on online education, such as developing a training course for colleagues. Education directors, education coordinators, and lecturer ambassadors could stimulate, compliment, and reward people who join in these activities. They can act as role models when participating in knowledge retention activities (Doan et al., 2011). This will create a more positive climate instead of seeing activities that contribute to knowledge retention as an extra task and not seeing its benefit. Within such a more positive climate, cooperation with the TLC and TIP should be stimulated. Team-based working on a higher level could further increase the number of interactions and, thereby, increase knowledge retention. This is not only a task for the TLC - who already have a focus on centralization and connecting people -, but also for

teachers themselves. They should be open to ideas and should be given the time to be involved in training courses or educational initiatives to contribute to a more varied and better education.

In addition to the specific recommendations for RU, this research also has relevance for other educational institutions, which are currently transitioning to online/hybrid education and working from home. First of all, other organizations can use the step-by-step diagnosis to assess their level of knowledge retention. Furthermore, the reader can judge by the rich description whether the results of this research are transferable to their situation, for example, to another faculty with a social culture at another university. However, the conceptual framework itself is relatively broad. It applies to many organizations, specifically knowledge-intensive organizations, such as research institutes, government ministries, and legal firms. In these organizations, most knowledge is stored in individuals as well, which creates the possibility that these organizations face similar problems concerning knowledge retention.

5.2.5 Theoretical relevance and recommendations

Although this study is practice-oriented, it does have theoretical relevance. As explained in chapter 2, knowledge management, including knowledge retention, is important for improving organizational performance and create competitive advantage. First of all, this research contributes to theory by applying a combination of existing theoretical frameworks to a whole new, transformed research context (Barnes, 2020), namely the context of a pandemic. This research showed in the analysis and par. 5.2.2. that the framework of Arif et al. (2009) is very applicable in such a research context.

Furthermore, in this research context, IT increased in importance as people had to work from home (Davies, 2021; Hjorthol & Gripsrud, 2009). ICT functionality, capacity, and accessibility is reshaping how work is done and the structure of workplaces and workforces, with workers increasingly able to work in locations remote from the central workplace (Davies, 2021). However, this makes the willingness to work with IT applications a very important issue. One study developed a seven-level model of technology implementation ranging from non-use through awareness, exploration, infusion, integration, expansion to refinement (Moersch, 1995; Schiller, 2003). Drivers and barriers from a user's perspective of IT systems could cause at which level an organization functions. To increase the level of technology implementation, research has been interested in looking at drivers and barriers from a users' perspective of IT systems (Arif, Khalfan, Bernard & Heller, 2012). This research contributes by showing one barrier on the users' side that could influence the level of technology implementation. However, this barrier is not a barrier on an individual level on the users' side, but on an organizational level, namely the organization's culture. In this research, culture was used in measuring the state of knowledge retention by putting it as one of the five repositories (Walsh & Ungson, 1991). Therefore, it seems not right to put it as a barrier or condition for other conditions of knowledge retention. However, in knowledge retention literature, culture is also sometimes mentioned as a condition for knowledge

retention (Doan et al., 2011). This research implicates that when an organization has a social culture - and, therefore, socially-oriented employees -, employees prefer face-to-face interaction to working with computers and, therefore, are less willing to work with IT systems. Another option is to choose an IT application that suits the social culture. Next to that, lack of time to use IT systems could be seen as a barrier. This problem seems to go hand in hand with an excessive workload. When, on top of that, users are not familiar with the IT system, people do not have time to find out how to use an IT system efficiently. Therefore, this research assumes that in organizations with a social culture, it is better to implement IT systems that are relatively familiar for employees and easy to get acquainted with to prevent resistance and lack of usage.

Based on the findings of this research, it is interesting to take a closer look at how organizations with a social culture can overcome barriers to using IT. Overcoming these barriers may contribute to the use of IT, which in itself may contribute to the prevention of knowledge loss. Furthermore, this will contribute to the possibility of more organizations working from home without losing efficiency or effectiveness due to the decrease of face-to-face interaction. In addition, as indicated in par. 5.2.2, in literature the conditions for adequate knowledge retention and the concept of knowledge retention itself seem to overlap, which makes it harder to diagnose knowledge retention and points for improvement properly. Therefore, a literature review focused on identifying overlap and differences between these variables could contribute to developing better measurement tools.

References

Achterbergh, J., & Vriens, D. (2019). *Organizational Development: Designing Episodic Interventions* (1st edition). London: Routledge. Doi: 10.4324/9781315695228

Agarwal, N. K. & Islam, M. A. (2015). Knowledge retention and transfer: how libraries manage employees leaving and joining. *Vine*, *45*(2), 150-171. Doi: 10.1108/VINE-06-2014-0042

Agarwal, N.K. & Marouf, L.N. (2014), Initiating Knowledge Management in Colleges and Universities: A template. *International Journal of Knowledge Content Development & Technology (IJKCDT)*, *4*(2), 67-95. Doi: 10.5865/IJKCT.2014.4.2.067

Alvesson, M. (2000). Social identity and the problem of loyalty in knowledge-intensive companies. *Journal of Management Studies*, *37*(8), 1101-1123. Doi: 10.1111/1467-6486.00218

Andersen, A. & The American Productivity and Quality Center. (1996). *The Knowledge Management Assessment Tool*: *External Benchmarking Version*, Chicago: Winter.

Andreeva, T. & Kianto, A. (2012). Does Knowledge Management Really Matter? Linking Knowledge Management Practices, Competitiveness and Economic Performance. *Journal of Knowledge Management*, *16*(4), 617-636. Doi: 10.1108/13673271211246185

Andrews Graham, D. (2019). Benefits of Online Teaching for face-to-face Teaching at Historically Black Colleges and Universities. *Online Learning*, *23*(1), 144-163. Doi:10.24059/olj.v23i1.1435

Argote, L., McEvily, B. & Reagans, R. (2003). Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management Science*, *49*(4), 571-582. Doi: 10.1287/mnsc.49.4.571.14424

Arif, M., Egbu, C., Alom, O., & Khalfan, M. M. (2009). Measuring knowledge retention: a case study of a construction consultancy in the UAE. Engineering, *Construction and Architectural Management*, *16*(1), 92-108. Doi: 10.1108/09699980910927912

Arif, M., Khalfan, M., Barnard, J.H. & Heller, N.A. (2012). Assessing knowledge retention in construction consultancies: Cases from the UAE, *Australasian Journal of Construction Economic and Building*, *12*(2), 55-71. http://dx.doi.org/10.5130/ajceb.v12i2.2461

Armat, M. R., Assarroudi, A., Rad, M., Sharifi, H., & Heydari, A. (2018). Inductive and deductive: Ambiguous labels in qualitative content analysis. *The Qualitative Report*, *23*(1), 219-221.

Baguma, S.D., Ragsdell, G. & Murray, I. (2014, 6-7 November). *Employees' responsibilities in a knowledge retention strategy: A Ugandan case study* (Conference contribution). In proceedings of the 11th international conference on intellectual capital, knowledge management and organizational learning (ICICKM 2014), Loughborough University, Loughborough, UK. https://hdl.handle.net/2134/17548

Barnes, S. J. (2020). Information management research and practice in the post-COVID-19 world. *International Journal of Information Management*, *55*, 102175. Doi: 10.1016/j.ijinfomgt.2020.102175

Barrett, D. & Twycross, A. (2018). Data collection in qualitative research. *Evid Based Nurs*, *21*(3), 63-64. http://dx.doi.org/10.1136/eb-2018-102939

Benbya, H., Passiante, G. & Belbaly, N. A. (2004). Corporate portal: a tool for knowledge management synchronization. *International journal of information management*, *24*(3), 201-220. DOI: 10.1016/j.ijinfomgt.2003.12.012

Bessick, J. & Naicker, V. (2013). Barriers to tacit knowledge retention: an understanding of the perceptions of the knowledge management of people inside and outside the organization. *South African Journal of Information Management*, *15*(2), 1-8. DOI: 10.4102/sajim.v15i2.556

Bleijenbergh, I. (2015). *Kwalitatief onderzoek in organisaties* (2nd edition). Den Haag, Nederland: Boom uitgevers Amsterdam.

Boeije, H. (2005). *Analyseren in kwalitatief onderzoek*. Den Haag: Boom Lemma uitgevers.

Bokde, V., Kharbikar, H. L., Roy, M. L., Joshi, P. & Ga, A. (2020). Possible impacts of COVID-19 pandemic and lockdown on education sector in India. *Food and Scientific Reports, 1*(Special issue), 30-33.

Bollinger, A. S. & Smith, R. D. (2001). Managing organizational knowledge as a strategic asset. *Journal of Knowledge Management*, *5*(1), 8-18. Doi: 10.1108/13673270110384365

Bratianu, C., & Leon, R. D. (2015). Strategies to enhance intergenerational learning and reducing knowledge loss: an empirical study of universities. *VINE*, *45*(4), 551/567. Doi: 10.1108/VINE-01-2015-0007

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101. Doi: 10.1191/1478088706qp063oa

Bryman, A. (2012). *Social Research Methods*. Oxford: Oxford University Press.

Bui, H. T. M. & Baruch, Y. (2011). Learning organizations in Higher Education: An Empirical Evaluation within an International Context. *Management Learning*, *43*(5): 515-544. Doi: 10.1177/1350507611431212

Cabrera, E. F. & Cabrera, A. (2005). Fostering knowledge sharing through people management practices. *The international journal of human resource management*, *16*(5), 720-735. Doi: 10.1080/09585190500083020

Centraal Bureau voor de Statistiek. (2020). *Monitor Brede Welvaart & Sustainable Development Goals 2020*. Centraal Bureau voor de Statistiek. https://www.cbs.nl/-/media/_pdf/2020/21/cbs-mbw-2020.pdf

Choo, C. W. (2006) *The knowing organization: How organizations use information to construct meaning, create knowledge, and make decisions* (2nd edition), New York: Oxford University Press.

Cronin, C. B., Alexander, A., Majumdar, E., Thompson, C., Wolf, B., Lazaro, R., & Lazaro, V. (2018). *Knowledge Management Resource to Support Strategic Workforce Development for Transit Agencies*. Washington, DC: The National Academies of Sciences, Engineering and Medicine. https://doi: 10.17226/24961.

Daghfous, A., Belkhodja, O. & Angell, L. C. (2013). Understanding and managing knowledge loss. *Journal of Knowledge Management*, *17*(5), 639-660. Doi: 10.1108/JKM-12-2012-0394

Dalkir, K. (2005), *Knowledge management in theory and practice*, Boston, MA: Elsevier.

Darke, P., Shanks, G., & Broadbent, M. (1998). Successfully completing case study research: combining rigour, relevance and pragmatism. *Information systems journal*, *8*(4), 273-289. https://doi.org/10.1046/j.1365-2575.1998.00040.x

Davenport, T. H., De Long, D. W. & Beers, M. C. (1998). Successful knowledge management projects. *Sloan management review*, *39*(2), 43-57.

Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know* (1st edition). Harvard Business Press.

Davis, R.L. & Zhong, Y. (2017). The Biology of Forgetting - a perspective. *Neuron*, *95*(3), 490-503. Https://doi.org/10.1016/j.neuron.2017.05.039

Deakin, H. & Wakefield, K. (2014). Skype Interviewing: Reflections of Two PhD Researchers. *Qualitative research*, *14*(5), 603-616. Doi: 10.1177/1468794113488126

Delcker, J., & Ifenthaler, D. (2020). Teachers' perspective on school development at German vocational schools during the Covid-19 pandemic. *Technology, Pedagogy and Education*, 1-15. Doi: 10.1080/1475939X.2020.1857826

DeLong, D.W. (2004), *Lost Knowledge: Confronting the Threat of an Aging Workforce*, Oxford University Press, New York, NY.

DeLong, D.W. & Davenport, T. (2003). Better practices for retaining organizational knowledge: lessons from the leading edge. *Employment Relations*, *30*(3), 51-63. Doi: 10.1002/ert.10098

Den Hertog, P. (2000). Knowledge-intensive business services as co-producers of innovation, *International Journal of Innovation Management*, *4*(4), 491-528. https://doi.org/10.1142/S136391960000024X

Doan, Q. M., Rosenthal-Sabroux, C. & Grundstein, M. (2011, 26-29 October). *A reference model for knowledge retention within small and medium-sized enterprises*. In Proceedings of the International Conference on Knowledge Management and Information Sharing (KMIS-2011), Paris, France. DOI:10.5220/0003632003060311

Eisenhardt, K.M. (1989). Theory building from cases: opportunities and challenges. *Academy of Management Journal*, *50*(1), 25-32. https://doi.org/10.5465/amj.2007.24160888

Ensslin, L., Mussi, C. C., Ensslin, S. R., Dutra, A. & Fontana, L. P. B. (2020). Organizational knowledge retention management using a constructivist multi-criteria model. *Journal of Knowledge Management*, *24*(5), 985-1004. Doi: 10.1108/JKM-12-2019-0689

Evans, M. M. & Ali, N. (2013, 24-25 October). *Bridging knowledge management life cycle theory and practice*. In Proceedings of the International Conference on Intellectual Capital, Knowledge Management and Organisational Learning (ICICKM 2013)*, Washington, DC, USA.

Evans, M., Dalkir, K., & Bidian, C. (2015). A holistic view of the knowledge life cycle: the knowledge management cycle (KMC) model. *The Electronic Journal of Knowledge Management*, *12*(1), 47.

Frigo, M. (2006). Knowledge retention: A guide for utilities. *Journal-American Water Works Association*, *98*(9), 81-84.

Garcia-Morales, V.J., Garrido-Moreno, A. & Martin-Rojas, R. (2021). The transformation of higher education after the COVID disruption: Emerging Challenges in an online learning scenario. *Frontiers in Psychology*, *12*(616059). Doi: 10.3389/fpsyg.2021.616059

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic management journal*, *17*(S2), 109-122. Doi: 10.1002/smj.4250171110

Grant R. M., (1997). The Knowledge-based View of the Firm: Implications for Management Practice. *Long Range Planning*, *30*(3), 450-454. Doi: 10.1504/IJLIC.2006.011747

Guba, E.G. & Lincoln, Y.S. (1989). *Fourth generation evaluation*. Newbury Park, CA: Sage.

Hartmann, A. & Doreé, A. (2015). Learning Between Projects: More than Sending Messages in a Bottle. *International Journal of Project Management*, *33*(2), 341-51. Doi: 10.1016/j.ijproman.2014.07.006

Hayward-Wright, N. (2009). Knowledge retention and the departing employee. *HLA News*, *1*(Dec 2009), 11-12.

Hedlund, G. (1994). A model of knowledge management and the N-form corporation. *Strategic management journal*, *15*(S2), 73-90. https://www.jstor.org/stable/2486877

Heisig, P. (2009). Harmonisation of knowledge management - comparing 160 KM frameworks around the globe. *Journal of Knowledge Management*, *13*(4), 4-31. Doi: 10.1108/13673270910971798

Hislop, D., Bosua, R., & Helms, R. (2018). *Knowledge management in organizations: A critical introduction* (4th edition). Oxford: Oxford university press.

Hitomi, N. & Black, J. (2018). Implicit and explicit knowledge in flood evacuations with a case study of Takamatsu, Japan. *International Journal of Disaster Risk Reduction*, *28*, 788-797. https://doi.org/10.1016/j.ijdrr.2018.02.008

Holan, P. de & Phillips, N. (2004). Remembrance of things past? The dynamics of organizational forgetting. *Management Science*, *50*(11), 1603-1613. Doi: 10.1287/mnsc.1040.0273

Holsapple, W., & Joshi, D. (1998). *In search of a Descriptive framework for Knowledge Management: preliminary Delphi Results*. Kentucky: Kentucky Initiative for Knowledge Management

Hunter, R., Rosser, B., Fleming, M., Cushman, A. & Harris, K. (1998). *The Knowledge Management Scenario: Trends and Directions for 1998-2003*. Stamford, Connecticut: Gartner. Inc.

Hyclak, T.J. & Kolchin, M.G. (1986). Worker involvement in implementing new technology. *Technovation*, *4*(2), 143-151.

Ingold, R., & Vanoirbeek, C. (2003). Document Analysis Revisited for Web Documents. In A. Antonacopoulos & J. Hu (eds.)., *Web Document Analysis: Challenges and Opportunities* (pp. 315-331), Singapore: World Scientific Publishing Co. Pte. Ltd. Https://doi.org/10.1142/9789812775375_0017

Ipsen, C., van Veldhoven, M., Kirchner, K., & Hansen, J. P. (2021). Six Key Advantages and Disadvantages of Working from Home in Europe during COVID-19. *International Journal of Environmental Research and Public Health*, *18*(4), 1826. Doi: 10.3390/ijerph18041826

Jakubik, M. (2007). Exploring the knowledge landscape: four emerging views of knowledge. *Journal of knowledge management*, *11*(4), 6-19. Doi: 10.1108/13673270710762675

Janghorban, R., Roudsari, R. L., & Taghipour, A. (2014). Skype interviewing: The new generation of online synchronous interview in qualitative research. *International journal of qualitative studies on health and well-being*, *9*(1), 24152. https://doi.org/10.3402/qhw.v9.24152

Jongeneelen, M.C.P. (2015). *Preparations for turbulence in the environment of the Dutch higher education system* (Master thesis). Utrecht: Utrecht University.

Kaplan, B. (2010). *Losing your minds: capturing, retaining, and leveraging organizational knowledge*. Londen: Ark Group.

Kidwell, J. J., Vander Linde, K. M. & Johnson, S. L. (2000). Applying Corporate Knowledge Management Practices in Higher Education. *EDUCAUSE Quarterly*, *23*(4), 28–33.

Klammer, A. & Gueldenberg, S. (2019). Unlearning and forgetting in organizations: a systematic review of literature. *Journal of knowledge management*, *23*(5), 860-888. Doi: 10.1108/JKM-05-2018-0277

Laudon, K. & Laudon, J. (1999). *Management Information Systems-Organization and Technology in the Networked Enterprise* (6th edition). London: Pearson.

Levallet, N. & Chan, Y.E. (2019). Organizational knowledge retention and knowledge loss. *Journal of Knowledge Management*, *23*(1), 176-199. Doi: 10.1108/JKM-08-2017-0358

Levy, M. (2011). Knowledge retention: minimizing organizational business loss. *Journal of Knowledge Management*, *15*(4), 582-600. Doi: 10.1108/13673271111151974

Liebowitz, J. (2008). *Knowledge retention: strategies and solutions* (1st edition). Boca Raton, Fla: Auerbach Publications.

Lin, T.C., Chang, C.L.H. & Tsai, W.C. (2016). The influences of knowledge loss and knowledge retention mechanisms on the absorptive capacity and performance of an MIS department. *Management Decision*, *54*(7), 1757-1787. Doi.org/10.1108/MD-02-2016-0117

Liyanage, C., Elhag, T., Ballal, T. & Li, Q. (2009). Knowledge communication and translation - a knowledge transfer model. *Journal of Knowledge Management*, *13*(3), 118-131. Doi: 10.1108/13673270910962914

Martins, E. C. & Meyer, H. W. (2012). Organizational and behavioral factors that influence knowledge retention. *Journal of Knowledge Management*, *16*(1), 77-96. Doi: 10.1108/13673271211198954

Mertins, K., Heisig, P., & Vorbeck, J. (2001). *Knowledge Management: Best practices in Europe*. Berlin: SpringerVerlag.

Meyer, M.H. and Zack, M.H. (1996). The design and development of information products, *Sloan Management Review*, *37*(3). 43.

Millar, C.C.J.M., Lockett, M. & Mahon, J.F. (2016). Knowledge intensive organisations: on the frontiers of knowledge management. *Journal of knowledge management*, *20*(5), 845-857.

Nonaka, I. & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.

NOS. (2020, 15 maart). Corona-overzicht 15 maart: de dag dat Nederland verder op slot ging. https://nos.nl/artikel/2327219-corona-overzicht-15-maart-de-dag-dat-nederland-verder-op-slot-ging.html

Nurmi, R. (1998). Knowledge-intensive firms. *Business Horizons*, *41*(3), 26-33. Doi: 10.1016/S0007-6813(98)90005-2

Pennings, J.M., Lee, K. & Witteloostuijn, A. van. (1998). Human capital, social capital, and firm dissolution. *Academy of Management Journal*, *41*(4), 425-440. Doi: 10.2307/257082

Pettigrew, A.M. (1990). Longitudinal field research on change: theory and practice. *Organization Science*, *1*(3), 267-292. DOI:10.1287/orsc.1.3.267

Polanyi, M. (1966). *The tacit Dimension*, London: Routledge & Kegan Paul.

Radboud University. (z.d.-a). College van bestuur. Radboud Universiteit. Viewed on 21 februari 2021, https://www.ru.nl/over-ons/organisatie/college-van-bestuur/

Radboud University. (z.d.-b). Faculteiten. Radboud Universiteit. Viewed on 21 februari 2021, https://www.ru.nl/over-ons/organisatie/faculteiten/

Radboud University. (z.d.-c). Missie en identiteit. Radboud Universiteit. Viewed on 21 februari 2021, https://www.ru.nl/over-ons/overradboud/missie/

Radboud University. (z.d.-d). Programma onderwijsdagen. Radboud Universiteit. Viewed on 20 maart 2021, https://www.ru.nl/docenten/actueel/onderwijsdagen-2021/programma-vogelvlucht/

Radboud University. (z.d.-e). Radboud Teaching and Learning Centre. Radboud Universiteit. Viewed on 21 februari 2021, https://www.ru.nl/lecturers/about-us/

Radboud University. (z.d.-f). Strategie: A Significant Impact. Radboud Universiteit. Viewed on 21 februari 2021, https://www.ru.nl/over-ons/overradboud/missie/strategie/

Radboud University. (z.d.-g). Faculty of Social Sciences. Radboud Universiteit. Viewed on 22 maart 2021, https://www.ru.nl/socialsciences/

Radboud University. (z.d.-h). About the Faculty of Social Sciences. Radboud Universiteit. Viewed on 22 maart 2021, https://www.ru.nl/socialsciences/faculty/about-faculty/

Radboud University. (z.d.-i). Strategy Faculty Social Sciences: 2021-2026. Radboud Universiteit. Viewed on 22 maart 2021, https://www.ru.nl/socialsciences/vm-fss/strategy-2126/strategy-faculty-social-sciences-2021-2026/

Radboud University. (z.d.-j). Vision and ambition TCL RU. Radboud Universiteit. Viewed on 22 maart 2021, https://www.ru.nl/lecturers/about-us/vision-ambitions/

Radboud University. (z.d.-k). Lecturer ambassadors TCL RU. Radboud Universiteit. Viewed on 22 maart 2021, https://www.ru.nl/lecturers/about-us/lecturer-ambassadors/

Radboud University. (z.d.-l). TIP TCL RU. Radboud Universiteit. Viewed on 22 maart 2021, https://www.ru.nl/lecturers/about-us/frequently-asked-questions-about-tlc/

Radboud University (z.d.-m). TIP FSS RU 2021. Radboud Universiteit. Viewed on 22 maart 2021, https://www.ru.nl/lecturers/about-us/contact/social-sciences/

Schmit, S., Borzillo, S. & Probst, G. (2012). Don't let Knowledge Walk Away: Knowledge Retention During Employee Downsizing. *Management Learning*, *43*(1), 53-74. Doi: 10.1177/1350507611411630

Schoenherr, T., Griffith, D. A. & Chandra, A. (2014). Knowledge Management in Supply Chains: The Role of Explicit and Tacit Knowledge. *Journal of Business Logistics*, *35*(2), 121-135. Doi: 10.1111/jbl.12042

Schultze, U. & Stabell, C. (2004). Knowing What You Don't Know? Discourses and Contradictions in Knowledge Management Research. *Journal of Management Studies*, *41*(4), 549–573. Doi.org/10.1111/j.1467-6486.2004.00444.x

Serban, A. M. & Luan, J. (2002). Overview of knowledge management. *New directions for institutional research*, *2002*(113), 5-16. Doi.org/10.1002/ir.34

Slagter, F. (2007). Knowledge management among the older workforce. *Journal of Knowledge Management*, *11*(4), 82-96. Doi: 10.1108/13673270710762738

Smith, E. A. (2001). The role of tacit and explicit knowledge in the workplace. *Journal of Knowledge Management, 5*(4), 311-321. Doi:10.1108/13673270110411733

Society for Human Resource Management (Ed.). (2009). Leveraging HR and Knowledge Management in a Challenging Economy. United States: SHRM.

Spek, R. van der & Spijkervet, A. (1997). Knowledge Management: Dealing intelligently with knowledge. In J. & Liebowitz, & Wilcox (Eds.), *Knowledge management and its integrative elements*. New York: CRC Press.

Stenmark, D. (2002, 7-10 January). *Information vs. knowledge: The role of intranets in knowledge management* (paper presentation). Proceedings of the 35th Annual Hawaii International Conference on System Sciences, Big Island, Hawaii, USA. Doi: 10.1109/HICSS.2002.994043

Swart, J. (2011). That's Why it Matters: How Knowing Creates Value. *Management Learning*, *42*(3), 319-32. Doi: 10.1177/1350507610391591

Symon, G.& Cassell, C. (eds.) (2012) *Qualitative Organizational Research: Core Methods and current challenges*. London: Sage.

Van der Meer, R. & Kautz, K. (2015). Knowledge retention through Low-Tech Knowledge Sharing Channels in Loosely Coupled Networks: A Human-Based Approach. *ACIS 2015 Proceedings*. arXiv:1605.01032.

Van Looy, A. (2021). How the COVID-19 pandemic can stimulate more radical business process improvements: Using the metaphor of a tree. *Knowledge and Process Management*, 1-10. Doi: 10.1002/kpm.1659

Vennix, J.A.M. (2011). *Theorie en praktijk van empirisch onderzoek*. Pearson Custom Publishing.

Verschuren, P.J.M. & Doorewaard, H. (2007). *Het ontwerpen van een onderzoek* (4th

ed.). Utrecht: Uitgeverij Lemma

Versteijlen, M., Perez Salgado, F., Janssen-Groesbeek, M. & Counotte, A. (2017). Pros and cons of online education as a measure to reduce carbon emissions in higher education in the Netherlands, *ScienceDirect*, *28*( ), 80-89. Doi: /10.1016/j.cosust.2017.09.004

Von Krogh, G. (1998). Care in Knowledge Creation. *California Management Review*, *40*(3), 133-153. Doi: 10.2307/41165947

Walsh, J. P. & Ungson, G. R. (1991). Organizational memory. *The Academy of Management Review*, *16*(1), 57–91. Doi: /10.2307/258607

Wamundila, S. (2008). Developing guidelines for a knowledge management policy to enhance knowledge retention at the University of Zambia (Doctoral dissertation, University of South Africa).

Wamundila, S. & Ngulube, P. (2011). Enhancing knowledge retention in higher education: A case of the University of Zambia. *SA Journal of Information Management*, *13*(1), 1-9. Doi: 10.4102/sajim.v13i1.439

Westelaken, van de, M. & Peters, V. *Participatief veranderen*. Nijmegen: Samenspraak Advies Nijmegen.

Wiig, K. (1993). *Knowledge management foundations*. Arlington: Schema Press.

Willems, R. (2009). Knowledge sharing and retention through the use of collaboration software - A bachelor thesis. Radboud Universiteit.

Winkelen, C. & McDermott, R. (2008). Facilitating the handover of knowledge. *Knowledge Management Review*, *11*(2), 24-27.

Yin, R. K. (2014). *Case Study Research Design and Methods* (5e ed.). Thousand Oaks, CA: Sage Publications

Appendix

1. Organizational chart RU

RU (2021). *Organogram RU*. RU. https://www.ru.nl/english/about-us/organisation/organogram/
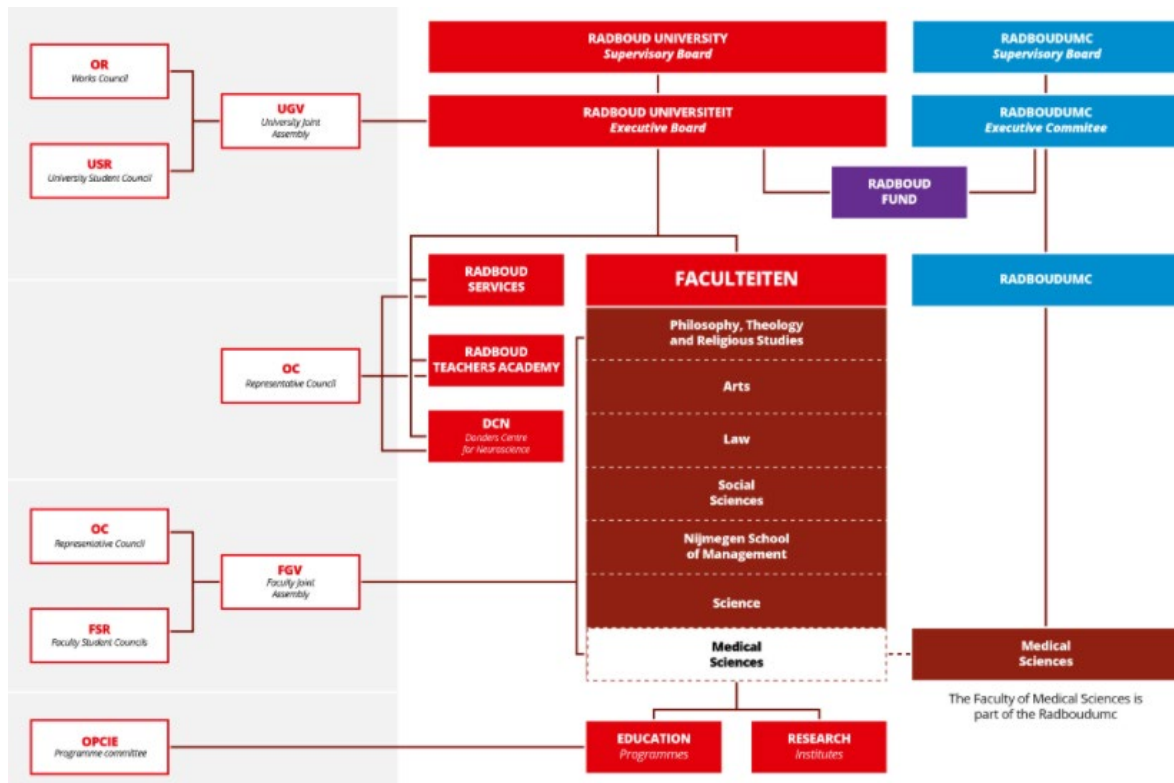
2. Overview knowledge management processes

Authors	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Holsapple and Joshi (1998)	Acquisition	Selection	Internalization	Use				
Hunter et al. (1998)	Create	Organize	Capture	Access	Use			
Davenport and Prusak (1998)	Generate		capture	Transfer				
Wiig (1993)	Creation	Manifestation	Use	Transfer				
Arthur Andersen	Share-create	Identify	Collect	Adapt-organize	Apply			

and APQC (1996)								
Van der Spek and Spijkervet (1997)	Develop	Distribute	Combine	Hold				
Mertins, Heising and Vorbeck (2001)	Create	Store	Distribute	Apply				
Hislop et al. (2018)	Create	Store	Share	Apply				
Meyer and Zack (1999)	Acquisition	Refinement	Storage/retrieval	distribution	Presentation/use			
Dalkir (2005)	Create/capture	Assess	Share/disseminate	Contextualize	Apply/use	update		
Agarwal and Islam (2015)	Creation	Acquisition/ sourcing	Compilation/capture	Organization, refinement, and storage	Dissemination, transfer, and access	Learning and application	Evaluation and value realization	reuse/divesting
Evans & Ali (2013); Evans, Dalkir, & Bidian (2015)	Identify	Organize and store	Share	Apply	Evaluate and learn			

Based on Benbya et al., 2004, Summary of knowledge management processes identified in different frameworks, p. 203.

3. Operationalization trees, including derived interview questions

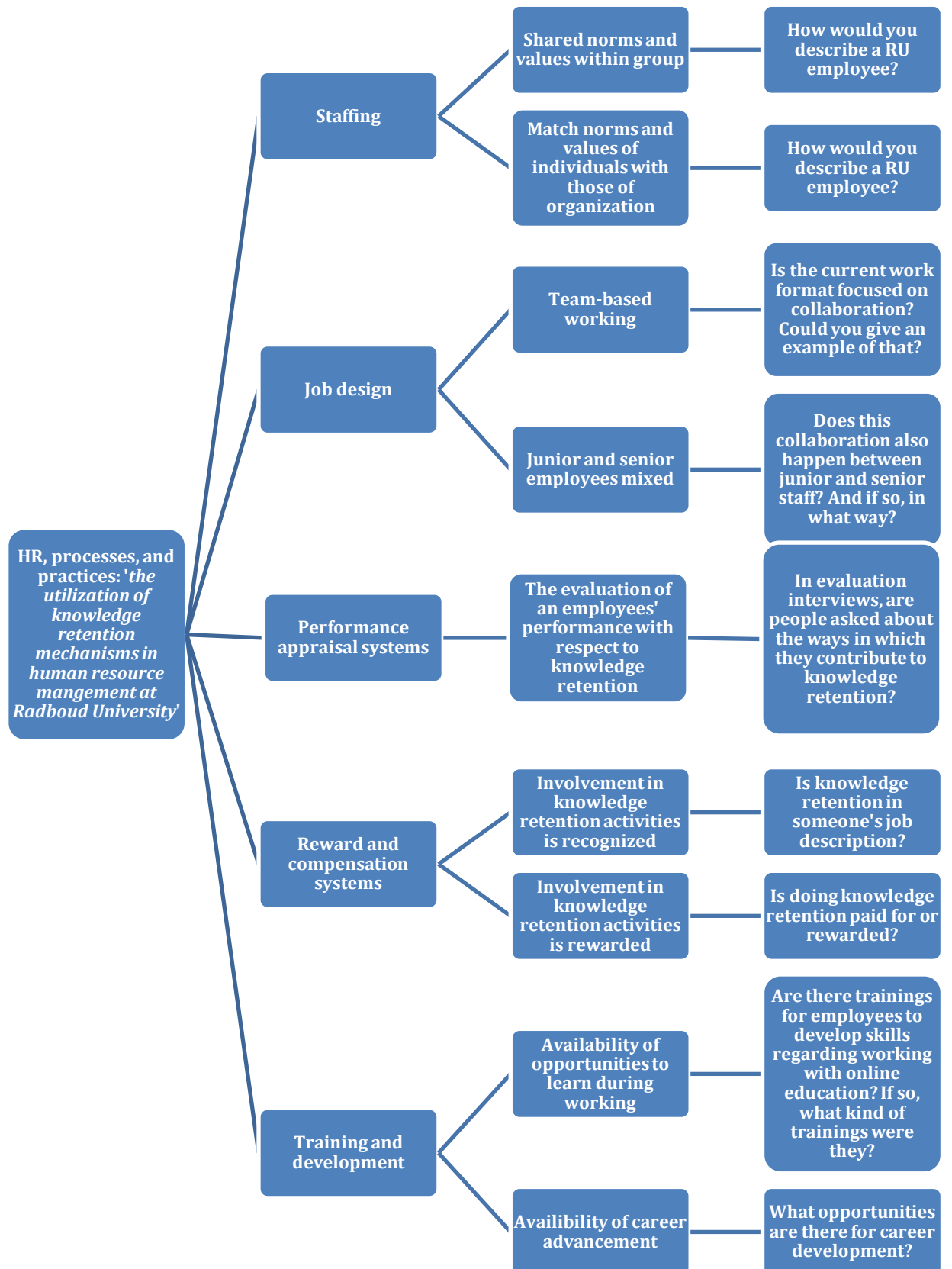### 3.1. Operationalization tree IT applications
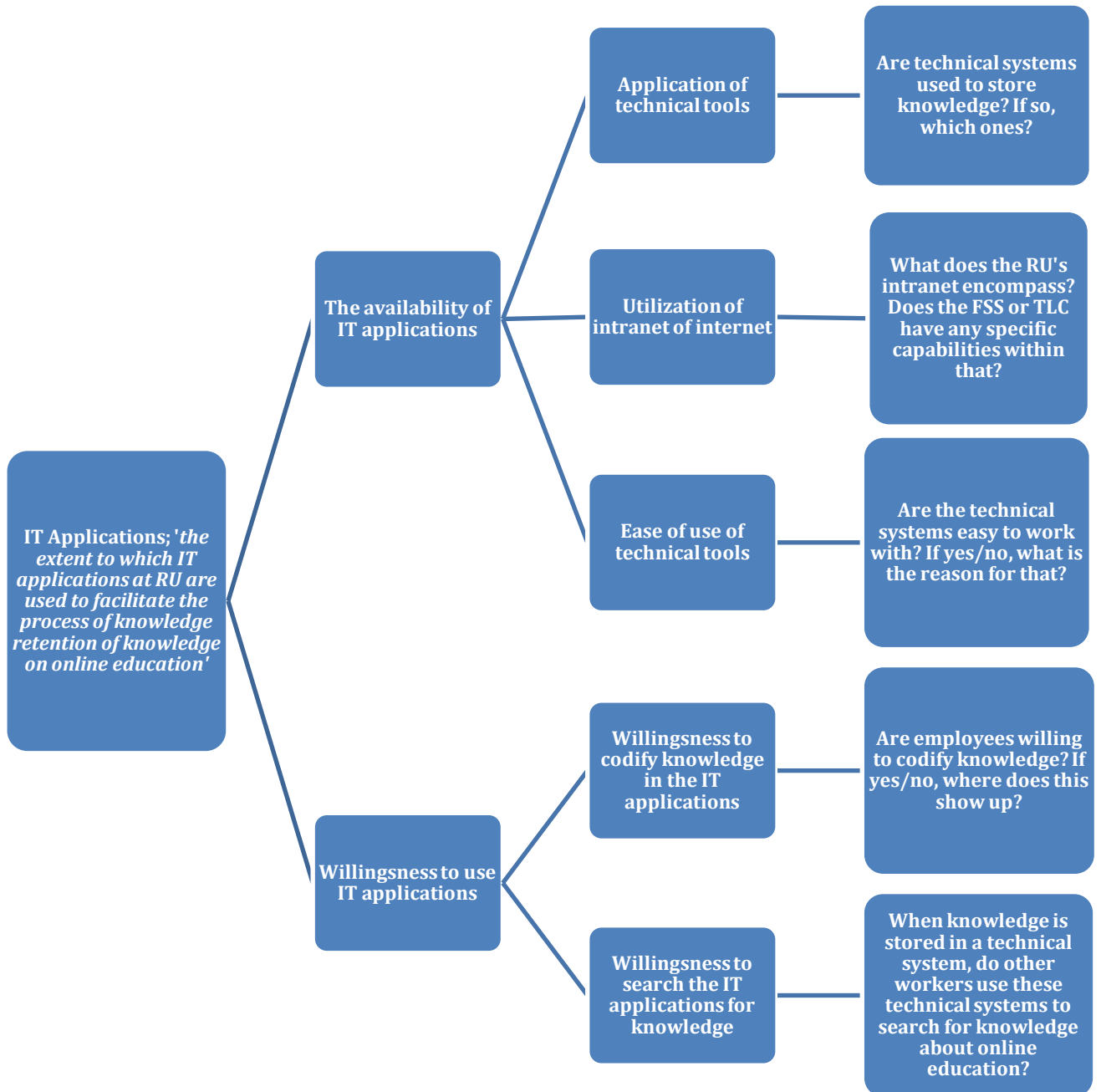
Based on the definitions of Doan et al. (2011) and further developed based on the theories by Wong & Aspinwall (2005) and Hislop (2018).
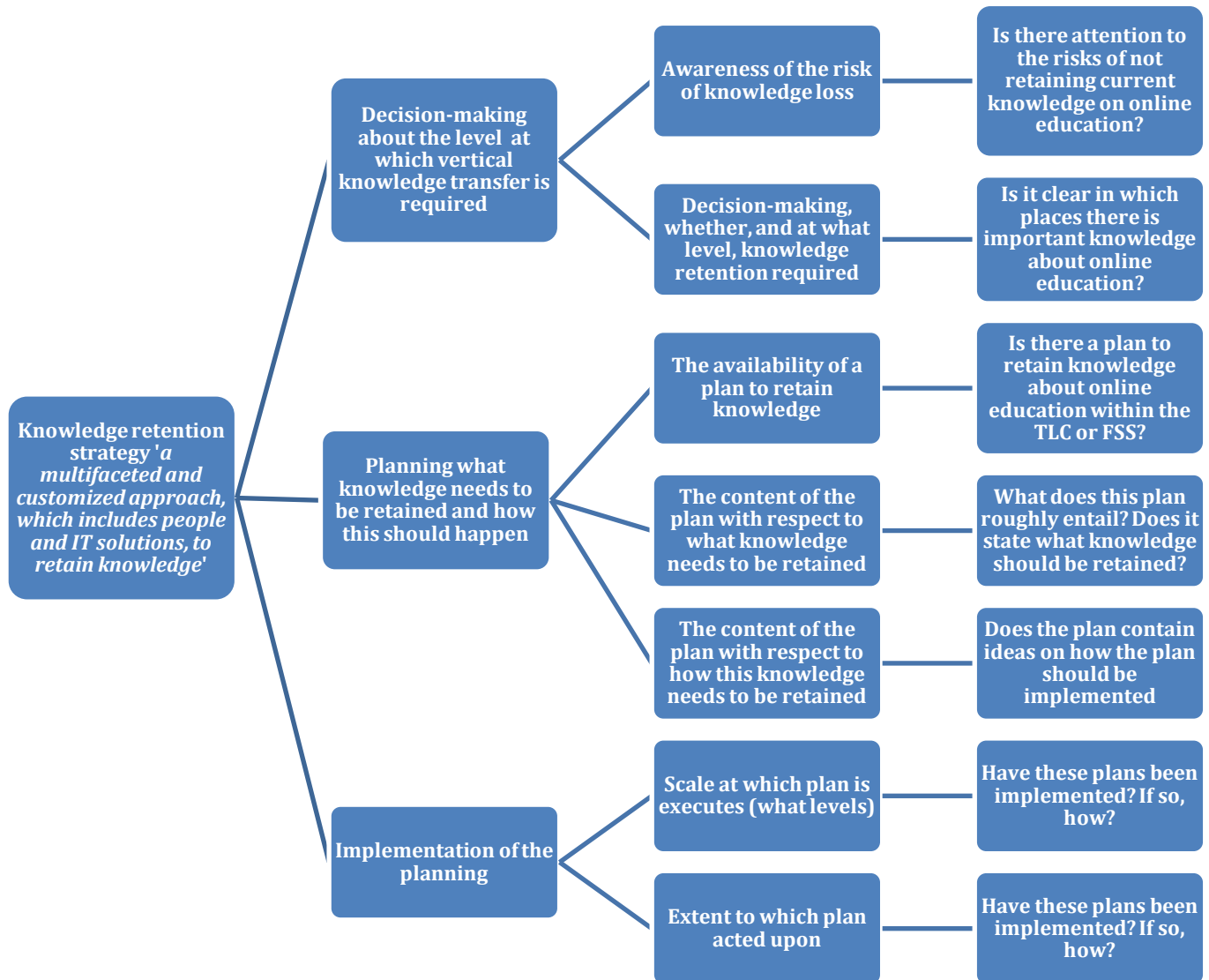
## 3.2. Operationalization tree HR, processes, and practices

Based on the definition constructed by the literature overview in paragraph 2.7.2 and further developed on Doan et al. (2011) combined with Cabrera and Cabrera (2005).

3.3. Operationalization tree Knowledge retention strategy

Knowledge retention strategy *'a multifaceted and customized approach, which includes people and IT solutions, to retain knowledge'*

- **Decision-making about the level at which vertical knowledge transfer is required**
  - **Awareness of the risk of knowledge loss** — Is there attention to the risks of not retaining current knowledge on online education?
  - **Decision-making, whether, and at what level, knowledge retention required** — Is it clear in which places there is important knowledge about online education?

- **Planning what knowledge needs to be retained and how this should happen**
  - **The availability of a plan to retain knowledge** — Is there a plan to retain knowledge about online education within the TLC or FSS?
  - **The content of the plan with respect to what knowledge needs to be retained** — What does this plan roughly entail? Does it state what knowledge should be retained?
  - **The content of the plan with respect to how this knowledge needs to be retained** — Does the plan contain ideas on how the plan should be implemented

- **Implementation of the planning**
  - **Scale at which plan is executes (what levels)** — Have these plans been implemented? If so, how?
  - **Extent to which plan acted upon** — Have these plans been implemented? If so, how?

Based on the definition of Frigo (2006) and further developed on the three elements of Levy (2011).

3.4. Operationalization tree Knowledge retention
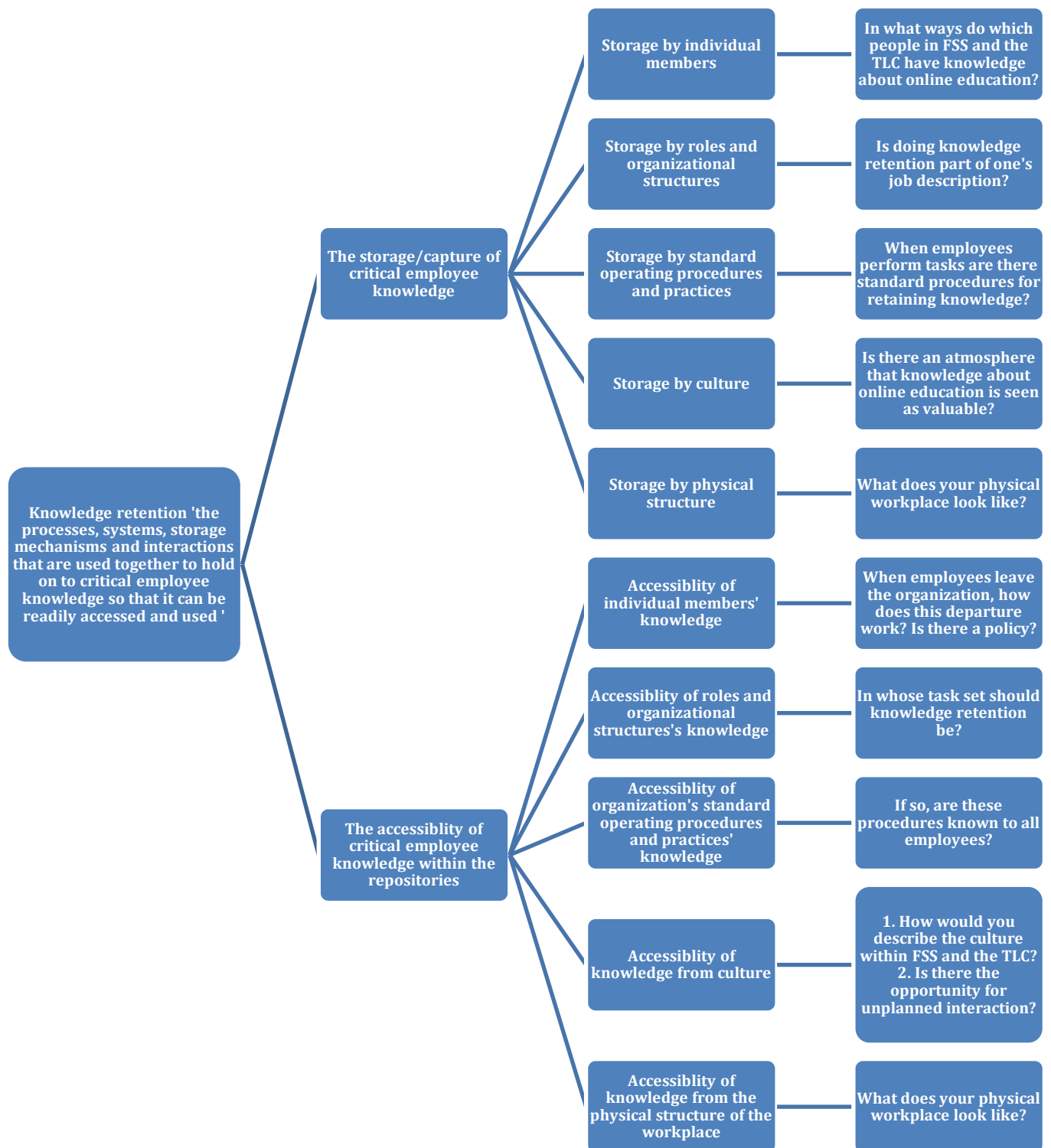
Based on the definition of Cronin et al. (2018, p.73) and further developed based on the five repositories of Walsh and Ungson (1991).

4. Interview statement

"Hartelijk dank dat u openstaat voor dit interview over kennisbehoud ten aanzien van online onderwijs op de Radboud Universiteit om zo hopelijk goed in beeld te krijgen hoe hier kennis worden behouden om na deze corona periode zo goed mogelijk weer aan de slag te kunnen. Voordat we aan het interview beginnen, wil ik u mededelen dat het u ten alle tijde vrij staat om terug te trekken of te stoppen met het interview. U zit hier op vrijwillige basis en bent niet verplicht om te antwoorden over zaken, waar u niet over wilt antwoorden. Na het interview wil ik het interview uitwerken in een transcript. Hierin zal ik alle namen zwart markeren, zodat anonimiteit behouden blijft. Verder zal ik u het transcript opsturen, zodat u zelf na kunt lezen wat er is gezegd en zo nodig corrigeren of aangeven of zaken u gevoelig liggen. Om dit uit te kunnen werken, wil ik vragen of u ermee akkoord gaat dat ik dit interview opneem."

5. Interview guide based on operationalization

5.1. Initial interview guide

Introductie
1.   Zou u zichzelf kunnen voorstellen?
2.   Wat is uw functie aan de RU? En wat houdt deze in?

Knowledge retention
Individual members:
1.   Hoe zou u een RU-medewerker omschrijven? Welke karaktereigenschappen beschikt een dergelijk persoon? (Job staffing)
2.   Er werken veel mensen in de FSW en in het TLC. Op welke manier beschikken deze mensen over kennis over online onderwijs?
3.   Op het moment dat zij de organisatie verlaten, is er dan goed beleid om contact te houden?
4.   Zijn er trainingen voor werknemers om vaardigheden te ontwikkelen t.a.v. online onderwijs? Bijvoorbeeld van oudere voor jongere werknemers (HR: training and development)
Organisational structure
5.   Is de huidige werkvorm erg gericht op samenwerken? Zou u daar een voorbeeld van kunnen noemen?
6.   Gebeurt dit ook tussen junior en senior medewerkers? Zo ja, op welke manier? (HR: Job design)
7.   Komen mensen vaak samen in andere vormen, zoals bijvoorbeeld projecten?
Standard operating procedures and practices
8.   Op het moment dat de werknemers taken uitvoeren zijn er dan standaard procedures om kennis op te slaan, die je moet doorlopen?
Cultuur
9.   Heerst een sfeer dat kennis over online onderwijs als waardevol wordt gezien? Waar merkt u dat aan? (KRS: decision making)
10.   Is deze cultuur erg open en informeel? Waar merkt u dat aan?
11.   Is er gelegenheid voor ongeplande interactie om zo kennis verder te ontwikkelen?
Physical structure of workplace

12.   Hoe zag uw fysieke werkplek eruit? Zit u in de toekomst in het nieuwe gebouw?

13.   Wordt er op dit moment samengewerkt in digitale ruimtes?

IT applicaties

Availability of IT applications

1.   Worden er technische systemen gebruikt om kennis over online onderwijs op te slaan? Zo ja, welke?

2.   Wat behelst het intranet van de RU allemaal? Heeft de FSW of TLC daar nog specifieke mogelijkheden binnen? FSW teacher service BS

3.   Zijn de technische systemen makkelijk om mee te werken? Zo ja/nee, waar zit dat in?

Willingness to use IT applications

4.   Zijn werknemers snel bereid om kennis te codificeren?

5.   Op het moment dat werknemers kennis opslaan. Maken andere werknemers gebruik van deze IT systemen om te zoeken naar informatie?

HR, processes, and practices

Job staffing

1.   Hoe zou u een RU-medewerker omschrijven?

Job design

2.   Wordt er veel samengewerkt in teams? Werken junior en senior medewerkers daarbij ook samen? En zo ja, op welke manier?

Reward and compensation systems

3. .   Wordt het behouden van kennis over online onderwijs gezien als taak? - Hinke

4.   Wordt hieraan werken uitbetaald of beloond?

Performance appraisal systems

5.   Wordt bij evaluatiegesprekken gevraagd hoe men bijdraagt aan kennisbehoud? Dus op welke wijze je hebt bijgedragen aan het verder ontwikkelen van de universiteit door als persoon ervaringen van jezelf of op grotere schaal te verzamelen?

Training and development

6.   Zijn er mogelijkheden om je te ontwikkelen binnen je taak? En zo zelf meer ervaring op te doen over online onderwijs? Zo ja, voorbeeld?

7.   Welke mogelijkheden zijn er om carrière wise een ontwikkeling door te maken?

Knowledge retention strategy

Decision-making

1.   Is er aandacht voor de risico's van het niet opslaan van de huidige ervaringen over online onderwijs?

2.   Is duidelijk op welke plekken belangrijke kennis over online onderwijs aanwezig is?

Planning

3.   Is er een plan om kennis over online onderwijs te behouden (binnen het TLC of FSW)?

4.   Wat houdt dit plan in grove lijnen in? Staat duidelijk welke kennis behouden dient te worden?

5.   Is er een idee hoe dit in de praktijk dan zou worden uitgevoerd?

Implementation

6.   Worden deze plannen uitgevoerd? Zo ja, hoe?

*Translated questions can be found in the fourth column of the operationalizations in Appendix 3.

5.2. Final interview guide

Introductie
1.   Zou u zichzelf kunnen voorstellen?
2.   Wat is uw functie aan de RU? En wat houdt deze in?

Knowledge retention
Individual members:
2.   Er werken veel mensen in de FSW en in het TLC. Op welke manier beschikken deze mensen over kennis over online onderwijs?
3.   Op het moment dat zij de organisatie verlaten, is er dan goed beleid om contact te houden?
4.   Zijn er trainingen voor werknemers om vaardigheden te ontwikkelen t.a.v. online onderwijs? Zo ja, welke trainingen zijn er? (HR: Training and development)

Organisational roles and structure
5.   Is de huidige werkvorm erg gericht op samenwerken? Zou u daar een voorbeeld van kunnen noemen? (HR: Job design)
6.   Gebeurt dit ook tussen junior en senior medewerkers? Zo ja, op welke manier? (HR: Job design)
Standard operating procedures and practices
8.   Op het moment dat de werknemers taken uitvoeren zijn er dan standaard procedures om kennis op te slaan, die je moet doorlopen?
Cultuur
9.   Heerst een sfeer dat kennis over online onderwijs als waardevol wordt gezien? Waar merkt u dat aan? (KRS: decision making)
10.   Hoe omschrijft u de cultuur in de FSW/het TLC?
11.   Is er gelegenheid voor ongeplande interactie om zo kennis verder te ontwikkelen?
Physical structure of workplace
12.   Hoe ziet uw fysieke werkplek eruit op het moment dat u op de campus werkt?
13.   Wordt er op dit moment samengewerkt in digitale ruimtes?

IT applicaties
Availability of IT applications
1.   Worden er technische systemen gebruikt om kennis over online onderwijs op te slaan? Zo ja, welke?
Bent u bekend met de Brightspace pagina van FSW/de site van het TLC?
3.   Zijn de technische systemen makkelijk om mee te werken? Zo ja/nee, waar zit dat in?
Willingness to use IT applications
4.   Zijn werknemers snel bereid om kennis te codificeren? Zo ja of nee, waaruit blijkt dat?
5.   Op het moment dat werknemers kennis opslaan. Maken andere werknemers gebruik van deze IT systemen om te zoeken naar informatie?

HR, processes, and practices
Reward and compensation systems
1.   Zit het in iemands takenpakket om te doen aan kennisbehoud? Zo ja, bij wie?
Doorvraag: Wiens taak zou het moeten zijn om te doen aan kennisbehoud?
2.   Wordt hieraan werken uitbetaald of beloond?
Performance appraisal systems

3.   Wordt bij evaluatiegesprekken gevraagd hoe men bijdraagt aan kennisbehoud? Dus op welke wijze je hebt bijgedragen aan het verder ontwikkelen van de universiteit door als persoon ervaringen van jezelf of op grotere schaal te verzamelen?

<u>Training and development</u>

4.   Zijn er mogelijkheden om je te ontwikkelen binnen je taak? En zo zelf meer ervaring op te doen over online onderwijs? Zo ja, voorbeeld?

5.   Welke mogelijkheden zijn er om op het gebied van carrière een ontwikkeling door te maken? Zo ja, voorbeelden?

Knowledge retention strategy

<u>Decision-making</u>

1.   Is er aandacht voor de risico's van het niet opslaan van de huidige ervaringen over online onderwijs?

<u>Planning</u>

3.   Is er een plan om kennis over online onderwijs te behouden (binnen het TLC of FSW)?

Zo nee, dan hier stoppen met dit onderwerp.

4.   Wat houdt dit plan in grove lijnen in? Staat duidelijk welke kennis behouden dient te worden?

5.   Is er een idee hoe dit in de praktijk dan zou worden uitgevoerd?

<u>Implementation</u>

6.   Worden deze plannen uitgevoerd? Zo ja, hoe?

1.   Hoe zou u een RU-medewerker omschrijven? Welke karaktereigenschappen beschikt een dergelijk persoon? (Job staffing)

*Translated questions can be found in the fourth column of the operationalizations in Appendix 3.

6. Sessions joined orientation phase

Name	Date	Description	Duration
Lessons learned COVID	26-01-2021	Support staff meeting to gather lessons learned from the COVID period about 1) structure and organization, 2) Involve and activate students, 3) interaction between students, 4) interaction lecturer and students, 5) interaction student and content, 6) feedback and reflection, and 7) community, social and academic bonding.	13.30-14.30
Inspiration session: One year TLC	28-01-2021	This was a meeting for support staff, teachers, and everyone with a heart for education. Employees could share experiences about how things can be done better in the upcoming years and how TLC can support the improvement of education.	16.00-17.00
Meeting lecturer professionalization and embedding lessons learned	23-02-2021	This was a meeting with the support staff about lecturer professionalization and how to display the lessons learned from the last meeting.	13.00-14.00
TLC meeting 'Changing thoughts on lessons learned from COVID time	26-03-2021	This was a meeting with members of TLC about collecting, bundling, and sharing lessons learned from the COVID period. It is a select group that is working on this project. In the meeting, employees work on a plan and decide about the priorities.	13.00-13.45
Appointment project leader plan lessons learned	23-04-2021	This meeting was a one-on-one conversation via zoom about the project by the TLC to gather lessons learned from the COVID period.	10.00-11.00

7. Codelists

7.1. Initial code list

Knowledge retention
1. Storage of critical knowledge
    a. Storage by individuals
    b. Storage by roles and organizational structures
    c. Storage by standard operating procedures and practices
    d. Storage by culture
    e. Storage by physical structure of workplace
2. Accessibility of critical knowledge
    a. Accessibility by individuals
    b. Accessibility by roles and organizational structures
    c. Accessibility by standard operating procedures and practices
    d. Accessibility by culture
    e. Accessibility by physical structure of workplace

IT applications
1. Availability of IT applications
    a. Application of IT tools
    b. Utilization of intranet/internet
    c. Ease of use of IT tools
2. Willingness to use IT applications
    a. Willingness to codify
    b. Willingness to search IT tools

HR, processes, and practices
1. Staffing
    a. Shared norms and values within organization
    b. Match norms and values of individuals
2. Job design
    a. Team-based working
    b. Junior and senior employees mixed
3. Performance appraisal systems
    a. Evaluation of employees performance with respect to knowledge retention
4. Reward and compensation systems
    a. Involvement in knowledge retention recognized
    b. Involvement in knowledge retention rewarded
5. Training and development
    a. Availability of opportunities to learn during work
    b. Availability of career advancement

Knowledge retention strategy
1. Decision-making
    a. Awareness risk of losing knowledge
    b. Decision-making whether and what level knowledge retention
2. Planning
    a. Availability knowledge retention plan
    b. Content of plan with respect to what knowledge retained
    c. Content of plan with respect to how knowledge retained
3. Implementation
    a. Scale at which plan executed

b. Extent to which plan executed

7.2. Final code list

<u>Knowledge retention</u>
3. Storage of critical knowledge
    a. Storage by individuals
        i. Experience from past job
        ii. Experience teacher-student feedback
        iii. Long time employee
    b. Storage by roles and organizational structures
    c. Storage by standard operating procedures and practices
    d. Storage by culture
    e. Storage by physical structure of workplace
4. Accessibility of critical knowledge
    a. Accessibility by individuals
        i. Focus on what inside uni, instead of what leaves
        ii. Start for new member
    b. Accessibility by roles and organizational structures
    c. Accessibility by standard operating procedures and practices
    d. Accessibility by culture
        i. Crisis situation
        ii. Event canceled due to COVID
        iii. Lack of connecting with colleagues
    e. Accessibility by physical structure of workplace
        i. Working from home

<u>IT applications</u>
3. Availability of IT applications
    a. Application of IT tools
        i. Active maintenance IT tool
        ii. Impact knowledge from IT tools
        iii. Not knowing what available online
        iv. Too much IT options
        v. Whether IT application can be found
    b. Utilization of intranet/internet
    c. Ease of use of IT tools
        i. Easiness to codify
        ii. Easiness to search IT tool
    d. Usefulness IT tool
4. Willingness to use IT applications
    a. Willingness to codify
        i. Time to codify knowledge
    b. Willingness to search IT tools
        i. Time to search IT tools

<u>HR, processes, and practices</u>
6. Staffing
    a. Shared norms and values within organization
    b. Match norms and values of individuals
7. Job design
    a. Team-based working
        i. Connection TLC TIP
        ii. Interaction support staff teachers
        iii. Interaction teachers
        iv. Knowing existence TLC

       v. Teacher TLC interaction
      vi. TIP teachers interaction
     vii. Working individually
   b. Junior and senior employees mixed
     i. Large and varied workforce
8. Performance appraisal systems
   a. Evaluation of employees performance with respect to knowledge retention
9. Reward and compensation systems
   a. Involvement in knowledge retention recognized
   b. Involvement in knowledge retention rewarded
10. Training and development
   a. Availability of opportunities to learn during work
     i. Announcement training
     ii. BKO-trajectory
     iii. Development training courses
     iv. Facilitation training
     v. Planning training
     vi. Topic training
     vii. Training in English
   b. Willingness to join training
     i. Time to join training
     ii. Easiness joining training
   c. Availability of career advancement

Knowledge retention strategy
4. Decision-making
   a. Awareness risk of losing knowledge
     i. No need for storage because keep doing
   b. Decision-making whether and what level knowledge retention
     i. Example bad practice
     ii. Example good practices COVID years
   c. No decision-making yet
5. Planning
   a. Availability knowledge retention plan
     i. No time yet to think about future
   b. Content of plan with respect to what knowledge retained
   c. Content of plan with respect to how knowledge retained
   d. Development plan
6. Implementation
   a. Scale at which plan executed
   b. Extent to which plan executed

Type of knowledge
1. Blended learning as topic
2. Face-to-face education as topic
3. Online education as topic

Sharing knowledge
1. Sharing knowledge
2. Sharing knowledge between teachers

Actors in organization
1. Board of directors RU

2. RU
3. Vice-deans
4. Career service
5. Digital examination
6. TLC
    a. Role TLC
7. Core team TLC
8. Coordinator TLC support staff
9. Support staff
    a. Role support staff
10. Education coordinator
    a. Role education coordinator
11. Faculty board
12. FSR
13. FSS
14. ICTIO
15. Lecturer ambassadors
    a. Role lecturer ambassador
16. OLC
17. TIP
18. Study program A
19. Study program B
20. Study program C
21. Study program D
22. Study program E
23. RCSW
24. Teachers