KCV Schriftenreihe

Band 6

Christina Benita Wilke / Monika Wohlmann (Hrsg.)

Challenges for Nursing Schools due to Digitalisation

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Eva Großpietsch

KCV KompetenzCentrum
für angewandte Volkswirtschaftslehre
der FOM Hochschule für Oekonomie & Management

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KCV Schriftenreihe der FOM, Band 6

Essen 2022

ISBN (Print) 978-3-89275-296-7 ISSN (Print) 2701-9403
ISBN (eBook) 978-3-89275-297-4 ISSN (eBook) 2701-9411

Dieses Werk wird herausgegeben vom KCV KompetenzCentrum für angewandte Volkswirtschaftslehre der FOM Hochschule für Oekonomie & Management gGmbH

Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliographie; detaillierte bibliographische Daten sind im Internet über http://dnb.d-nb.de abrufbar.

MA Akademie Verlags-
und Druck-Gesellschaft mbH
Leimkugelstraße 6, 45141 Essen
info@mav-verlag.de

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Preface by the Editors

The sixth volume of our publication series of the KCV Competence Center of Applied Economics at the FOM University of Applied Sciences examines the impact of digitalisation on education and, in particular, the impact on nursing schools, which are a key driver to meet challenges of demographic change or the lack of skilled nurses. This study is based on a Master's thesis, which was supervised by Professor Dr. Alexander Spermann. We thank him for his valuable advice for the preparation of this study.

The KCV bundles the research activities of academics working at the FOM in the field of economics and therefore covers a broad spectrum from micro- to macroeconomic research as well as from theoretical to empirical research. In addition to selected research papers by FOM professors and lecturers as well as our FOM students, this series also includes contributions on current social issues, which we explain using economic theories and models in a generally understandable way for interested readers from politics, science, and practice (cf. the first volume on the economic effects of the Covid-19 pandemic). This series also intends to provide a forum for discussion: The contributions cover the plurality of economics as a science. Each contribution represents the opinion of the author and does not in principle reflect the opinion of the editors or the university.

Demographic change and digitalisation are two of the megatrends that are currently challenging society. The (long-term) care sector is largely affected by both. In times of scarce labor supply, nursing schools play an essential role in contributing to a well-qualified workforce. The training of nursing staff, which in Germany takes place as a dual training in hospitals and nursing schools, is therefore an important component in combating the shortage of nursing staff. At the same time, increasing digitalisation is changing professional and everyday life – a challenge that nursing schools also have to face. This raises the question, on the one hand, of the extent to which the content of training must be adapted to increasing digitalisation in the healthcare sector and, on the other, whether the way of teaching must be adapted to new forms of learning.

This volume examines the state of digitalisation in nursing schools and critically reflects on the future possibilities and opportunities of further digitalisation. The status quo of digitalisation in nursing schools is captured via an online survey of nursing schools. This general overview is then supplemented by an expert survey at a selected nursing school to gain a deeper insight. Although nursing schools have also experienced a digitalisation boost in the wake of the Covid-19-related

school closures, the results show that several challenges remain to be overcome in the digitalisation process.

Essen, August 2022

Prof. Dr. Christina Benita Wilke
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Abstract

This study analyses the impact of digitalisation on nursing schools. The phenomenon of digitalisation is going to reach every domain of human life – the private and the professional. This is also evident for the (long-term) care sector and its nursing schools. In this growing industry the relevance of nursing schools increases by being a key driver to meet challenges like the demographic change or lack of skilled nurses. In 2020, during the first Covid-19 restrictions, nursing schools, like other schools, had to find solutions to continue teaching. While general schools attracted much more public attention with their attempts to replace traditional teaching, nursing schools were given the same attention. Therefore, an online survey was conducted with more than eighty nursing schools attendants to find out the status quo of digitalisation. It is fair to say that most of them enabled remote learning via online class. However, it seems that the use of digital technologies and methods is still limited to that. A case study concerning an education company with seven nursing schools in North Rhine-Westphalia confirms that the technical infrastructure is only one prerequisite to digitalising classes. Furthermore, the employees and, in particular, teachers have to obtain and develop knowledge in using. This should not be restricted to the teaching and learning part of it but should also include the preparatory work and follow-up of classes. In addition, the corresponding administration processes have to be digitalised as well. At the time of writing this publication, in July 2021, more than one year after the first lockdown, many nursing schools still seem to be at the very beginning of the digitalisation process, despite of the boosting effect by the Covid-19 restrictions.

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List of Abbreviations

AAL	Ambient Assisting Living
ADM	Arbeitskreis Deutscher Markt- und Sozialforschungsinstitute e.V.
apm	Akademie für Pflegeberufe und Management GmbH
ASI	Arbeitsgemeinschaft Sozialwissenschaftlicher Institute e. V
BA	Bundesagentur für Arbeit
BGW	Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrts pflege
Bibb	Bundesinstitut für Berufsbildung
BMBF	Bundesministerium für Bildung und Forschung
BMFSFJ	Bundesministerium für Familie, Senioren, Frauen und Jugend
BMG	Bundesministerium für Gesundheit
BMWi	Bundesministerium für Wirtschaft und Energie
bpa	Bundesverband privater Anbieter sozialer Dienste e. V.
BVDW	Bundesverband Digitale Wirtschaft e.V.
BVM	Berufsverband Deutscher Markt- und Sozialforscher e. V.
BWP	Berufsbildung in Wissenschaft und Praxis
CAWI	Computer-assisted web interview”
CNE	Certified Nursing Education
DAA	Deutsche Angestellten Akademie
DGOF	Deutsche Gesellschaft für Online-Forschung e. V
DW	Deutsche Welle
EU	Europäische Union
FAZ	Frankfurter Allgemeine Zeitung
GDM	Gesellschaft für Didaktik der Mathematik
GWS	Die Gesellschaft für Wirtschaftliche Strukturforschung mbH
HMD	Handbuch der maschinellen Datenverarbeitung
IAB	Institut für Arbeitsmarkt- und Berufsforschung

IAQ	Institut Arbeit und Qualifikation
ICT	Information and communication tool
IZA	Institut zur Zukunft der Arbeit
MAGS	Ministerium für Arbeit, Gesundheit und Soziales des Landes Nordrhein-Westfalen
OECD	Organisation for Economic Cooperation and Development
PfBRefG	Pflegeberufereformgesetz
PflAFinV	Pflegeberufe-Ausbildungsfinanzierungsverordnung
PflBG	Pflegeberufegesetz
SGB	Sozialgesetzbuch
WDR	Westdeutscher Rundfunk
Wiwo	Wirtschaftswoche
ZEW	Zentrum für Europäische Wirtschaftsforschung
ZQP	Zentrum für Qualität in der Pflege

About the Editors

Prof. Dr. Christina Benita Wilke has been Professor of Economics at the FOM University of Applied Sciences since 2016. She is also Head of Academic Studies at the FOM University Center Bremen and Scientific Director of the KCV Competence Center of Applied Economics. Previously, she worked as a senior researcher and managing director at the Mannheim Research Institute for the Economics of Ageing (MEA) as well as senior expert and managing director of the Bremen branch of the Hamburg Institute of International Economics (HWWI). Her research focuses on demographic change, social and labour market policy and health economics.

Prof. Dr. Monika Wohlmann has been Professor of Economics at the FOM University of Applied Sciences in Düsseldorf since 2014 and is Scientific Director of the KCV Competence Center of Applied Economics. After studying business administration at the University of Passau and the University of Málaga, she earned her doctorate in economics at the Ibero-America Institute of the University of Göttingen. She then worked as an economist at a major German bank for several years. Her research focuses on monetary policy and financial markets.

About the Author

Eva Großpietsch studied Modern History, Politics and Education at the University of Cologne. She worked at the German Economic Institute (IW) in Cologne and became a member of the Management Board at the Akademie für Pflegeberufe und Management, a private company with nursing schools in now six federal states, in 2012. In 2018, she began her MBA studies at FOM University of Applied Sciences in Cologne. Beside her management job she is responsible for the implementation and improvement of the digitalisation process in the apm nursing schools.

1 Introduction

Digitalisation and nursing schools – two words, two worlds? One meaning of digitalisation is the technical transformation of the conventional way of information and communication.[1] Within the German dual training system nursing schools are vocational schools and responsible for the theoretical training. They collaborate with care providers, which conduct the practical part.[2] This study will explore how both terms fit together.

1.1 Problem and Background

The first Covid-19-related school closure in 2020 seems to be a turning point in time for any kind of schools. Traditional classes could not be continued and alternatives had to be found to keep daily business running. Distance or remote learning, supported by online tools, was one possibility which had to be introduced quickly. Digitalisation was also implicated in domains where (mobile) devices were usually not, or just very rarely, part of the lessons. However, the public attention focused mainly on general schools and their efforts to replace in-person teaching. Nursing schools, which were also affected by the lockdown, had to tackle these challenges, too. This study will analyse the digital status quo in nursing schools and what this development means to them.

First, the author elaborates what digitalisation means in nursing schools. It could stand for:

1. Digitalisation of the learning environment
2. Digitalisation of school administration processes
3. Digitalisation of teaching contents, respectively care contents

All topics are equally important, but they might not be equally pressing. Due to the Covid-19 lockdown nursing schools were forced to focus on the first one: Digitalisation of the learning environment. But the necessity for a technical change became evident earlier. Schools have to overcome the challenge of a changing learning environment to acquire new students. This environment should meet the students' needs: it has to be individual, contemporary and fit in with their daily lives.[3] This could mean the use of mobile devices in order to get new information or exchange knowledge with others. The use of digital tools during and in addition to lessons could be an appropriate measure to motivate existing and attract new

1 Cf. Gabler Wirtschaftslexikon, Digitalisierung; BMWi, Control (2020).
2 Cf. Pflegeausbildung.net, Voraussetzungen.
3 Cf. Telekom Stiftung, Kinder (2020); Dietrich, S., Herr, M., Begriff (2003), p. 2.

students. Due to the school closure in 2020 and 2021 it has become an indispensable prerequisite.

Apart from the learning environment the digitalisation also extends to the administration processes. Due to increasing requirements in regards to quality assurance, efficiency and productivity, nursing schools have to save costs und be efficient. They have to optimise their processes, e. g. with digital tools for school management, teachers and administration.

The third topic, “digitalisation of teaching contents”, deals with the fact that jobs in the care sector are also affected by digitalisation and that nursing schools have to prepare their students for these jobs. Currently, several studies show that digitalisation in the nursing sector is still in an early stage.[4] That means that this topic does not seem to be very pressing. If the care sector is not prepared for digitalisation, schools will have difficulties to be the driving element. It does not seem to make sense to educate trainees in digitalisation if there is no practical use. However, a lack in developing and teaching digital care contents might be a strategic risk as this situation is going to change in future.[5]

Therefore, the digital transformation cannot start in one field disregarding other domains as they are closely linked. If teachers are not used to working with a mobile device they cannot show how an electronic care record works. Digital teaching conflicts with analogue administration. In the course of this publication it will be examined what level of digitalisation nursing schools achieved in which domain and which challenges they have to tackle in this context.

1.2 Approach

The purpose of this study is to identify the challenges of digitalisation for German nursing schools. Therefore, the study consists of the following sections. The first two sections address the topics “Digitalisation and schools” and “Long-term care”. The third chapter includes an evaluation of the digitalisation level of nursing schools in Germany. The last chapter is a deep dive of a case study regarding an education company with seven nursing schools in North Rhine-Westphalia.

Starting with the definition of digitalisation in general, the opportunities and risks of digitalisation are discussed as well as digitalisation in schools. The “Digitalpakt Schule” – a measure by the federal government and states financing the digital

4 Cf. BVDW, Pflege (2017); DAA-Stiftung, Digitalisierung (2017); ZQP, Pflege (2019).
5 Cf. Meißner, A. et al., Vorwort (2021), p. 13-15; Trübswetter, A., Digitalisierung (2019), p. 343-345.

infrastructure of schools – underlines that politicians also confirm the need to push digital transformation in schools.

The next step includes a close look at the care sector with its structure and financing as well as its opportunities and risks and the current level of digitalisation. As a detailed examination of the whole healthcare sector would go beyond the scope of this publication, the focus lies on long-term care. As a special form of vocational school nursing schools are also part of the care sector due to their funding background.[6] In some federal states, they are not supervised by the education ministry but, contrary to other vocational schools, by the ministry for health.

In order to investigate at which digitalisation level these schools currently are and whether they have to overcome similar obstacles and challenges as general schools,[7] principals of German nursing schools were interviewed via an online questionnaire.

Furthermore, a case study concerning an education company with seven nursing schools in North Rhine-Westphalia shall point out the challenges of digital transformation in detail. Five experts were interviewed and asked for their assessment regarding the development and future of digitalisation at these nursing schools.

6 They are financed by hospitals, (partial) stationary and ambulatory long-term care providers, by the federal states and by the long-term care insurance (see chapter 4.4.3).

7 See chapter 3.3.3.

2 Methodology

The methodology of this study contains different approaches. The sections “Digitalisation and schools” and “Long-term care in Germany” are based on a desk research. The main selection of literature is presented in the next two chapters. The following chapter, “Digitalisation at German nursing schools”, is based on an online survey as a quantitative method and the chapter “Digitalisation at an education company in North Rhine-Westphalia” is based on expert interviews as a qualitative method.

2.1 Desk Research: Digitalisation and Schools

The phenomenon of digitalisation is discussed and explored in different contexts. It relates mostly to industry as “industry 4.0” and refers to the development of automation, Internet of Things, e-commerce and many more. It seems to be a phenomenon of the English language as there is no specific translation in German for “digitisation”. To explain the difference between digitalisation and digitisation (and digital transformation) contributions by Jason Bloomberg[8] and Dobrica Savic[9] are used.

The topic of this study focuses on digitalisation in nursing schools. However, apart from a published study by Angelika Trübswetter and Lina Figueiredo considering a mixed-method approach by interviewing 8 experts and 147 trainees in order to assess the status quo of digitalisation in nursing training, literature concerning this topic is very limited.[10] There is more information about digitalisation in other domains of education, such as general schools, vocational schools and adult education. In their essay about digital media and adult education, Matthias Rohs and Mario Ganz describe the development of these areas.[11] The status quo since the first Covid-19 lockdown is reported in several media such as news, magazines and journals.[12] A variety of studies about the implementation of distance learning examine the situation in general schools in 2020 and 2021, conducted e.g. by the “Westdeutscher Rundfunk” (WDR),[13] Robert-Bosch-Stiftung[14] and

8 Cf. Bloomberg, J., Digitization (2018).
9 Cf. Savic, D., Digitization (2019).
10 Cf. Trübswetter, A., Figueiredo, L., Digitalisierung (2019).
11 Cf. Rohs, M., Ganz, M., Media (2016).
12 Cf. E. g. Wiwo.de, Bildung, 2020; Tagesschau, Digitalisierung (2020).
13 Cf. WDR, Umfragen (2020).
14 Cf. Forsa, Schulbarometer (2020).

Georg-August-Universität Göttingen.[15] Furthermore, the Organisation for Economic Co-operation and Development (OECD) regularly publishes a report about education innovation and research.[16]

In order to describe what a digital school or class could look like, Stefan Dietl and Markus Hennecke released a publication about the digital transformation in vocational training.[17] They listed some examples of vocational trainings and schools which use various digital tools for students, teachers and school administration tools. The contribution by Helmut Niegemann focuses on challenges and opportunities of digitalisation in vocational education.[18]

2.2 Desk Research: Long-term Care in Germany

The description of the structure of the long-term care sector is based on monographs by Beate Land[19] and Michael Simon[20] as well as on a publication by a group of authors around Melanie Arntz.[21]

The data used in “Opportunities and risks” are mainly taken from the Federal Ministry for Economic Affairs and Energy[22] as well as from the Federal Statistical Office.[23]

Besides Meiko Merda et al.,[24] Chaloner Chute and Tara French[25] wrote about “Care 4.0”. Digital technologies in practical use are specifically described in the publication by Anne Meißner and Christophe Kunze.[26] Patrick Fehling presents several projects about digital technologies sponsored by BMWi.[27]

15 Cf. Mußmann, F. et al., Digitalisierung (2021).
16 Cf. Fernández-Macías, E., Education (2016).
17 Cf. Dietl, S., Hennecke, M., Ausbildung (2019).
18 Cf. Niegemann, H., Introduction (2020).
19 Cf. Land, B., Gesundheitssystem (2018).
20 Cf. Simon, M., Gesundheitssystem (2017).
21 Cf. Arntz, M. et al., Care (2006).
22 Cf. BMWi, Pflegewirtschaft (2021); BMWi, Gesundheitswirtschaft (2019).
23 Cf. Statistisches Bundesamt, Bevölkerung (2019); Statistisches Bundesamt, Wandel (2020).
24 Cf. Merda, M. et al., Pflege 4.0 (2017).
25 Cf. Chute, C., French, T., Care 4.0 (2019).
26 Cf. Meißner, A., Kunze, C., Vorwort (2021).
27 Cf. Fehling, P., Entwicklungsstand (2019).

2.3 Questionnaire-based Online Survey

The fourth chapter, “Digitalisation in nursing schools”, is based on a quantitative method. As the objective is to identify the level of digitalisation at nursing schools and whether they are confronted with the same problems as general schools,[28] the approach was to interview principals of nursing schools. The interview tool is a standardised online survey, which is a special form of written surveys via internet – the so-called “computer-assisted web interview” (CAWI). The number of online surveys in research has grown due to the fact that it is very economical, fast and efficient. [29] It is independent from temporal and spatial limits. Every addressee is contacted at the same time and asked the same question and data are immediately available.[30] To conduct the survey, the program “SoSci” was used.[31] Online programs simplify the questioning a lot: They support generating the questionnaire and directly consolidate the responses of the interviewees.[32] The approach has to correspond to quality criteria. The survey has to be reliable, valid and objective, respectively traceable (as a person’s appraisals are usually subjective).[33]

This method is useful if the target group is specific and available via internet. In this case the target group is nursing schools; nearly each one has access to the internet as they usually have an own website. Therefore these criteria are fulfilled.[34]

Concerning the type of questions, closed questions are recommended as their answers can be better compared than those of open questions.[35] Each question is formulated simply and short, without specific terms. Answers were mainly given by multiple choice and simple yes- and no-answers. Reliable and valid questions are necessary in order to receive usable responses.[36] The aim is that participants

[28] Many general schools still have difficulties to establish distance learning via digital tools (see chapter 3.2.3).
[29] Cf. Möhring, W., Schlütz, D., Befragung (2019), p. 140-141; Wagner-Schelewsky, P., Hering, L., Online-Befragung (2019), p. 787-789.
[30] Cf. Wagner-Schelewsky, P., Hering, L., Online-Befragung (2017), p. 788-789.
[31] Cf. www.soscisurvey.de.
[32] Cf. Möhring, W., Schlütz, D., Befragung (2019), p. 142; Wagner-Schelewsky, P., Hering, L., Online-Befragung (2019), p. 794.
[33] A comprehensive test of these criteria would go beyond the scope of this study. For more details see Möhring, W., Schlütz, D., Befragung (2019), p. 19-21; Häder, M., Sozialforschung (2015), p. 103-110.
[34] Cf. Möhring, W., Schlütz, D., Befragung (2019), p. 140-141; Wagner-Schelewsky, P., Hering, L., Online-Befragung (2019), p. 787-789.
[35] Cf. Möhring, W., Schlütz, D., Befragung (2019), p. 119.
[36] Cf. Möhring, ibid., p. 69.

understand the questions and can respond without much effort.[37] Therefore, the questions and answers are adapted as much as possible to the specific environment of nursing schools.

The layout and structure of the questionnaire are highly affecting the willingness of participation.[38] As recommended, the questionnaire is divided into sections.[39] The first section is about general school data such as the type of school, location and product portfolio. The second section includes the digital infrastructure and processes whereas the last section focuses on the digitalisation of classes. The layout is predefined by the program, which guarantees a comfortable completion of the form: One question per page with a progress bar and the automatic control including automatic filters and reminders referring to missing answers.[40]

Before the real test starts a pretest is necessary in order to check the technical and content-related quality.[41] Five persons were asked to fill out the form and leave comments for improvement. After revision of the questionnaire the survey could start.

The addresses of schools are listed on a website hosted by the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth. There are about 1,200 schools listed.[42] 450 randomly selected schools in Germany in sixteen Federal States were asked via e-mail from 27/02/2021 to 13/03/2021. Each school contacted received an e-mail including a link to the online questionnaire. Due to the fact that most surveys are done online[43] one might assume that there is a low inhibition to answer. The mail does not contain personal data such as names, hence concerns about data security or missing anonymity do not exist. The cover letter refers clearly to the voluntariness to participate.[44]

In many cases of samples a possible source of error is the problem of self-recruitment. There are several obstacles for participants in surveys: Getting to the questionnaire, the decision to participate in the survey and possibly additional costs (such as provider fees, but this can be probably ignored due to flat rates). As the quality of a survey increases with a higher number of valid responses,

37 Cf. Möhring, W., Schlütz, D., Befragung (2019), p. 19.
38 Cf. Wagner-Schelewsky, P., Hering, L., Online-Befragung (2019), p. 788-789.
39 Cf. ibid., p. 815.
40 Cf. ibid., p. 794, 788-789; Möhring. W., Befragung (2019), p. 142
41 Cf. Möhring, W., Schlütz, D., Befragung (2019), p. 181-182.
42 Cf. Pflegeausbildung.net, Übersicht.
43 Cf. Wagner-Schelewsky, P., Hering, L., Online-Befragung, 2017, p. 787; based on ADM, Jahresbericht, 2017, p. 15; confirmed by ADM, Jahresbericht (2019), p. 14.
44 Cf. Corresponding to the guidelines for online surveys (ADM et al., Richtlinie, 2021).

drop-outs or breakoffs should be avoided. To increase the willingness to participate in and finish the survey, predominantly two factors play a role: the topic as well as the duration to answer the questionnaire. In this case the completion takes about 10-15 minutes, as recommended.[45]

In total, 116 responses returned, 85 interviews were finished and could be used for the evaluation. Finally the data cleansing followed, which has to be done in case of inconsistent statements. An Excel spread sheet is used for consolidation purposes, adjustments and the final evaluation.[46]

2.4 Case Study Based on Expert Interviews

A case study is a comprehensive research strategy to analyse a unit – a case – within its internal structure and environmental relations.[47] The case study in chapter 6 is based on a qualitative method whereas five experts were asked to give an interview. These experts are members of the same enterprise but represent different functions and responsibilities. The questionnaire consists of five open questions about infrastructure, digital methods and technologies as well as the success and challenges in the digitalisation process. The intention was to assess the status of digital development of this education facility and to identify obstacles.

The first step was to work out the questionnaire in order to generate data. It is also the transition of research questions and theoretical assumption into interview questions. Furthermore, it has the function of a guideline and structures the interview.[48] An introductory “ice-breaker” enables the interview partner to get into the interview situation.[49] Structuring questions guide the expert to the different sections throughout the interview.[50]

The following criteria were used to identify potential experts for the interview: Who has relevant information? Who is suitable to give precise information? Who is willing and available to share this information?[51] The interviews were held in a

45 Cf. Wagner-Schelewsky, P., Hering, L., Online-Befragung (2019), p. 793.
46 Cf. ibid., p. 794.
47 Cf. Hering, L., Jungmann, R., Einzelfallanalyse (2019), p. 619, based on Yin, R., Case study (2014).
48 Cf. Kaiser, R., Experteninterviews (2014), p. 52.
49 Cf. ibid., p. 63-64.
50 Cf. ibid., p. 65; for further details about interview questions see: Kaiser, R., Experteninterviews (2014), p. 68.
51 Cf. ibid., p. 72, based on Gläser, J., Laudes, G., Experteninterviews (2006), p.113; for the choice of the expert see chapter 6.2.1.

flexible and unbureaucratic manner by using the guideline as boundary.[52] As all experts are well known to the author the interview situation was comfortable and relaxed.

Both the analysis and interpretation of the interviews are based on the approach of Kaiser.[53] He developed a guideline, which follows the technique of Mayring in a simplified way. Mayring developed a method called "qualitative content analysis".[54] It includes a procedure for a qualitatively oriented analysis to evaluate texts, which are collected in the context of social science research.[55] Its main characteristic is the forming of categories. By using such categorial system the material has been analysed and the text passages that refer to the categories were considered.[56] Various qualitative-content analytical techniques exist, such as the deductive and inductive approach. In this case the inductive forming of categories is used, which means generating the categories according to the evaluated text passages.[57]

Whereas Mayring's model can also be used for other texts, which are collected in the context of social science research such as standardised surveys, field studies, records and more,[58] this very comprehensive model was reduced by Kaiser who adapted this model especially to expert interviews.[59] Kaiser's approach also contains the main tools such as summary, explication and structuring, but does not consider the analysis regarding the situation of development and mode of action. His concept also comprises the inductive forming of categories.[60]

The documented interviews are based on detailed notes taken during the interview and the comprehensive minutes recorded directly after the interview. The advantage of this approach is that impressions, which cannot be secured by an electronic recording, are documented, e. g. the social interaction or visual impressions. Otherwise, parts of the conversation get lost.[61]

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52 Cf. Kaiser, R., Experteninterviews (2014), p. 83, based on Meuser, M., Nagel, U., Experteninterviews (2005), p. 269.
53 Cf. Kaiser, R., Experteninterviews, 2014.
54 Cf. Mayring, Inhaltsanalyse (2015); Mayring, P., Fenzl, T., Inhaltsanalyse (2019).
55 Cf. Mayring, P., Fenzl, T., Inhaltsanalyse (2019), p. 633.
56 Cf. ibid., p. 634.
57 Cf. ibid., p. 637.
58 Cf. ibid., p. 633.
59 Cf. Kaiser, R., Experteninterviews (2014), p. 90-91.
60 The other way is deductive approach when the categories are already formed (Cf. Kaiser, R., Experteninterviews, 2014, p. 91).
61 Cf. Kaiser, R., Experteninterviews (2014), p. 93-94.

Due to the scope of questions, in this case memory minutes are supposed to be sufficient. After finalising the minutes, statements were consolidated and translated as the conversation took place in German language. Thereafter the results were evaluated and discussed by each category.

3 Digitalisation and Schools

As stated in several publications digitalisation is a phenomenon, which is going to affect every domain of human life.[62] And there are some variations and definitions and also similar terms, such as automation. This chapter will point out the different meanings. After the general introduction to digitalisation the application on an educational context will follow. To describe the status quo of digitalisation in schools the German school landscape will be described. As there is only little literature about digitalisation in nursing schools the situation in other schools will be analysed. In addition, a scenario will be created to show how a digitalised school could look. In this context the "Digitalpakt Schule" has to be mentioned, a funding programme by the government and the federal states with the aim to push the digital transformation in schools.

3.1 Digitalisation, Digital Transformation, Digital Education

There are different varieties of the terms and also different applications. Digitalisation and digitisation are often used synonymously, but there are also opinions that a difference between the two terms exists. The term digitisation can be understood as a part of digitalisation. It refers to the change of analogue information to digital, which can be read by computers for further processing.[63] An example could be writing e-mails instead of letters.

The term "digitalisation" as used in this study could be understood as a complete shift from an analogue process to a digital one. This relates to the work as well as to leisure domains such as the whole storing of information in a software data container instead of using paper filing. Machines are able to read information and, furthermore, to understand, to react to and to forward them. The term "digital revolution" refers to the general shift to the digital age.[64]

An additional term is often mentioned in same context: automation. It is also a process which started in the 1970s.[65] The introduction of digital electronic and information technologies enable further automation of production processes.[66]

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62 Cf. BMWi, Control (2020); Fernández-Macías, E., Automation (2018), p. 1.
63 Cf. Bloomberg, J., Digitization (2018); Savic, D., Digitization (2019).
64 Cf. Gabler, Digitialisierung; Bloomberg, J., Digitization (2018); Vogler-Ludwig, K., et al., Arbeitsmarkt (2016), p. 73; Wolf, T., Strohschen, J.-H., Digitalisierung (2018), p. 58; Savic, D., Digitization (2019).
65 Cf. Spermann, A., Auswirkungen (2019), p. 112.
66 Cf. Wolter, M. I. et al., Industrie (2015), p. 9.

Digital transformation does not only include the implementation of digital technologies but it "requires cross-cutting organisational change to achieve a customer-driven strategic business transformation".[67] This means that an organisation transforms its business model: digital products and digital services, produced and supported by digital technology.

Digital education refers to the impact of digitalisation on education. The learning environment changes, just like the tools for teaching and interaction. This term includes technical aspects but also consequences for methodology, didactics and communication.[68] These consequences signify a change of the learning culture. For instance, knowledge is not anymore the "USP" of teachers. The students can use the internet via mobile devices and search for information. The teacher rather develops into a learning consultant.[69]

3.2 Digital Change in Schools

E-learning, blended learning, virtual classroom – there are developments of digital methods which can replace traditional lessons in classrooms at least partially. Mobile devices like mobile phones and tablet computers enable learning detached from time and place.[70] The Covid-19 pandemic seems to be catalyst for the implementation of digital classes. To continue the daily business, schools had to meet similar challenges: Build up an infrastructure with a platform, improve internet connectivity, provide mobile devices for teachers and students, hire staff to maintain the infrastructure, acquire know-how how to teach digitally etc.[71]

As education is a very unspecific term which includes every offer of teaching and learning with different structures, this study focuses on schools. As nursing schools are rarely in the focus of the media, studies etc., the current situation in general schools will be shortly evaluated.

3.2.1 School Landscape

The school landscape in Germany is complex and diverse. This is also due to the fact that each federal state is responsible for its education policy. There a different types and of schools in the 16 federal states. General schools comprise primary

67 Cf. Bloomberg, J., Digitization (2018); Savic, D., Digitization (2019).
68 Cf. Hischer, H., Bildung (2018), p. 10-13.
69 Cf. Apel, J., Apt, W., Lernen (2016), p. 68-69.
70 Cf. Fernández-Macías, E., Education (2016), p. 68.
71 Cf. DW, Corona (2020).

schools, secondary schools, schools for pupils with special educational needs, comprehensive schools and a few other types.[72]

The German Vocational Training System is mainly presented by the dual training system, i.e. a combination of theory and training embedded in the real-life work environment. Its main characteristic is the cooperation between companies and a publicly funded vocational school.[73] There are also vocational schools which prepare students for working life without a practical partner. The number of vocational schools does not take nursing schools into account.[74] In some federal states nursing schools are supervised by the health ministry instead of the Ministry of Education.

As listed in table 1 there are more than 30,000 schools with more than 8 million students in Germany. Approximately 8,000 vocational schools with 2,4 million students exist and about 1,700 nursing schools with 97,000 students.

Table 1: General Schools, Vocational Schools and Nursing Schools in Germany

Type of School	Number of Schools	Number of Students
General schools	32,228	8,380,767
Vocational schools	8,337	2,417,004
Nursing schools	1,740	96,867

Source: Statistisches Bundesamt, Allgemeinbildende Schulen, 2021; Statistisches Bundesamt, Berufliche Schulen, 2021

3.2.2 The History of Digitalisation in Schools

Digitalisation in education is mainly used for teaching and learning supported by digital media. E-learning is one form, which developed due to the technical development. During the 1980s the computer-based training started in a learning environment in which learning was based on passive learning models. When the web-based training began in the 1990s the learning models also changed from passive to more (inter)active ones. Then, internet-based e-learning started and

[72] Cf. Statistisches Bundesamt, Allgemeinbildende Schulen (2021).
[73] Cf. BMWi, Training (2017).
[74] Cf. Statistisches Bundesamt, Berufliche Schulen (2021).

interaction and social networking were needed. In 2005, when the e-learning boom declined, the process of learning with digital media changed. The development of the web 2.0 made more learning channels possible, such as social media. Now e-learning is understood as a training delivered on a device which enables individual learning in a synchronous and asynchronous form. It includes the offer of learning material and tasks, but also online courses and various learning constructs with guidance and assessments to define learning dispositions and acquired competences.[75]

3.2.3 The Status Quo in General Schools

German general schools do not appear to be a digitalised place.[76] "Digitalised" means e. g. the availability of notebooks and tablet computers with special learning and teaching tools for students and teachers, used in classrooms as well as at home. School closings, missed classes for weeks, getting tasks via (e-)mail or even by call during the first Covid-19 lockdown in spring 2020 and also in winter 2020/2021 show that a lot of schools have not been able to use technical support for distance education even when it should have been available. Although the so-called "Digitalpakt Schule" (see chapter 3.2.5) was passed in 2019 – an agreement by the federal government and the federal states to foster the technical equipment and infrastructure at schools by making notebooks, tablet computers and high speed internet available – still a few schools applied for the money and purchased mobile devices.[77] Traditional education concepts of schools are still based on attendance and conventional learning tools such as blackboards. Many students do not have a tablet computer or notebook to participate in virtual lessons or do digital homework and not every teacher has the equipment for digital classes.[78]

The scenario today is as follows: Since 2020 the equipment in schools has improved, but a study by the University of Göttingen found out in 2021 that there

[75] Cf. Rohs, M., Ganz, M., Media (2016), p. 10; Niegemann, H., Introduction (2020); Kabaum, M., Anders, P., Digitalisierung (2020), p. 309-310.

[76] Cf. Wiwo.de, Bildung (2020); Tagesschau, Digitalisierung (2020); Fernández-Macías, E., Education (2016) p. 71-72.

[77] Since 2019 5 billion Euros have been made available, until June 2020 15 million Euros were applied for (cf. FAZ, Geld, 2020). In the meantime, 1,5 billion Euros were added (cf. BMBF, Digitalpakt, 2020). In 2021, the application of the original Digitalpakt is still underperformed (cf. Digitalpaktschule.de, Finanzen).

[78] Cf. Forsa, Schulbarometer (2020), p. 2; WDR, Umfragen (2020); Zeit online, Absicht (2020); Focus, Homeschooling-Bilanz (2020).

are still many schools which are not able to participate in the digital transformation. While there are also schools which developed to digital pioneers – about 12 % – a third of the sample of schools consists of laggards.[79] A further study found out that, on average, learning effects during school closings were the same as during the summer holidays.[80]

3.2.4 A Scenario of a Digital Classroom

This section addresses the elements of a digital classroom regardless of how the prerequisites could be organised.

Internet

The most important prerequisite to use digital technology is a stable internet connection with a high bandwidth, which should be available in all places where digital media are used. This is also important for students and teachers at home or at any place where they work or learn.[81]

Mobile devices

The next step is the use of information and communication technologies (ICT) as they are a part of nearly each domain of human life and in particular of younger people. As they can support and enhance learning they should be – whenever it fits – used in lessons, for homework, for communication and for exchange of information among each other. That means that each teacher and each student should have an own mobile device. Usually nearly everyone has a smartphone, which is usable for short sessions or learning videos. For longer lessons and working a tablet computer or a laptop would be better.[82]

The digital learning environment

The digital learning environment includes an education management software with an individual access for every teacher and students with the corresponding rights. A learning platform with up- and download possibilities for teachers (learning material) and students (homework, group work) is important. It should also have a content platform where students and teachers can file scripts or videos

[79] 2,750 teachers at 233 secondary general schools responsed (Cf. Mußmann, F. et al., Digitalisierung, 2021, p. 2, 24).
[80] Cf. Hammstein, S., Effects (2021), p. 8; Welt.de, Distanzunterricht (2021).
[81] Cf. Dietl, S., Hennecke, M., Ausbildung (2019), p. 212; Apel, J., Apt, W., Lernen (2016), p. 69; Cornelsen, Unterricht (2020).
[82] Cf. Dietl, S., Hennecke, M., Ausbildung (2019), p. 305-306; Wegweiser-digitale-schule.de, Formen; Fernández-Macías, E., Education (2016), p. 68.

for collecting knowledge with software-based learning offers and apps for downloads. A tool for communication and for interaction should be integrated which can be applied via smartphones, too. Also, an administration software for test results, periods of absence and digital class-books should be connected or integrated, which makes timetables available online. Resources like rooms and equipment can hence be controlled as well.[83]

Digital lessons

Digital lessons comprise video conferencing software for distance lessons as well as the possibility to produce media products such as presentations, explanation videos, podcasts or stop motion movies. Tablets or laptops are needed and an interactive smartboard is recommended.[84]

Acquiring knowledge about the use of digital media

Flexible offers such as self-learning videos or (online) trainings for participants with a wide range of digital skills are needed. The use of digital media can reduce the former main characteristic of teachers – the knowledge – in importance. A change in learning culture will follow and transform the teacher into a teaching or learning consultant. Learning does not have to take place in a classroom in school anymore. Other or new learning concepts like the "Flipped classroom" can be implemented.[85]

Digital processes in the school administration

Digitalisation should not only take place in the (virtual) classroom. The school administration should also introduce digital processes to simplify procedures and make them more efficient. This also refers to a network between the school principal, teachers and students (and parents if students are not yet adults).[86]

3.2.5 "Digitalpakt Schule"

The "Digitalpakt Schule", passed in 2019, is an agreement between the federal government and the federal states of Germany to foster the digitalisation of

[83] Cf. Dietl, S., Hennecke, M., Ausbildung (2019), p. 212-213; Wegweiser-digitale-schule.de, Formen.
[84] Cf. Wegweiser-digitale-schule.de, Formen.
[85] Flipped classroom means that students work out a new topic at home and discuss the results with the teachers afterwards (Cf. Apel, J., Apt, W., Lernen, 2016, p. 69; Dietl, S., Hennecke, M., Ausbildung, 2019, p. 242).
[86] Cf. Wegweiser-digitale-schule.de, Formen.

schools. The main focus lies on digital equipment (e. g. displays or mobile devices) and high speed internet access. A change of the basic constitutional law was needed to allow the federal government to co-finance this project. In 2018, the digital infrastructure fund was started to finance this project.[87]

The financing

When the agreement came into force the federal government supported the fund with 5 billion Euros, the federal states with 555 million Euros. Due to the school closings during the Covid-19 pandemic in spring 2020, the federal government also decided to subsidise digital content like software licenses.

The next extension was the so-called “Sofortprogramm” (prompt program). The coalition committee of the federal government decided to provide 500 million Euros to ensure that every student has a notebook or tablet computer to participate in virtual lessons. Schools were able to apply for that money rather simply.[88]

In 2020, a further agreement between the federal government and the federal states was passed: the subsidy of administration for digital technologies. An additional 500 million Euros were funded to improve the technical support in schools for the training and financing of IT-administrators.[89]

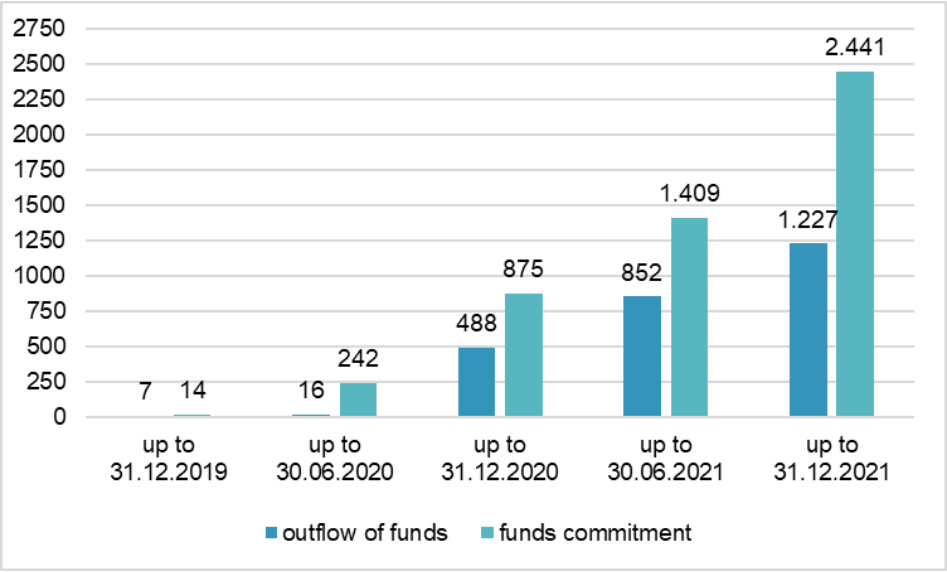
Current utilisation

Schools have to develop a concept that includes technical as well as educational issues based on the individual guidelines of the regional government. They have to apply for funds via their owners and the federal states approve them.[90]

Passed in 2018, only 10 million Euros were paid until June 2020; 242 million Euros were applied for. Until December 31, 2020, about 488 million Euros were paid and 875 million Euros were applied for. In 2021, more than 2 billion Euros are planned and 1.2 billion Euros paid. 495 million Euros are paid in the context of the prompt program, and only 423 million Euros are based on the original digital pact.[91]

87 Cf. BMBF, Digitalpakt.
88 Cf. BMBF, Corona-Hilfe II (2020).
89 Cf. BMBF, Corona-Hilfe III (2020).
90 Cf. BMBF, Digitalpakt.
91 Cf. Digitalpaktschule.de, Finanzen.

Figure 1: Funds Commitment - Outflow of Funds (in Million Euros)



Source: own figure based on Digitalpaktschule.de, Finanzen (accessed: 31st December 2021)

To sum up, an improvement is noticeable but the whole amount has, by far, not been exploited.

3.3 Discussion

The digitalisation is a development which cannot be stopped and affects every domain of human life, even though at different speeds. There are industry sectors that are more digitalised than others or absolutely new sectors with an intense use of digitalisation. Avoiding the digital change could be dangerous for established business models. Although the digitalisation does not affect the education sector respectively schools as fast as other industries, it would be a risk to think that schools are not affected at all.

Education providers that follow the learning expectation of a younger generation are probably more successful. Due to the development of artificial intelligence the work of teachers might one day be replaced by digitally-enabled automation. Routine work in education and administration done by programs in turn increase the productivity of both and leave more space for the students, respectively more students can be supported. While the teaching profession is unlikely to be eliminated by digitalisation (most likely only routine parts as described above) the

teaching model will change a lot. As school can take place independently of place and time, teachers from everywhere could conduct lessons.

The school closure due to the Covid-19 pandemic revealed the lack of digitalisation in schools, especially in general schools. Nearly two years after the first lockdown the general schools were still not sufficiently equipped with mobile devices for teachers and students and the quality of distance learning seems to be inappropriate. The digital school as described in chapter 3.2.4 seems to an exception rather than the norm. Also, the “Digitalpakt Schule” does not have the expected effect as it only finances the hardware while knowledge and usability are still missing.

4 Long-term Care in Germany

In general, the structure of the nursing training corresponds to the German vocational education and training system (see chapter 4.4).[92] But the vocational training act (Berufsbildungsgesetz) does not apply to the nursing training (§63 PflBRefG). Due to its financing (by care providers, care insurances and federal states, see chapter 4.4.4) it is part of the (health) care sector.[93] Therefore, in the following chapter the long-term care industry will be analysed. The risks and opportunities will be discussed to understand the development in this industry. Digitalisation also plays a role but there is a slow development, too, which is described in chapter 4.3. A detailed description of the three-year-training and an international comparison follow.

4.1 Structure and Financing of the Long-term Care Sector

The German care sector includes all institutions and providers which offer care. Important domains are the ambulant and (partially) stationary long-term care.[94] The long-term care sector is also part of the social insurance system (see figure 2) and started growing with the introduction of the long-term care insurance in 1995. Along the lines of the healthcare insurance this insurance is financed by most of the German citizens,[95] contributing to its financing by 50 %. The other half of it is paid by the employers. Unlike the healthcare insurance it is a kind of partial cover insurance. The basic care is granted but the insured person also has to bear costs.[96]

[92] A period of three years, about half of the time in school and half of the time at the workplace (structure of dual vocational training see chapter 3.3.1; structure of nursing training see chapter 4.4.2).

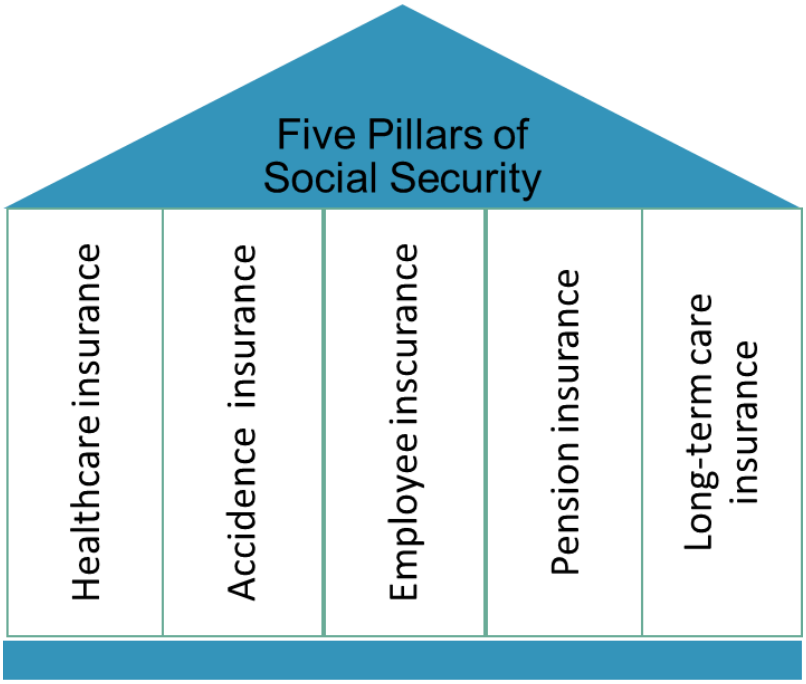
[93] Vocational schools are mainly financed by the public sector (Cf. Bibb, Datenreport, 2020, p. 236); BWP, Finanzierung (2020).

[94] Cf. BMWi, Pflegewirtschaft (2021).

[95] Since 2009 everyone who has a permanent residence in Germany has to be insured by a (private) long-term care insurance (Cf. Land, B., Gesundheitssystem, 2018, p. 39)

[96] Cf. Land, B., Gesundheitssystem (2018), p. 49-51; Simon, M., Gesundheitssystem (2017), p. 263-264.

Figure 2: System of Social Security



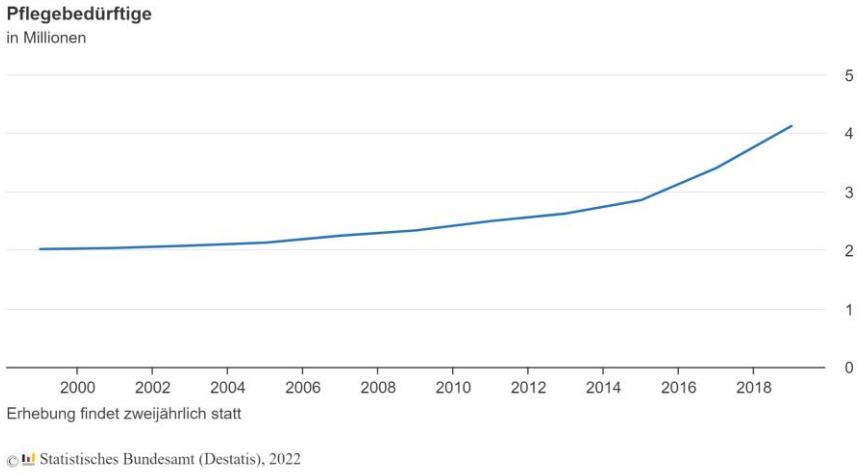
Source: own figure based on Land, B., Gesundheitssystem, 2018, p. 26.

Besides healthcare, pension, unemployment and accident insurance (see figure 8) the introduction of the long-term care insurance in 1995 is the fifth pillar within this system.[97] Before the introduction long-term care had to be paid by the persons in need of care. In the case that they were not able to pay, they received support by social assistance (“Sozialhilfe”). The increasing number of persons in need of care (see figure 3) led to a severe burden of the municipalities.[98]

[97] Cf. Paquet, R., Reformbedarf (2020), p. 6; Arntz, M. et al., Care (2006), p. 2; Land, B., Gesundheitssystem (2018), p. 26.

[98] Cf. Land, B., Gesundheitssystem (2018), p. 48; Simon, M., Gesundheitssystem (2017), p. 261.

Figure 3: Rising Number of Persons in Need of Care



Source: Statistisches Bundesamt, Pflegebedürftige (2022)

In order to avoid additional administration structures the long-term care insurances were taken over by the healthcare funds. Each insured person is obliged to take out a long-term care insurance.[99] Whether care is given at home or at an elderly home depends on the need of care. This need has to be determined by the medical services of the health funds (MDK). If the person in need of care lives at home he or she can choose between in-kind or lump-sum transfer or a mix of both.[100]

The players

The German system is based on the so-called principle of self-governing (Prinzip der Selbstverwaltung). In literature the players are classified into three groups:

1. The federal government and federal states, responsible for laws, rules and supervision
2. The public corporations like the long-term care insurance funds
3. Long-term care providers
4. Insured persons[101]

[99] Cf. Land, B., Gesundheitssystem (2018), p. 48.

[100] Cf. Land, B., Gesundheitssystem (2018), p. 50-53; Simon, M., Gesundheitssystem (2017), p. 269-270; the need of care („Pflegebedürftigkeit“) is legally defined §14 SGB XI.

[101] Cf. Arntz, M. et al., Care (2006); p. 3; Gerlinger, T., Charakteristika, 2012; Simon, M., Gesundheitssystem (2017), p. 81-82.

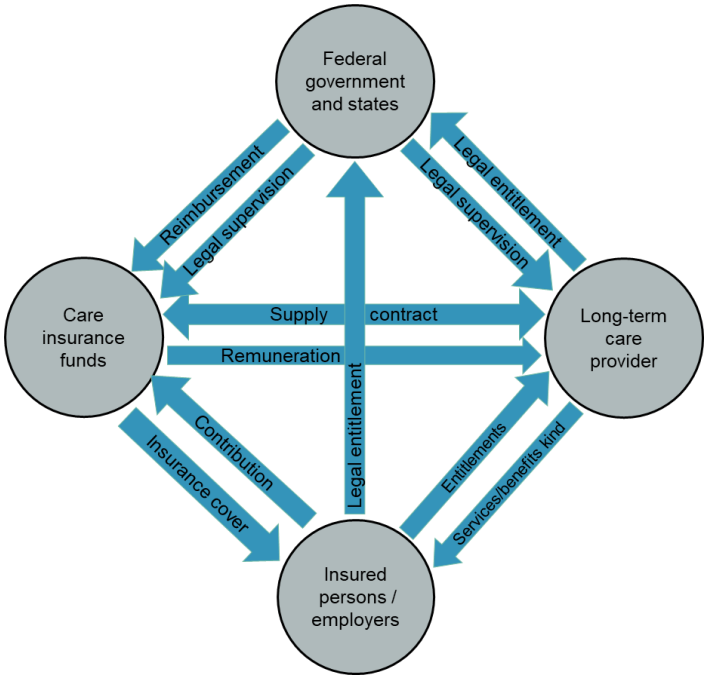
The federal government and the federal states are responsible for the framework of passing and monitoring of compliance by laws and regulations. They also have to guarantee that the needed infrastructure of long-term care with qualitative and efficient care institutions is provided.[102]

The long-term care insurance funds are responsible for the choice of service as well as for the quality of supply. They dispose of the care level of the insured person and bargain with care providers regarding the price of care service.[103]

The long-term care providers have to enter into a supply contract with the long-term care insurance funds. It includes type, content and extent of the general care services, which a care institution has to render (§ 72 SGB XI).

The list of participating groups has to be added by the insured people as they and their employers are obliged to contribute[104] (see figure 4).

Figure 4: Structure of the German Long-term Care System



Source: own extended figure based on Simon, M. (Gesundheitssystem, 2017), p. 81

[102] Cf. Arntz, M. et al., Care (2006); p. 3; Simon, M., Gesundheitssystem (2017), p. 81.
[103] Cf. ibid., p. 3.
[104] Cf. Land, B., Gesundheitssystem (2018), p. 49.

4.2 Opportunities and Risks

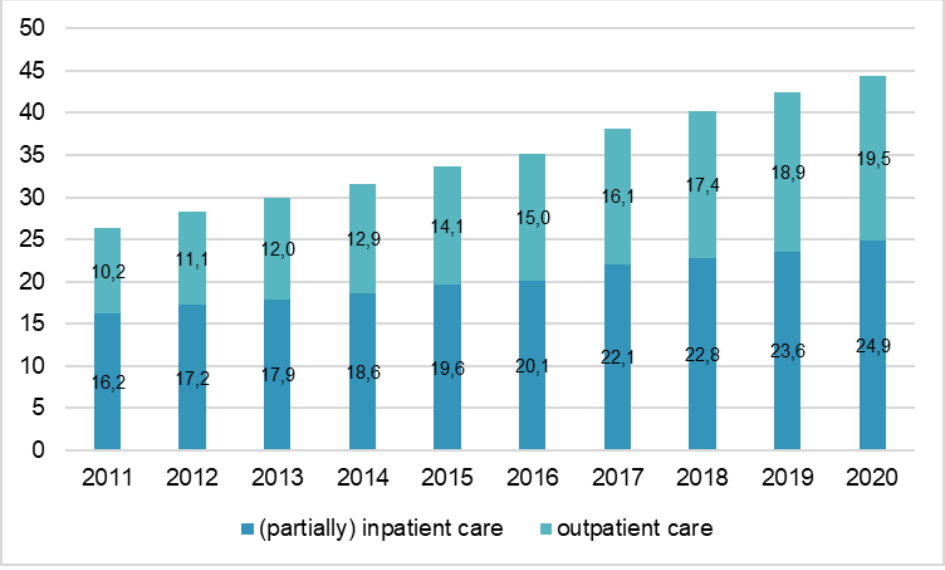
This industry shows a high dynamic, characterised by its growth and the challenges involved.

4.2.1 Increasing Industry

The long-term care sector as part of the healthcare industry has increased its economic potential constantly. In 2019, 15,380 nursing homes and 14,688 providers of outpatient care were counted in Germany.[105]

They caused a gross value added of about 44,4 billion Euros (outpatient: 19,5 billion Euros, inpatient: 24,9 billion Euros). Within the healthcare industry long-term care ranks third after hospitals and surgeries. Since 2011, the gross value added has increased significantly, especially the outpatient care, which has nearly doubled (see figure 5).[106]

Figure 5: Gross Value Added (in Billion Euros)

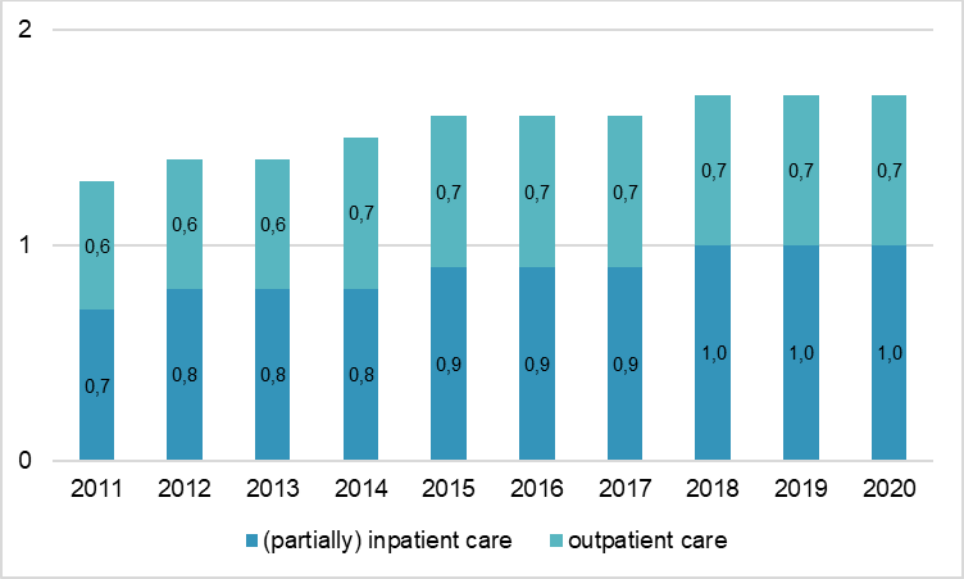


Source: own figure based on BMWi, Gesundheitswirtschaft, 2021

[105] Cf. BMWi, Pflegewirtschaft (2020); Statistisches Bundesamt, Pflegestatistik (2020).
[106] Cf. BMWi, Pflegewirtschaft (2021).

In accordance with this performance the number of employed persons in the care sector increased as well (see figure 6).

Figure 6: Employed Persons (in million)



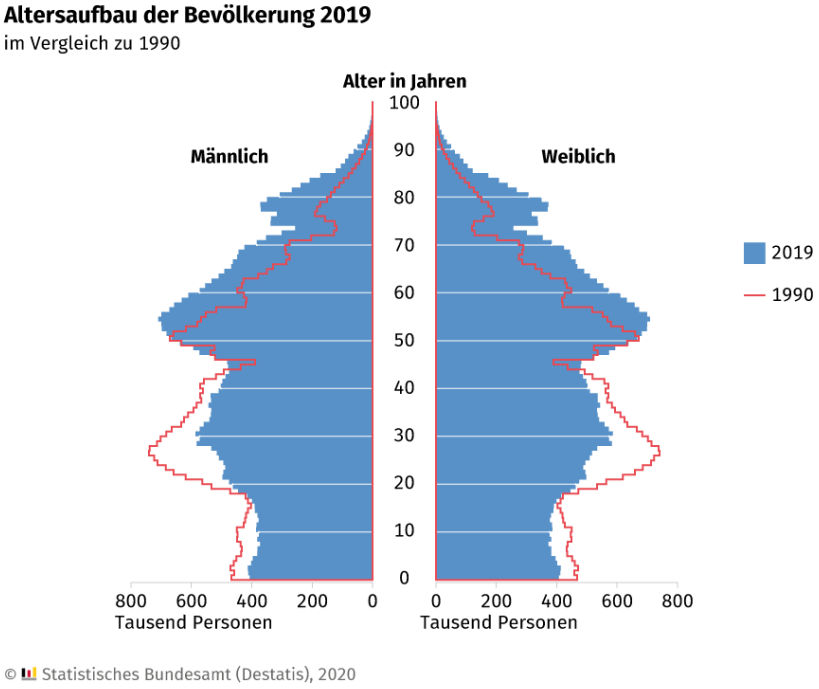
Source: own figure based on BMWi, Gesundheitswirtschaft, 2021

To sum up, the economic relevance of long-time care increased significantly and constantly. One of the reasons is the above-described rising number of persons in need of care (see chapter 4.1, figure 3) due to the demographic change shown in chapter 4.2.2.

4.2.2 Demographic Change

The demographic development means a challenge for the care sector. As seen in figure 7, the portion of elderly people increases:

Figure 7: Structure of Age in 2019



Source: Statistisches Bundesamt, Wandel, 2020

The number of people older than eighty years has increased significantly. Due to the decreasing fertility rate over the last centuries[107] and due to longer life expectancy the portion of elderly people will increase stronger than the portion of younger ones. More older people will need more care despite the fact that more older people will be healthier than in former decades and centuries due to good life conditions and the increasing quality of medical supply.[108]

4.2.3 Lack of Skilled Nurses

The already mentioned effects, such as the increase of older people and of people in need of care, cause a higher demand of nurses. Qualified nurses have to

[107] Cf. Statistisches Bundesamt, Bevölkerung (2019), P. 30-31.
[108] Cf. ibid., p. 36-37; Statistisches Bundesamt, Wandel (2020); Land, B., Gesundheitssystem (2018), p. 49; Haubrock, M., Herausforderungen (2017), p. 4-5.

pass a vocational training, which takes three years (for more details see chapter 4.4). But due to the demographic change there are less young people available for the labour expert market. That means there will also be less people available for the care sector. In 2021, the federal agency for work stated that there are only 31 nurses seeking employment per 100 job offers, compared to 52 unemployed nurses per 100 job offers in 2011. This relation will intensify in the years to come.[109]

This development needs a solution to avoid an increasing mismatch of the relation of qualified nurses and persons in need of care. Several possibilities are discussed, such as the recruitment of foreign nurses or making the job more attractive in order to acquire more applicants.[110]

4.3 Digitalisation in Long-term Care

This section describes the development of digital technologies in long-term care. At first sight, technology and (long-term) care seem to be two antithetic disciplines, but the interlocking is unavoidable.[111] "Care 4.0" refers to a new development of technologies in care, which also includes hospital care.[112] Some are of the opinion that the implementation of digital technologies in long-term care can relieve nurses in their daily business as one solution to the lack of professional nurses.[113] As the nursing training is structured in the same way as other dual training systems (for more details see chapter 4.4.3) the students are closely linked to their employers. Corresponding to the status quo of digitalisation of (long-term) care providers they could be a key driver of digitalisation in the nursing training.

4.3.1 Digital Technologies

Corresponding to the development of "Industry 4.0" which refers to changes, adaption and sometimes disruption caused by digital technologies in many business areas there is or will also be a similar development in care, the so-called

[109] Cf. BA, Arbeitsmarktsituation (2022), p. 18.
[110] Cf. BMG, Aktion (2021).
[111] Cf. Fehling, P., Entwicklungsstand (2019), p. 198.
[112] Cf. BGW; Chute, C., French, T., Care 4.0 (2019), p. 1.
[113] Cf. Bertelsmann Stiftung, Strategien (2018), p. 37-38.

"Care 4.0".[114] It implies systems to support persons in need of care (such as smart home systems) as support for nurses.[115]

The following technical solutions are mentioned:

- Using electronic care record for improving the information flow and collaboration between nurses
- technical assistance
- distance care, such as telecare
- different types of robotic: assistance, monitoring and accompanying robots
- digital education, such as care simulation, using virtual reality
- augmented reality applications[116]

The electronic care record as a replacement for the paper-based care record is one of the most popular technical achievements. The care record is the documentation of the planned and executed care, observations, special developments and changes, including any information and data which are relevant to the person in need of care. This documentation can be very comprehensive and complex as it has to ensure and to prove the quality of care.[117]

Technical assistance is useful as it reduces monitoring and routine work by nurses, such as digital walking aids, tracking systems, interconnected nursing beds, Ambient Assisting Living (AAL) and other sensor technologies.[118]

There are different research projects, supported by the Ministry of Health, which developed several technical tools to support patients' lives. One example is SensFloor, a technical assistant to detect, via sensors in the floor, where the person in need of care is located and whether there are conclusions about his or her constitution due to steps he or she takes or whether there is a risk of falling. Another invention, which is often very critically perceived, are robots, but they are not yet ready for the market.[119] The development and application of distance care

[114] Cf. Merda, M. et al., Pflege 4.0 (2017), p. 14.
[115] Cf. Bertelsmann Stiftung, Strategien (2018), p. 37.
[116] Cf. ZQP, Pflege (2019), p. 32; DAA, Digitalisierung (2017), p. 14; Tisch, A. et al., Chancen (2020), p. 695; Merda, M. et al., Pflege 4.0 (2017), p. 14.
[117] Cf. Peschke, D. et al., Strukturmodell (2021), p. 125.
[118] Cf. SchwesterPfleger, Pflege (2018).
[119] Cf. Fehling, P., Entwicklungsstand, 2019, p. 200; more examples of technical inventions, partially only invented, but not yet available on the market, are also to find here: a robot called ROREAS, INSYDE, an intelligent matrass, TrinkTracker for cups and more (Fehling, P., Entwicklungsstand, 2019, p. 200).

as well as robotic, virtual and augmented reality depend on the status quo of the technical development and the handling of data security or ethical concerns.[120]

4.3.2 Reasons for the Implementation

Digital technologies in care – this means a huge variety of opportunities. The aim has to be the welfare of the persons in need of care who are mostly vulnerable and unable to speak for themselves. The objective of granting good care meets the known challenges, such as the rising number of persons in need of care and the decreasing number of nurses. One of several solutions could be the support of technical tools to support the person as well as the nurses. Digital technologies can improve processes by making them more efficient. Digital supporting tools can relieve nurses, e.g. by helping to mobilise patients or reminding to take medicine.[121]

Systems already used in other industries could also be used in care, e.g. networked systems or ubiquitous communication technology like telemedicine. Also, big data applications could increase the efficiency of patient care. But due to several risks e. g. data security, the transfer is more complex. Telemedicine, which also plays an important role in long-term care, is possible only in a narrow legal framework. In addition, the usage of big data cannot be transferred as usual.[122]

4.3.3 Challenges of Implementation

As mentioned above, digitalisation affects all domains of life. As it is clearly noticeable in industries like the automobile or the finance sector it seems that it has not yet the same influence on long-term care.[123] But the need for technological support is realised and also possible and useful, as described in chapter 4.3.2. Hospitals seem to be more advanced by using IT-technologies for information and care record than long-term care providers.[124] Different reasons seem to slow down that process.

[120] Cf. Deutscher Ethikrat, Robotik (2020), p. 47-50.
[121] Cf. DAA, Digitalisierung (2017), p. 47; Vogler-Ludwig, K., et al., Arbeitsmarkt (2016), p. 75-76.
[122] Cf. Dwertmann, A., Schürholz, M., Digitalisierung (2017), p. 165.
[123] Cf. Lutze, M., Weiß, C., Versorgung (2017), p. 155; Fehling, P., Entwicklungsstand, (2019), p. 198; DAA, Digitalisierung (2017), p. 47.
[124] Cf. Lutze, M., Weiß, C., Versorgung (2017), p. 159.

Change needs time

It takes decades until an invention is used in daily business. In contrast to other work domains the work of nurses did not change much in the last two decades. The core process of care is hardly supported by computers. Only 20 % of the work of a nurse can be replaced by digitalisation.[125]

Otherwise nurses experience increasing pressure of deadlines and performance as well as fast working to the breaking point. The challenges of high physical activities, like lifting a person, remain. Currently, not many positive effects of digitalisation are perceivable. Furthermore, the phase of implementation means more work at first. A persistent overload of work due to understaffing does not leave much room for changes.[126]

Uncertainty of nurses and customers

There seems to be uncertainty on the side of the nurses or the customers of the service. Sometimes older people are not able to follow the development.[127] Using digital technology means a change or an extension of the profession. Nurses do not only have to know about professional care, but also need a higher technical comprehension to use the systems.[128]

Data protection

Technical prerequisites are not the only factor to implement technical systems. Digital technology of higher development, such as artificial intelligence, needs data to act and learn. Storing and forwarding data is in general a very sensitive issue. Due to the vulnerable customer group in long-term care the handling of personal data has to be ruled very strictly and does not leave much free space.[129]

Ethical criteria

Technical systems should not replace the human interaction but should enhance it. And they only have to pursue the welfare of the person in need of care. Technical systems should also push the quality and support the further development of care and not only assist nurses.[130]

[125] Cf. Tisch, A. et al., S.-C., Chancen (2020), p. 690-693.
[126] Cf. ibid., p. 693-695.
[127] Cf. Lutze, M., Weiß, C., Versorgung (2017), p. 155.
[128] Cf. Tisch, A., Meyer, S.-C., Chancen (2020), p. 695.
[129] Cf. Deutscher Ethikrat, Robotik (2020), p. 47-48.
[130] Cf. ibid., p. 7.

4.4 The Nursing Training

The vocational training is one important key factor to meet the several challenges, like the lack of skilled nurses or supporting the digitalisation. Apart from the care providers, the schools could and maybe should play a role in the digitalisation process as they have the task to prepare nurses for their working life.

4.4.1 Development and Reform of the Training

The training for nurses in long-term care was always different from the training of nurses in hospitals. The former was ruled by the federal states while the latter was supervised by the federal government. In the last century, becoming a geriatric nurse could be generally achieved via an apprenticeship over two years. During the 1980s, some states extended the training to three years. Only in 2000 was the care for the elderly act ("Altenpflegegesetz") introduced nationwide and renewed in 2003.[131]

From this moment onwards the geriatric nursing training had to last three years. This step meant an approximation to the training of nurses for hospitals, which could also be valued as a preparation for the act of reforming care professions ("Pflegeberufereformgesetz").

In early 2020, the new act of care professions ("Pflegeberufegesetz") was introduced. The three different vocational trainings were merged into one training.[132]

The framework curriculum by the expert commission according to §53 PflBG includes requirements for digital competencies which were not mentioned e.g. in the directive for the vocational training of geriatric nurses. In this context, digital competencies refer to knowing how to use digital tools for documentation and other technical and digital tools.[133]

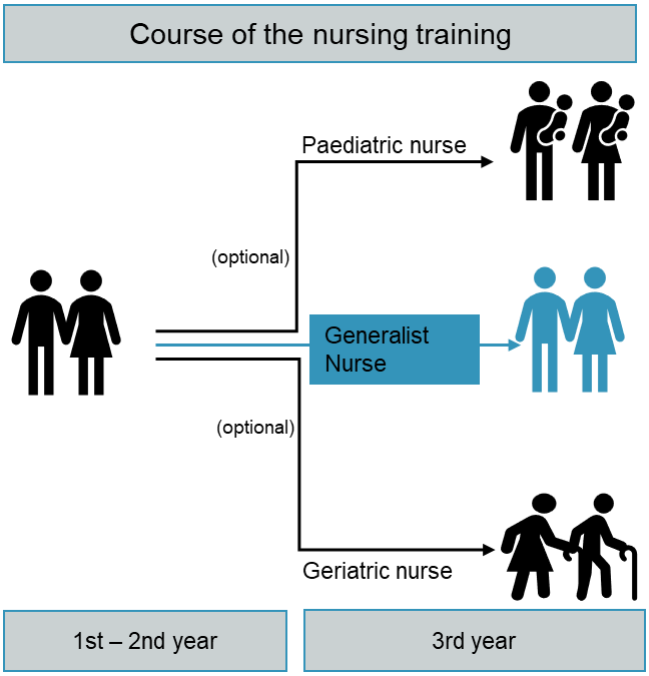
4.4.2 Structure

This training takes three years and combines theory and practice. The students spend more than a half of these three years in a hospital, nursing home or mobile care service and the other part in a nursing school. After passing the final exam they can work in all of the above-mentioned places.[134]

[131] Cf. Weiß, T. et al., Pflegeberufereformgesetz (2018), p. 78.
[132] Cf. ibid., p. 88-89.
[133] Cf. BMG, Rahmenpläne (2019).
[134] Cf. Pflegeausbildung.net, Voraussetzungen.

The first two years are the same for all students (see figure 8). Until 2026, the students are allowed to choose their specification. They can chose whether they want to be a generalist, a paediatric or a geriatric nurse (§59 PflBG).

Figure 8: Course of the Nursing Training



Source: own figure based on gfg Rostock, Ausbildung (2021)

In 2003, the federal government passed the care for the elderly act, a nationwide rule for professional licensing. Since then the federal states have been responsible for the content-related and organisational realisation.[135]

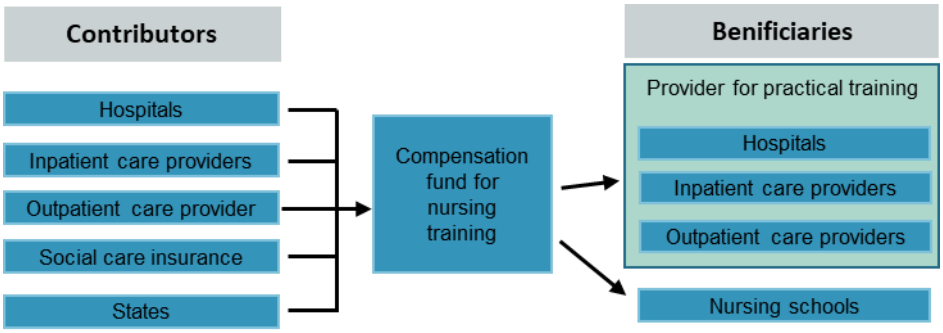
4.4.3 Financing

In the same vein, the financing was adapted. In the financial regulation of the nursing training (Pflegeberufe-Ausbildungsfinanzierungsverordnung PflAFinV) the following points are determined (see figure 9):

[135] Cf. Lehmann, Y. et al., Bestandsaufnahme (2014), p. 29.

- School fees are abolished
- Hospitals and long-term care providers are obliged to pay an adequate salary to their trainees
- The training is financed by a compensation fund
- Mainly hospitals and long-term care providers contribute to this fund
- The states, care insurance and private care insurances also contribute to a lesser degree
- The beneficiaries are the training hospitals and care providers as well as the nursing schools.[136]

Figure 9: Financing by Compensation Fund



Source: own figure based on Bezirksregierung Münster, Ausgleichsfonds, 2020

4.4.4 International Comparison

An international comparison of the profession shows that there are similar trainings in other countries. The German development of the training also has to be seen in an international context. The reform of the care profession includes the European recognition of the diploma “Pflegefachfrau/-mann”. Table 2 shows an overview of nursing trainings in Denmark, France, the Netherlands, Austria, Poland and Sweden.

In several European countries the nursing training takes place at a university, e.g. in Denmark, France, Poland, and Sweden. In the Netherlands and Austria the training also takes place at a university but there are also vocational schools which provide the nursing training.[137]

[136] Cf. BMG, Pflegeberufe-Ausbildungsfinanzierungsverordnung (2018).
[137] Cf. Waldhausen, A. et al., (Alten)Pflegeausbildungen (2014), p. 14-15.

Table 2: Nursing Education in Several European Countries

Country	**Training**			**Particularity**	**Field of work:** Hospitals, long-term care and/or others
	Place	**Duration**	**Graduation**		
Denmark	University of Applied Sciences	3.5 years	Bachelor		All
France	University	3 years	Bachelor		All
Netherlands	Vocational school	3-4 years	State-approved diploma	Specification choice in last year of training between hospitals, long-term care, homecare	All
	University	4 years	Bachelor	Specification choice in last year of training between general care, psychiatric care or public health	All
Austria	University of Applied Sciences	3 years	Bachelor	Reform in 2016: 1 general training since 2018[138]	All

[138] Cf. Rappold, GuKG-Novelle (2016).

Poland	University (of Applied Sciences) Vocational school	3 years 2 years	Bachelor State approved diploma		All Long-term care
Sweden	University	3 years	Bachelor		All

Source: own compilation based on Waldhausen, A. et al., (Alten)Pflegeausbildungen (2014), p. 15-30; Lehmann, Y. et al., Bestandsaufnahme (2014), p. 145

The comparison considers only these above-mentioned countries as the training is only partially comparable. It takes the system of long-term care as well as the vocational training into account. The countries with the highest possible congruence are chosen.[139]

4.5 Discussion

The long-term care sector in Germany was founded by introducing the long-term care insurance in 1995 as the fifth pillar of the social security. A rising number of persons in need of care were not able to finance it on their own and the communities were overburdened by compensating the social security. By now, most Germans have to contribute to the insurance system in order to secure financing.

The structure is complex and the conduct of the relevant parties is strictly determined but follows the principle of self-governing. The government and the states deliver the legal frame, the main institutions are the long-term care insurance funds and long-term care providers as they bargain the prices, scope and type of service. This means that the market is not as flexible as other industry sectors where only supply and demand define prices and services.

As the service has to be guaranteed the relevant parties have to react to certain challenges. The population is getting older and more (older) people need care. This leads to a growth of a sector where more qualified nurses are required. But a lack of skilled nurses also occurred due to the demographic change. There are several approaches to overcoming these challenges, such as the acquisition of

[139] Cf. Waldhausen, A. et al., (Alten)Pflegeausbildungen (2014), p. 5; Lehmann, Y. et al., Bestandsaufnahme (2014), p. 27.

foreign nurses. A further approach could be the implementation of digital technology to relieve nurses. But this happens very restrainedly.

The development of technology is not the reason for the slow movement. To the contrary, different useful applications have already been invented. It is also often possible to transfer inventions from other industries to the care sector with some adaptions. But in the process of implementation many obstacles have to be overcome. They concern data security, social and ethical criteria, uncertainties of employees and customers and finally the fact that the core process of care, the interaction between nurse and person in need of care, is not subject to replacement. Only parts of the working environment have to be replaced, which is why the implementation requires some time.

As the use of digital technology in long-term care will increase the profession of a nurse has to evolve. The applicants are often motivated to work closely with people in a social context. They are not prepared to work in high developed technical surroundings. This leads to the conclusion that the work of most nurses will change a lot. As they still work closely with the patient they also need a high technical comprehension in the digital environment. That means they have to calibrate and to evaluate the existing technologies, in the best case combined with an affinity for new tools and the will to learn on their own.

The nursing training of three years as the main producer of nurses could be one key driver for implementing digitalisation in care. Since the reform of care professions the curriculum has included digital elements in training. Yet the implementation in lessons is up to the schools, which are closely linked to the (long-term) care provider. But the reform shall also close the gap of sufficiently skilled nurses. In international comparison it seems to be advisable to adapt the nursing training to international requirements. This raises the question of how much digitalisation impacts the nursing training in other countries. Unfortunately, though, the answer to this question would go beyond the scope of this study and has to be discussed in another analysis.

5 Digitalisation in German Nursing Schools

In March 2020, when general schools were closed in nearly every German state, the health ministries of the states respectively the responsible authorities in the states decided to close nursing schools and allow distant education.[140] It can be assumed that most nursing schools meet the same challenges: traditional educational concepts, missing technical equipment and a lack of digitally-skilled teachers.[141] But there are also schools, such as some vocational schools, for whom the COVID lockdown meant a "digital crash course".[142] Due to the fact that reports and examinations about nursing schools are not available some of these schools were asked via an online survey about their status quo of digitalisation.

5.1 Nursing Schools

There are about 1,700 nursing schools in Germany.[143] Before the reform of care professions they had been divided into vocational schools for hospital nurses, geriatric nurses and paediatric nurses. Since January 1st 2020, nursing schools (according to "Pflegefachschulen") are responsible for training nurses (according to the "Pflegefachfrauen/männer") who can work at different care providers, such as hospitals, homes for elderly people and paediatric hospitals.[144]

In order to receive a training permit a personnel infrastructure is required, such as an educationally qualified principal as well as educationally skilled nursing teachers in relation to the numbers of students. Furthermore, suitable (class) rooms as well as teaching and learning material students are required.[145] Official rules or recommendations concerning equipment to be used in lessons do not exist. The schools have to decide on their own how to achieve the training aim, which is legally defined.[146] The apprenticeship includes theoretical and practical lessons as well as practical trainings. The theoretical and practical lessons are based on an internal curriculum developed by the school.[147]

[140] Cf. Tagesschau, Corona-Krise (2020); MAGS, Einstellung (2020); MAGS, Weiterführung (2020).
[141] See chapter 3.2.3.
[142] Cf. Hackstein, P. et al., Berufskollegs (2020).
[143] See chapter 3.2.1.
[144] Cf. Weiß, T. et al., Pflegeberufereformgesetz (2018), p. 156.
[145] Cf. ibid., p. 152.
[146] Cf. ibid., p. 10.
[147] Cf. ibid., p. 11.

5.2 The Questionnaire

The methodology and approach to analysing the digital status quo of nursing schools are described in chapter 2.3. As mentioned above the content of the questionnaire is divided into three sections: data about the school, questions about the digital infrastructure and processes and a last section about the digitalisation of the lessons.

Four questions in the first section, “school data”, verify that the responding participant answers as a representative of a nursing school in Germany. Besides the type of school location and federal state the product portfolio and number of students have to be mentioned.

The second section, “digital infrastructure and processes”, contains six questions. It was asked whether fast internet is available and whether teachers and students have their own mobile device. Furthermore, the questionnaire asks for the documentation of contact data, marks, periods of absence or completed contents of lessons to be done paper-based or digitally. A further question is aimed at finding out who is responsible for the maintenance of technical devices – an own dedicated IT resource, a service provider or a teacher.

The last section, “digitalisation of classes”, contains four questions. The difference to the questions in the other sections is that a higher selection of responses is possible. It was asked which digital technologies and which digital methods are used, which learning product students can create (such as an explanation video or presentation to comprehend the learning progress) and which digital technology used in care is subject in class. Each question has several answers to choose from, and theoretically all of them can be selected.

5.3 Results

The results are structured according to the sections.

5.3.1 School Data

The random sample contains 83 schools of thirteen federal states. The first questions ensure that a German nursing school is interviewed respectively that nursing trainings of three years take place. Most schools of the survey are located in the south of Germany (16 % from Baden-Württemberg, 14 % from Bavaria), but also some from Hesse (14 %) and Lower Saxony (13 %). Then North Rhine-Westphalia follows with 10 %, Saxony and Brandenburg with 8 % each, and

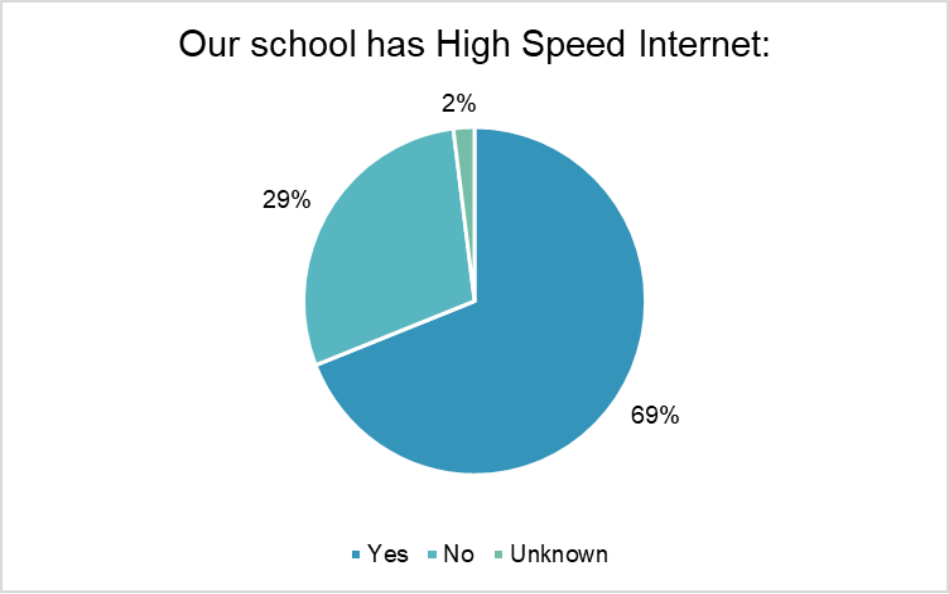
Rhineland-Palatinate, Mecklenburg-Western Pomerania and Bremen with 4 % each. Saxony-Anhalt (2 %), Thuringia and Schleswig-Holstein (1 % each) are at the very end. Schools from Berlin, Hamburg or Saarland are missing.

The size of the nursing schools are different, ranging from 12 to 737 students. The average is approximately 135 students per school. These numbers include students who participate in the three-years-nursing training and – depending on the portfolio of the school – also students who participate in trainings such as nursing assistants or other healthcare trainings, e.g. surgery technical assistants, physiotherapists etc.

5.3.2 Digital Infrastructure and Processes

The schools were asked whether fast internet is available; they could choose between “yes”, “no” or “I do not know”. About 70 % of the schools confirmed to be connected with high speed internet; nearly 30 % denied that.

Figure 10: Availability of High Speed Internet



They were also asked whether their teachers and students have the possibility to work with a mobile device, like laptops or tablet computers, regardless of whether they have an own one or one given by the school. They could answer with “yes”, “no” or “I do not know”. More than three-quarters of the schools confirmed that

each teacher has a mobile device, less than a quarter could not confirm his information. About half of the schools confirmed that each student has a mobile device, the other half denied this. A little minority was not sure on that topic.

Figure 11: Availability of Mobile Devices for Teachers

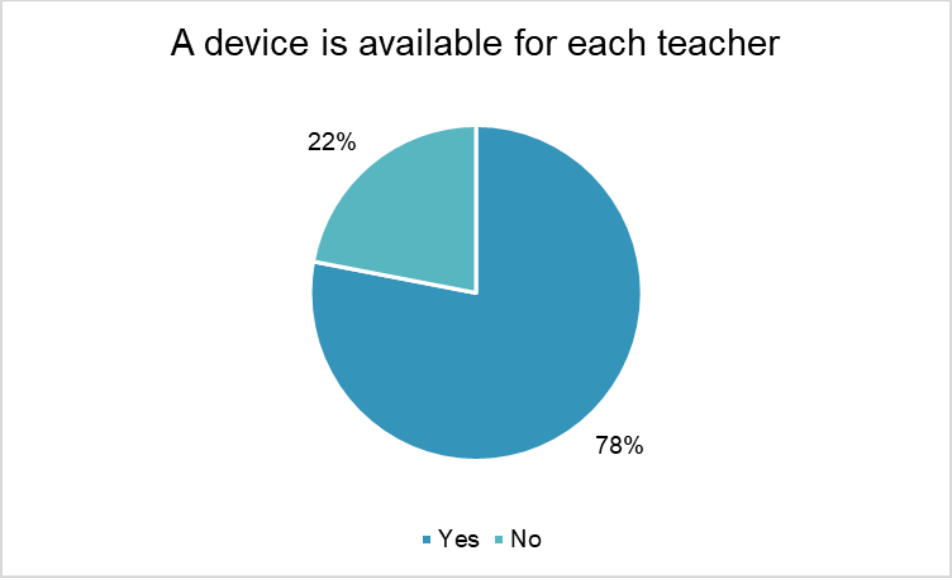
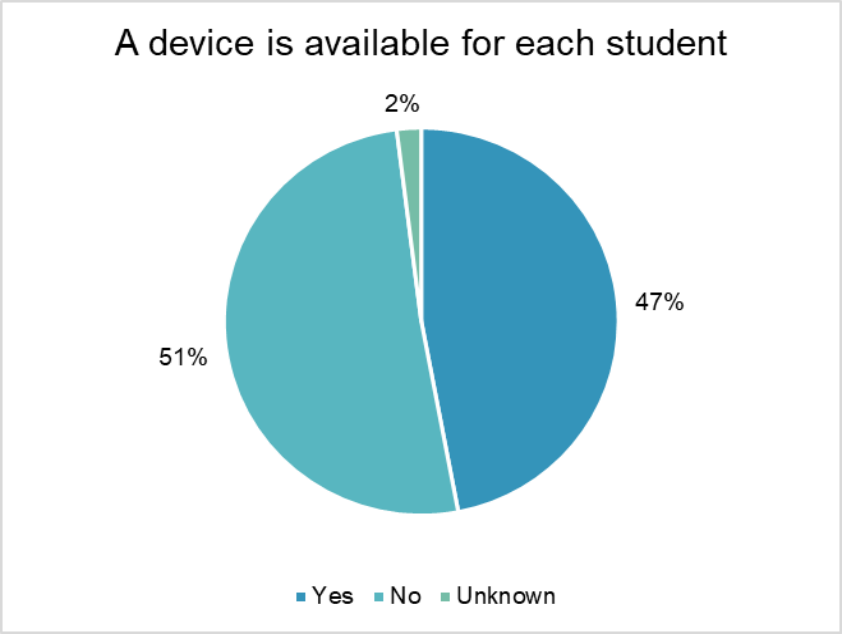
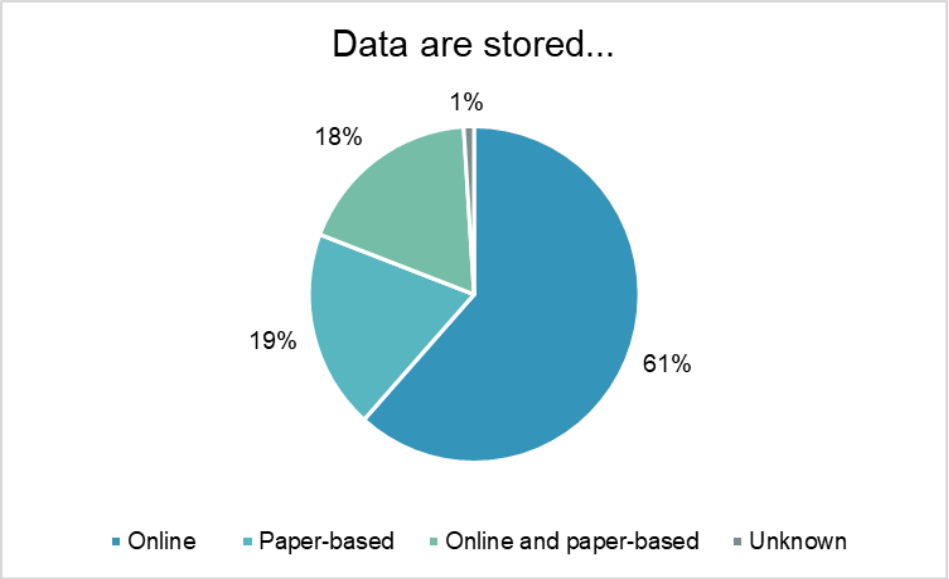


Figure 12: Availability of Mobile Devices for Students



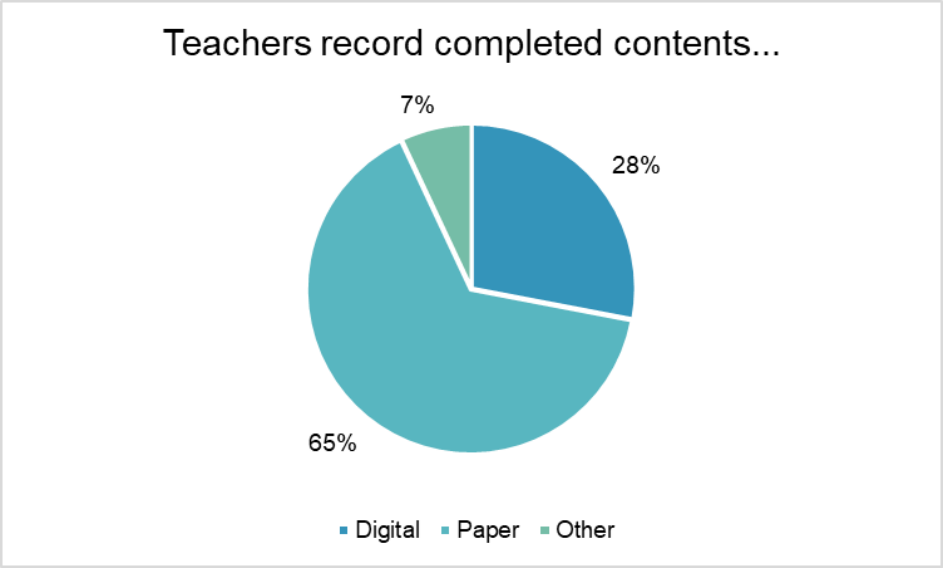
Furthermore, the schools were asked about the handling of administration tasks and the storage of data. They had to choose between “information will be managed and stored online”, “paper filing”, a “mix of both” or “I do not know”. Nearly two thirds of schools confirmed to store contact data, periods of absence and performance of students online, a fifth via paper filing and another fifth uses a mix of both.

Figure 13: Administration and Storage of Data



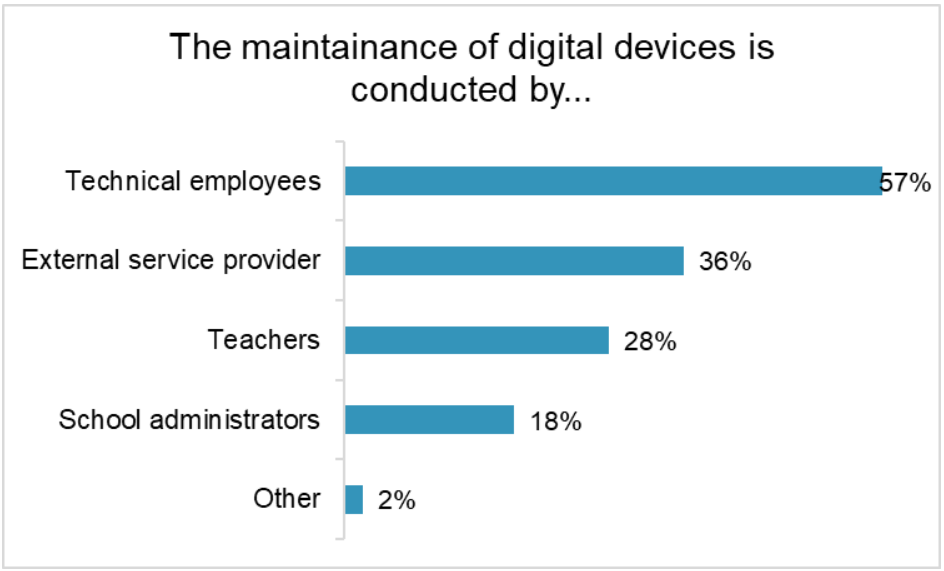
They were also asked whether they use a digital or a paper-based class register and had to choose which is applied more. Two thirds still use the conventional class register. More than one quarter has transferred their system to a digital class register.

Figure 14: Class Register



In response to the question who is responsible for the technical maintenance the schools could select more than one answer, such as own IT resources, external service providers, teachers, the school administration office or others. The schools were able to choose more than one answer. Most schools were able to hire technically trained colleagues for the maintenance of the technical infrastructure. About a third commissions external service providers. But also nearly a half (46 %) ask teachers or colleagues of the school administration office for help.

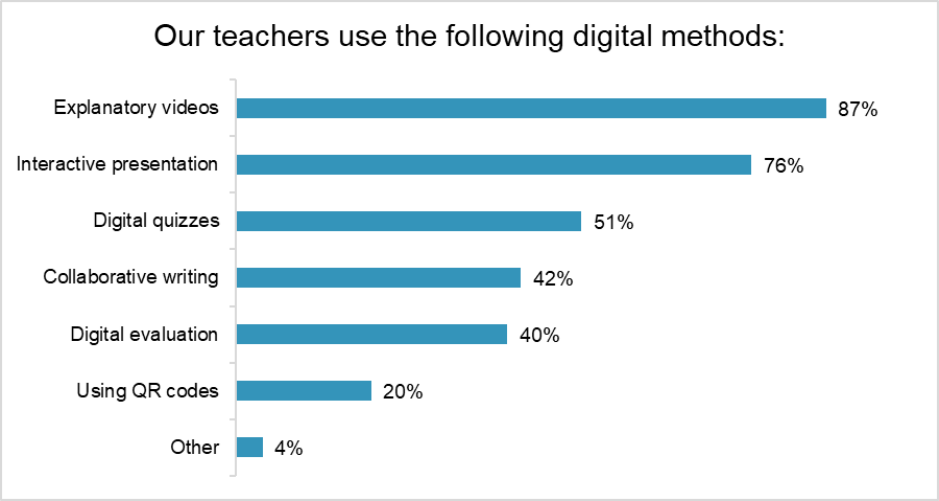
Figure 15: Technical Maintenance



5.3.3 Digitalisation of Classes

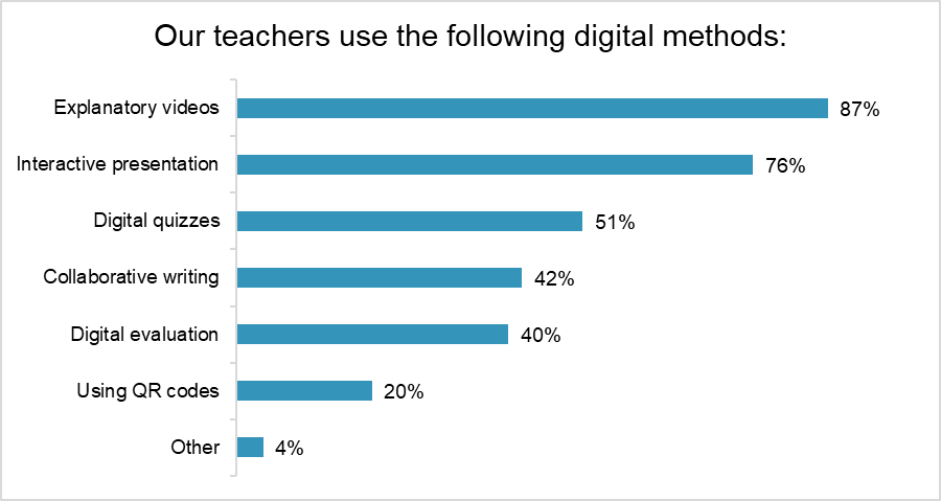
The schools were asked which digital technologies they use in class. They could select more than one answer, e. g. online class via video conference, using a learning platform, digital blackboards or interactive whiteboards, digital projectors, learning or gaming apps or others. More than 90 % confirmed that online video conferences were held for training purposes. Three quarters of the asked schools were also using a learning platform for sharing content. Furthermore, two thirds worked with digital blackboards or interactive whiteboards. A little more than a half uses a digital projector. Less than one third work with learning or gaming apps. Apparently, there are not many more alternatives when it comes to digital technologies, as only 5 % add some information, e. g. working with document cameras.

Figure 16: Digital Technologies in Class



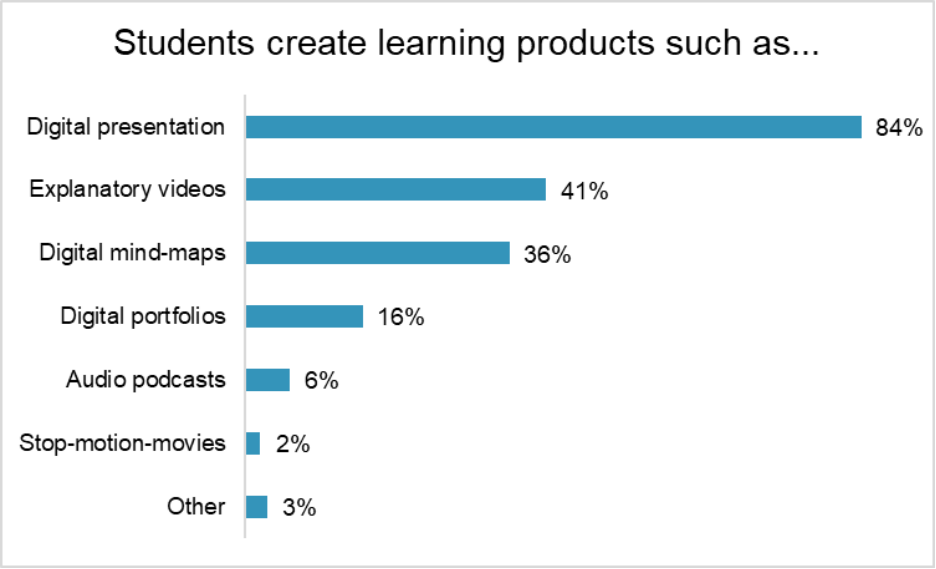
Several answers were possible to the questions concerning the use of digital methods. The interviewees could select explanatory videos, interactive presentations, digital quizzes, collaborative writing, digital surveys during lessons, using QR-codes and others. Most chose the answer ‘explanatory videos’. Three quarters confirmed to work with an interactive online presentation, which can be shared and edited simultaneously by the speaker and the audience during the presentation. One half uses digital quizzes, e. g. for testing the knowledge progress. Two fifth work with files, which can also be edited by different people at the same time. Also, two fifth conduct digital evaluations during lessons. One fifth uses QR-codes on analogue documents.

Figure 17: Digital Methods Used in Class



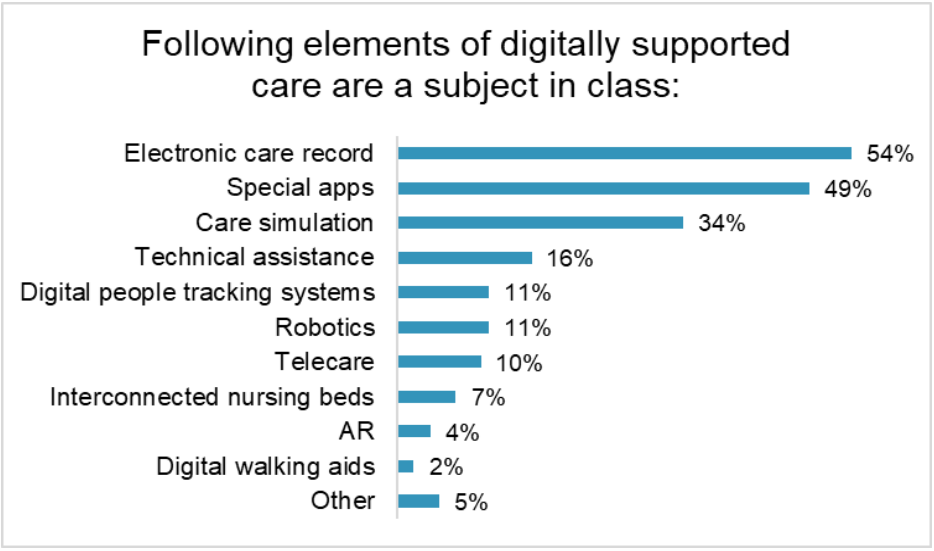
In the question about which digital learning products are used by the students, schools could choose digital presentations, explanatory videos, digital mind-maps, digital portfolios, audio podcasts, stop-motion movies and others. Most of the survey participants indicated that they use digital presentations. Two fifth use self-made explanatory videos and one third works with digital mind-maps. 16 % create digital portfolios and less than 10 % stated to create audio podcasts or stop-motion-movies.

Figure 18: Digital Learning Products



In the end a question followed regarding what digital technologies used in care are discussed during lessons. Several answers were possible, such as electronic care record, special nursing apps for information, communication, monitoring etc., care simulation, technical assistance, digital people tracking systems, robotics, telecare, interconnected nursing beds, augmented reality or digital walking aids. The participants of the survey could also add other content. More than a half confirmed to talk about the electronic care record and nearly a half about special apps used in care to inform, communicate, and monitor as well as for training purposes. About a third makes care simulation subject to discussion. Less than a fifth mention robotics, tracking systems, telecare and others.

Figure 19: Digitally Supported Care in Class



5.4 Discussion

The selection of the schools was conducted randomly. Only schools that use e-mail for communication could participate. As the act of reforming care professions is valid nationwide and support for the process of digitalisation, such as the “Digitalpakt Schule”, is nationwide available, too, the different regions do not play a role in this analysis.

The sizes of the schools differ. The sizes of the schools differ and depend on the number of students, which ranges from 12 to 734 as well as on the portfolio of different trainings that a school offers. The objective to analyse the level of digitalisation does not include a comparison of schools due to their size.

Whether a school has a digital infrastructure depends on the availability of high speed internet. More than two thirds of the interviewed schools stated to have access to high speed internet. “Fast” is a very subjective assessment because an official guidance for data volumes does not exist. If a school does not have access to high speed internet this can mean that the responsible school owner does not consider it to be necessary or that high speed internet is not available in the school’s region.

At the time of the survey nearly 80 % of the schools stated that their teachers have a mobile device. It does not matter whether a laptop or tablet computer is a

private device or a device owned by the school. A main result is that only nearly half of the schools confirmed that their student have a mobile device. The other half does not have a mobile device, so that they are not able to participate in online classes. But in times in which nearly every young person has a mobile phone, which is sufficient to participate in video conferences, it is remarkable that there are so many students without any mobile device. Obviously, these schools did not apply for support by the “Digitalpakt Schule” to provide mobile devices. As the number of schools which asked for support by the “Digitalpakt Schule” is still low it shows that the “Digitalpakt Schule” does not seem to be the right or sufficient measure to foster the digital transformation in schools.

At least two thirds use an online solution for the administration and storage of students’ data, e. g. periods of absence or test marks. It seems that the majority of the interviewed schools has switched to an electronic system instead of paper filing. But regarding the question about using a digital or a paper class register, most of schools confirmed to still work with the paper version. That means that in a paper class register noted facts about students like periods of absence or class contents have to be transferred into an electronic system instead of direct digital input.

Regarding the question who is responsible for technical maintenance most of the survey participants stated that they are supported by own IT resources. That shows that most of the schools deem the technical support necessary but there are still several schools where teachers or the colleagues from the school administration office are responsible for the technical support – probably additionally to their actual tasks.

After analysing the digital infrastructure and processes of the schools the digitalisation of classes needs to be investigated. The answers to the questions about the digital technologies used in class show that nearly all schools are used to give online lessons via a video conferencing system. This could be a consequence of the lockdown due to Covid-19. Furthermore, many schools use a learning platform as it seems to be necessary for up- and downloading exercises, homework and learning material due to online classes. This can also be a lockdown effect. Still, more than a half use digital blackboards or interactive whiteboards and digital data projectors. This is remarkable as the use of digital data projectors should be more popular than digital blackboards or interactive whiteboards, regardless of the lockdown. To sum up, the use of such equipment in class does not seem to be very common and not many alternatives were mentioned in the survey. The use of digital technologies is clearly visible but seems to still be in the early stages.

When asked what digital methods are used in class, nearly 90 % of the schools stated to use explanatory videos that are available on the internet. A huge majority of survey participants indicated to use interactive presentations. This is remarkable and it could be interesting to investigate what applications are used by these schools. 40-50 % use digital quizzes, collaborative writing and survey programs. Although this is not the majority, such applications do not seem to be unknown. As there were hardly any further digital methods mentioned the author comes to the conclusion that the survey contains a comprehensive selection list.

When asking the schools which learning products they use to assess the learning progress of students most of them mentioned digital presentations. Less than a half produces explanatory videos. Only a third work with digital mind-maps and only a few create digital portfolios, audio podcasts, stop-motion-movies etc. These learning products depend on the equipment available and on the know-how of the teachers and the students.

Digitally supported care in class often means the use of electronic care records and specific apps. This was confirmed by 50 % of the schools which leads to the conclusion that the other half does not discuss the use of electronic care records.

Other solutions do not seem to be popular. They are also depending on the know-how of the teachers, i. e. if the teachers do not work in the (long-term) care sector any more their practical knowledge might be outdated.

In summary, there are differences concerning the digital level of schools and the use of digital technologies. Due to the Covid-19 lockdown most schools had to change to online classes but this seems to be the only relevant digital topic until now. Other aspects seem to be of minor relevance from today’s point of view.

6 Digitalisation at an Education Company in North Rhine-Westphalia

After checking the status quo of several nursing schools now a deep dive into schools of one education company follows to examine positive effects, obstacles and measures to meet the challenges.

6.1 The Education Company

The described company was founded in 2011 by its parent company. The parent company is located in Osnabrück, with several subsidiaries mainly in Lower Saxony; it is an education company to qualify people for the job market in different industries.[148]

In 2010 the levy for the geriatric nursing training ("Ausbildungsumlage in der Altenpflege") was introduced in North Rhine-Westphalia to make the training more attractive to long-term care providers. More of them began to train (geriatric) nurses and the number of students increased by more than 10 %.[149] At this time, the theoretical part of the training was managed mainly by schools run by churches and welfare organisations. Furthermore, the capacities of established schools were limited. The Bundesverband für private Anbieter sozialer Dienste e. V. (bpa), a registered association to represent private long-term care provider in all 16 federal states, started the collaboration with the parent company to found the nursing school with 7 subsidiaries in North Rhine-Westphalia, starting in 2011. Each member of the bpa in North Rhine-Westphalia should now have the opportunity to train people in cooperation with this nursing school.[150]

Although the company was founded to guarantee the theoretical apprenticeship for bpa members, several other long-term care providers also started to collaborate with this nursing school. Today 1,500 students participate in the three-year nursing training at seven locations in North Rhine-Westphalia. Additional trainings are offered, like nursing assistant or qualification programs for refugees and migrants. Furthermore, other subsidiaries were founded in Lower Saxony, Bremen, Hamburg, Hesse and Baden-Württemberg, partially as an own legal entity.[151]

Furthermore, approximately 100 employees, such as teachers, principals, administration and commercial staff, are responsible both for the apprenticeships as

[148] The name of the company shall not be disclosed.
[149] Cf. BMFSFJ, Zwischenbericht (2015), p. 8.
[150] Internal source.
[151] Internal source.

well as for further qualification trainings for nurses and managers of long-term care providers. Due to the law for care professions a cooperation with hospitals is also possible, but up to now their share is negligible.[152]

Starting on March 16th 2020, when the first Covid-19 lockdown began, the nursing schools had to meet the same challenges as other schools. As vocational schools they were able to continue the training by closing the schools and switching the theoretical block with the practical part. Two weeks were needed to reorganise the lessons. Each teacher received a notebook and training on the videoconference system Zoom. The same happened to the administration staff as well as to the commercial management. On April 1st 2020, the class started again via online lessons.[153] In addition to the level of digitalisation this case study shall also analyse reasons and influence factors for digitalisation and its challenges.

6.2 The Expert Interviews

Reasons for the chosen methodology and its approach are described in chapter 2.4. Hence the identified experts, addressed questions and the categories will be described in the following section.

6.3 The Experts

Expert DUT has been a nurse and head of a nursing school at the enterprise since May 2020. He gained experience in digitalisation in other schools as a school principal and teacher before he joined the company.

Expert MG is a managing director and owner of this enterprise. He has been leading the family business in second generation since 2010 and is a key driver of digitalisation.

Expert PF is a nurse who completed his studies on care education and joined the enterprise in 2019. During his master studies he worked as a teacher and product developer in the domain “e-learning”.

Expert TP has been an IT administrator at this enterprise since 2019. He is responsible for IT maintenance, equipment and further development of the IT infrastructure of the nursing schools. Before he joined the company he gained experience in digitalisation at other vocational schools.

[152] Internal source.
[153] Internal source.

Expert WD has been a managing director at this enterprise since December 2020. Before that he had been a managing director at another education company for several years. Due to his functions he gained experience in digitalisation in schools.

6.4 The Questions

The experts were asked the five following questions:

1. How important is digitalisation to secure und increase the competitiveness of nursing schools for you?
2. How do you evaluate the process of digitalisation of these nursing schools regarding
    - the availability of fast WiFi,
    - the availability of mobile devices for teachers and students,
    - the use of digital technologies and methods in and for class,
    - the processes in school administration?
3. Which part of the digitalisation process do you think has been very successful?
4. What are the biggest challenges on the way to digitalisation at these nursing schools?
5. Which measures have to be taken to push the process of digitalisation at these nursing schools? Where should the short-term, medium-term and long-term focus lie?

The interview partners received the questions a few days before the interview took place. The interviews were held dependent on availability via phone call (MG, WD, TP), video conference (PF) or personal meeting (DUT). After a short introduction the questions were asked separately, and after each question the interview partners could answer without interruption so that they had the opportunity to reconcile the content of the question with their knowledge and experience. The questions were used as a kind of a guideline and overlapped partially.

6.5 The Categories

A summary of the interviews was done right after the interview instead of a verbatim transcription to filter the main statements directly. Next, the answers of the questions were encoded and categories defined. This approach is based on the

principles of Kaiser who defined a recommendation according to the content analysis by Mayring (see chapter 2.3).

After consolidating and comparing the documented interviews six categories were inductively defined:

A) Marketing tool
B) Administration processes
C) Technical infrastructure
D) Digital tools
E) Support by management
F) Employees

The categories define the structure for the analysis.

6.3 Results

As described above the results are structured according to each category.

6.3.1 Category A: Marketing Tool

The interview started with a question regarding the meaning of digitalisation for a nursing school. All experts stated a high importance due to several reasons. On the one hand, the possibility of digital classes attracts students as well as teacher applicants. On the other hand, digital tools and channels support the acquisition of students.

6.3.2 Category B: Administration Processes

Nearly all experts confirmed that the digitalisation has also impacted the administration processes. Established software is used more intensively and new tools are implemented. They shorten the processes which brings efficiency gains regarding human and capital resources. On the other hand, it was stated that the strategic focus of digitalisation rather lies on products and that the processes have to be more focused. In addition to those statements, there are several proposals for further development by using new tools such as an integrative management system with the possibility to access data from everywhere. Another proposal includes the implementation of digital class books, digital timetable planners and an application for digital project management.

6.6.3 Category C: Technical Infrastructure

This category refers to the hardware equipment, including internet access. Three experts stated that the quality of internet access depends on the locations of the schools. All of them confirm that high speed internet access is essential everywhere and that many subsidiaries can use it. Concerning the equipment, all interview partners agree that every employee, such as teachers, administration staff etc. should be offered an own mobile device, such as a laptop. All students should also have an own mobile device, but this is currently up to them. If they do not have any possibility to get a device a laptop can be borrowed at this nursing school to participate in an online class. Each nursing school is also able to equip two classes with laptops when lessons take place in the classroom.

6.6.4 Category D: Digital Tools

With regard to digital tools and in particular to software and programs being used, two experts stated that classes could be continued nearly without interruption during the first lockdown in 2020. Furthermore, the use of the tools increased due to the school closure. Before the restrictions started, the local authorities did not support the use of digital learning, such as e-learning or other types of asynchronous learning. However, it was stated that there is still a lot of know-how missing about available tools. The teachers do not make full use of the range of possibilities. This includes, for instance, the learning platform currently used, which could be used more. Another proposal is to offer a platform app for mobile phones, as teachers and students can use them in a more flexible way. The digital communication should be fostered as it is faster as well as more transparent and it enables more interaction among students and teachers, too.

6.6.5 Category E: Support by Management

The influence of the management board in the context of digitalisation is noticeable in the following cases. Two experts stated that the distribution of laptops during the first lockdown happened very fast. In addition, the non-interruption of class was also secured due to the already existing digital infrastructure, which could be adapted quickly. The establishment of an IT-department several years ago also proved beneficial. Furthermore, an online tutorial and training system was implemented comprehensively. The management board can track the completion of (essential) trainings and directly react to needs.

The next step by the management board shall be a tool to enable hybrid classes – a combination of an in-person class and students participating via an online access. However, the acceptance of the supervisory authorities is needed in order to develop and enable this kind of training.

6.6.6 Category F: Employees

The experts confirmed employees to be a key driver in the development. They have to be motivated to participate in the digital change and to provide their teaching content in a digital form. As their range of digital competency is very wide, trainings about tools, the hardware and also risks, e. g. about data protection or phishing mails, are necessary. There are also worries about losing employees when they feel overburdened by the increasing digitalisation and that due to mobile working the work-life balance could be at risk if there are no clear boundaries between work and private life. If the number of employees increases the digitalisation could be fostered. Furthermore, one person should be constantly approachable regarding digital topics.

6.7 Discussion

According to the statements of the interview partners these nursing schools started a fast digitalisation process in 2020. Due to the lockdown because of Covid-19 and the suspension of in-person classes each teacher and every other employee received a mobile device as fast as possible in order to be able to work at home. As they were also able to give virtual lessons in school the availability of a high speed internet was an important prerequisite. There are regional differences in connectivity. Many subsidiaries exploited the capacities and were able to work with sufficient data volume.

Furthermore, everyone had to participate in a training for using video conferencing systems. All teachers were obliged to proceed with their lessons and video conferencing systems were the only way to do so. The classes could be continued and an interruption of daily business could be avoided.

This could be realised as the digitalisation process was strongly pushed by the management board. With the lockdown and schools closing the distribution of laptops to teachers was accelerated.

It was a strategic management decision to strengthen the product portfolio by introducing a learning platform. Neither the distribution of laptops nor the adjust-

ments of the learning platform could happen without the implementation of a professional IT-department, which was set-up and scaled up before. This was beneficial during the lockdown period and the system could be easily adapted to the new requirements.

At the time of the interviews the experts stated that the offering of lessons via video conferencing systems and working with mobile devices in class attracted new students. The same holds true for new employees, such as teachers. Hence, the participation in class was guaranteed to each student.

A further common statement was that the administration processes could be made more efficient with an intensified use of existing software and the introduction of new tools.

6.7.1 Challenges and Proposals

The continuation of the business activity was successful. But the interview partners stated a variety of challenges and made some proposals for the near future.

It is a prerequisite to have access to high speed internet. Nonetheless there might still be a few working places where the data bandwidth is not sufficient. Furthermore, it would be desirable to provide each student with a mobile device, independently of whether he or she has an own, in order to secure the same equipment standard for everyone.

Additionally, laptops and video conferencing programs were introduced, but without training in digital teaching methods. It was stated that the various digital tools for lessons were used rarely due to a lack of knowledge. The existing learning platforms as well as video conferencing systems are not utilised to their full potential. The digital communication could be intensified in order to use all advantages. Learning platforms should also be offered via an app for teachers and students, which can be installed on their mobile phones. The digital interaction should be pushed more.

As the main focus has been on the digitalisation of classes, the administration processes did not develop with the same speed. Digital products conflict with analogue processes. Missing interfaces between administration systems lead to a high manual workload in maintaining spreadsheets, which requires many resources. Shortening the administration processes could generate more time for customer service activities. An integrative management system, i.e. a central filing of data, should be implemented. Furthermore, a variety of digital tools gain

more efficiency in processes, e. g. digital class books, a digital timetable planner or a digital project management tool.

Finally, one important factor has a decisive influence on the success of digital transformation: The acceptance of the employees. It was stated that it is very important to motivate them to take part in this process. The experts emphasised that training is needed and should be provided for different topics: handling of the hardware, training on popular digital tools as well as risks. The range of digital skills is wide: from experienced to very uncertain if and how to use digital tools. This aspect can become a serious concern as there could be a risk to loose resources due to perceived excessive requirements. A potential solution might be to exempt these resources temporarily from work in order to train them in the new tools and processes to push the process of digitalisation besides the daily business. One further recommendation is to implement specialists for different topics, which guarantees constant availability of contact persons, e. g. digitally experienced teachers who will be released a little from their daily work.

7 Conclusion

Digitalisation and nursing schools – one might think that these two terms do not fit together as they relate to two apparently different domains with only little overlaps. However, the truth is that most nursing schools obviously began with the process of digitalisation but there is also room for improvement. What challenges do they have? To find the answer to that question the following was done: Digitalisation in schools as well as the long-term care sector with its nursing schools were analysed in a desk research. Furthermore, the status quo of digitalisation in nursing schools was examined with the help of an online survey and challenges and obstacles of an implementation were identified via expert interviews in an education company running 7 nursing schools in North Rhine-Westphalia.

Digitalisation needs to be understood as a holistic approach as it means the conversion of all analogue processes into digital ones. For enterprises digitalisation could mean a risk if they do not adapt their business model, which then would turn into a competitive disadvantage. This could also be evident for any kind of schools as digitalisation meanwhile also affects the whole education sector. Maybe schools are not affected by digitalisation in the same way as enterprises are, since their customers – the students – usually cannot easily switch to another much more digitalised provider. However, if students have the choice they probably would take a school which is perceived to be modern and adapted to a new learning environment and which fits better to their way of (digital) life.

Furthermore, the role of a teacher will most likely change as students with mobile devices such as a mobile phone are able to conduct research during lessons and as they request a change in teaching and learning methods. And when teachers do not need to care about class administration as this could be done much more easier by software programs, they could spend more time with the students or lesson preparation. For sure all data security issues need to be solved, but once all questions about data security have been answered, no arguments against digitalisation should remain from today's point of view.

As there are more arguments for digitalisation than against it, the school closings due to Covid-19 restrictions show that the digitalisation process had not, or only rarely, started at many general schools. Although the federal government and the federal states decided to support the process with the "Digitalpakt Schule" in 2019 the situation did not change noticeably. An only slowly increasing number of schools applied for the funds and the establishment of digital tools nearly two years after the first lockdown has improved only slightly.

Before investigating the situation at nursing schools the context of nursing schools had to be explained as they are a specific type of vocational school offering a dual training in order to become a nurse. They are part of the long-term care sector.

As the long-term care sector with its complex structures and different players is faced i.a. with a strong increase due to the growing number of older people who are in need of care (demographic change) and with the significant lack of skilled nurses, the use of digital technologies would be part of a solution to meet the challenges in this sector. There are several digital technologies which could improve the work and its environment. But the care sector is still underdeveloped due to several reasons, e. g. concerns about data security, ethical reasons and also difficulties in implementation.

Due to the fact that, in general, vocational schools are closely linked to enterprises with whom they cooperate, in particular if they offer the dual training system, they have to teach practical contents. If the enterprises or the corresponding industry sector are more characterised by automation this could have an impact on the collaborating vocational schools. However, as described above, the long-term care sector is just at the very beginning of the digitalisation process and does not seem to be the driving element.

The nursing training could be key element. The reform of care professions was a national approximation to the training in other European countries. But the new curriculum was confronted with the challenge to conduct a concept which combines the three nursing trainings. Digitalisation is mentioned in the framework curriculum but does not play a significant role. But the nursing training in particular served as a key enabler to push the digitalisation when schools had to adapt due to Covid-19 restrictions. This does of course not relate to specific care tools but to the use of digital tools for administration and communications purposes.

The next step was to assess the digital status quo in German nursing schools. Via an online survey 83 schools were asked about their technical infrastructure, processes, technologies and methods in class. It seems that the infrastructure was given in most nursing schools with access to high speed internet and dedicated equipment for teachers. But there is room for improvement regarding the equipment of students as only approximately half of the schools ensure that their students have a mobile device. Otherwise, administration processes are meanwhile transferred to digital solutions and technical maintenance is assigned to professionals. The basic equipment for online classes was also given by the schools and more than a half stated an active use of several technologies and methods. But most digital learning products were used by less than a half and

also less than a half discusses digitalisation in care. This means that the nursing schools also react to the lockdown and tried to find a way to continue their daily business. Apart from exceptional cases the digital transformation has slowed down so that they are still at the beginning of the digitalisation process.

The analysis of this education company with seven nursing schools in North Rhine-Westphalia shows the development of digitalisation in detail. Five expert interviews confirm that the nursing schools have a well-developed digital infrastructure in general with access to high speed internet and a sufficient equipment for teachers. The participation in class is also ensured for students. Due to the fast distribution of mobile devices during the first lockdown, the quick implementation of a video conferencing tool and other strategic measures implemented earlier (own IT-resources, digital infrastructure etc.) daily business could be continued. But then the process of digitalisation of classes and administration slowed down significantly as digital tools for class were still not used and important digital tools for administration were not introduced. One key element are the employees who determine the use of digital tools in their daily business. If they are not convinced to use and work with digital methods the progress of digitalisation is difficult. Employee trainings with relevant content play an important role, too.

To sum up there are challenges for nursing schools due to digitalisation. They are forced to participate in the digital transformation. In the long view, schools with a digital equipment that is not sufficient or not used will lose customers, the nursing students, and become less attractive for employees. Schools with analogue and inefficient processes usually have a costly administration, which has a negative effect on the profitability. And only schools with a digital environment are eligible for practical teaching of digital technologies used in care. Although there is currently room for improvement in long-term care, this sector will very likely become more developed in the future. Schools must be able to offer an adequate nursing training according to practical requirements, including technical tools. As the analysis shows most nursing schools still have to improve their level of digitalisation. This does not only include the equipment but digitally-skilled and motivated employees, in particular teachers and a complete digital administration.

Appendix: Questionnaire Digitalisation at Nursing Schools

soSci
oFb - der onlineFragebogen

Online-Umfrage

Digitalisierung in deutschen Pflegeschulen

Zeitraum: 27.02. – 13.03.2021

Autor: Eva Großpietsch, Master-Absolventin der FOM Köln

Sehr geehrte Pflegeschulleiterin, sehr geehrter Pflegeschulleiter,

herzlichen Dank für Ihre Bereitschaft, an dieser Umfrage teilzunehmen. Ich absolviere zur Zeit berufsbegleitend den Master of Business Administration an der Fachhochschule für Ökonomie und Management (FOM) in Köln.

Um im Rahmen meiner Masterarbeit „Die Digitalisierung als Herausforderung für Pflegeschulen" den Status quo der Digitalisierung an deutschen Pflegeschulen festzustellen, benötige ich Ihre Hilfe. Als Dank für Ihr Mitwirken lasse ich Ihnen im Anschluss gern die Ergebnisse der Befragung zukommen. Da Ihre Teilnahme anonym stattfindet, benötige ich hierzu Ihre Kontaktdaten. Diese können Sie mir gern an die unten angegebene Mailadresse zukommen lassen.

Es sind insgesamt 14 Fragen. Die Beantwortung dauert maximal 10 Minuten.

Die Teilnahme ist absolut freiwillig und völlig anonym. Die erhobenen Daten werden streng vertraulich behandelt und unterliegen dem Datenschutz.

Aus Gründen der besseren Lesbarkeit wird in dieser Umfrage die männliche Sprachform angewandt. Es wird an dieser Stelle darauf hingewiesen, dass die ausschließliche Verwendung der männlichen Form geschlechtsunabhängig verstanden werden soll.

Vielen lieben Dank und freundliche Grüße

Eva Großpietsch

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Köln, 27. Februar 2021

Seite 02

Daten zu Ihrer Schule

1. Zu welcher Schulform gehört Ihre Schule?

Bitte wählen Sie:

- ◯ Pflegeschule nach dem Pflegeberufegesetz
- ◯ Andere

2. Wo befindet sich der Sitz Ihrer Schule?

Bitte geben Sie Postleitzahl, Ort und Bundesland an.

Postleitzahl	
Ort	
Bundesland	

3. Welche Ausbildungen werden an Ihrer Schule durchgeführt?

Bitte geben Sie an, was Sie regulär anbieten:

- ☐ Dreijährige Ausbildung zur Pflegefachkraft nach dem Pflegeberufegesetz
- ☐ Einjährige Ausbildung zur Kranken- oder Altenpflegehilfe bzw. Pflegeassistenz nach dem Pflegeberufegesetz
- ☐ Andere 1:
- ☐ Andere 2:
- ☐ Andere 3:

4. Wie viele Schüler bzw. Teilnehmer besuchen Ihre Schule?

Dreijährige Ausbildung zur Pflegefachkraft	Bitte geben Sie eine Zahl an	Schüler
Einjährige Ausbildung zur Hilfskraft bzw. Pflegeassistenz	Bitte geben Sie eine Zahl an	Schüler
Andere 1 (siehe Frage 3):	Bitte geben Sie eine Zahl an	Schüler
Andere 2 (siehe Frage 3):	Bitte geben Sie eine Zahl an	Schüler
Andere 3 (siehe Frage 3):	Bitte geben Sie eine Zahl an	Schüler

Seite 03

Digitale Infrastruktur und Prozesse

5. Wie ist die Ausstattung mit Internet an Ihrer Schule?

Unsere Schule verfügt über schnelles Internet:

- ◯ Ja
- ◯ Nein
- ◯ Ich weiß nicht

6. Wie ist die Ausstattung mit mobilen Endgeräten für Lehrer?

Gemeint sind Laptops, Tablets, ggf. Mobiltelefone, sowie private und gestellte Geräte.

Jedem Lehrer steht ein mobiles Endgerät für den Unterricht zur Verfügung

- ◯ Ja
- ◯ Nein
- ◯ Ich weiß nicht

7. Wie ist die Ausstattung mit mobilen Endgeräten für Schüler?

Gemeint sind Laptops, Tablets, ggf. Mobiltelefone, sowie private und gestellte Geräte.

Jedem Schüler steht ein mobiles Endgerät für den Unterricht zur Verfügung.

- ◯ Ja
- ◯ Nein
- ◯ Ich weiß nicht

8. Wie werden die Kontaktdaten, Fehlzeiten sowie Leistungen der Schüler erfasst, gepflegt und archiviert?

Wenn alle Antworten zutreffen, dann wählen Sie bitte die Vorgehensweise, die mehr genutzt wird. Entscheidend ist die Form der Aufbewahrung (analog oder digital), die für den Nachweis für Prüfinstanzen genutzt wird.

- ◯ Die Informationen werden in Papierform erfasst, gepflegt und archiviert
- ◯ Die Informationen werden in einer (Online)Datenbank erfasst, gepflegt und archiviert
- ◯ Anderes:
- ◯ Ich weiß nicht

9. Wie dokumentieren die Dozenten die Inhalte ihrer geleisteten Stunden in den einzelnen Kursen?

Wenn alle Antworten zutreffen, dann wählen Sie bitte die Vorgehensweise, die mehr genutzt wird. Entscheidend ist die Form der Aufbewahrung (analog oder digital), die für den Nachweis von unterrichteten Stunden genutzt wird. Übergangslösungen, die lediglich aufgrund des Distanzunterrichts angewendet werden, sind nicht gemeint.

- ○ Im Klassenbuch in Papierform
- ○ Online im digitalen Klassenbuch
- ○ Anderes

- ○ Ich weiß nicht

10. Wer ist an Ihrer Schule für die technische Wartung der Geräte / der Infrastruktur zuständig?

Die Wartung und Prüfung der digitalen Geräte übernehmen...

- ☐ Dozenten
- ☐ Verwaltungsmitarbeiter
- ☐ Angestellte technische Mitarbeiter
- ☐ Externe Dienstleister
- ☐ Andere:

- ☐ Ich weiß nicht

Seite 04

Digitalisierung des Unterrichts

11. Auf welche digitalen Technologien greifen Ihre Pädagogen bzw. Sie bei der Unterrichtsdurchführung sowie bei der Unterrichtsvor- und -nachbereitung zu?

Es können mehrere Antworten ausgewählt werden.

- ☐ Wir arbeiten mit einer Lernplattform, z. B. mit einer eigenen oder mit Moodle, iServ o. ä.
- ☐ Wir bieten auch Online-Unterricht mit Hilfe einer Videokonferenzsoftware an, z. B. via Skype, Zoom o. ä.
- ☐ Wir arbeiten auch mit digitalen Tafeln bzw. interaktiven Whiteboards
- ☐ Es gibt Lern-Angebote via Lern- oder Game-Apps, z. B. Körperanatomie in 3D o. ä.
- ☐ Wir arbeiten mit digitalen Projektoren (Beamer)
- ☐ Anderes:

- ☐ Wir verwenden keine digitalen Technologien

12. Welche digitalen Methoden wenden Ihre Pädagogen bzw. Sie im Unterricht an?

Es können mehrere Antworten ausgewählt werden.

- ☐ Es werden (Erklär)-Videos gezeigt
- ☐ Dateien werden gleichzeitig von mehreren Personen bearbeitet (Collaborative Writing)
- ☐ Es werden während des Unterrichts digitale Um- und Abfragen durchgeführt und direkt sichtbar gemacht, z. B. mit Mentimeter, Answergarden o. ä.
- ☐ Interaktive Präsentationen erlauben das Teilen der Folien während des Vortrags; Fragen können direkt in der Präsentation gestellt werden
- ☐ Es werden QR-Codes auf analogen Arbeitsblättern verwendet
- ☐ Als Lernwiederholung und Wissensüberprüfung werden digitale Quiz durchgeführt, z. B. mit Kahoot, Learning Snacks o. ä.
- ☐ Anderes

- ☐ Wir verwenden keine digitalen Methoden

13. Welche digitalen Lernprodukte werden von den Schülern erstellt?

Es können mehrere Antworten ausgewählt werden.

Die Schüler produzieren mit Unterstützung von entsprechender Software

- ☐ (Erklär-)Videos
- ☐ digitale Portfolios, z. B. mit Flipsnack o. ä.
- ☐ digitale Mind-Maps, z. B. mit Padlet o. ä.
- ☐ Hörspiele
- ☐ digitale Präsentationen, z. B. Power Point, Impress o. ä.
- ☐ Stop-Motion-Filme
- ☐ Anderes

- ☐ Sie erstellen keine digitalen Lernprodukte

14. Welche digitalen Technologien aus der Pflege werden im Unterricht behandelt?

Geben Sie alle an, die im Unterricht an Ihrer Schule thematisiert werden.

- ☐ Nutzung von „Pflege"-Apps zur Information, Kommunikation, Monitoring, Training u. a.
- ☐ Elektronische Dokumentation (software-basierte Pflegeplanung und Erfassen der pflegerischen Maßnahmen)
- ☐ Telecare – Erbringen von Pflegeleistungen durch Informations- und Kommunikationstechnologien auf Distanz
- ☐ Technische Assistenz als digitale Unterstützung in der häuslichen und pflegerischen Umgebung
- ☐ Robotik mit verschiedenen Einsatzmöglichkeiten, z. B. Service, Pflege, Emotionen
- ☐ Augmented Reality – über AR-Brillen werden Informationen sichtbar gemacht, die Hände bleiben frei für die Pflege
- ☐ Digitale Gehhilfen
- ☐ Personen-Ortungs-Systeme
- ☐ Pflegesimulation
- ☐ Vernetzte Pflegebetten
- ☐ Andere:

- ☐ Digitale Technologien in der Pflege werden kaum im Unterricht behandelt

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Letzte Seite

Vielen Dank für Ihre Teilnahme!

Ich möchte mich ganz herzlich für Ihre Mithilfe bedanken. Fragen, Anregungen und Rückmeldungen nehme ich gern via Mail: eva.grosspietsch@web.de entgegen.

Ihre Antworten wurden gespeichert, Sie können das Browser-Fenster nun schließen.

Möchten Sie in Zukunft an interessanten und spannenden Online-Befragungen teilnehmen?

Wir würden uns sehr freuen, wenn Sie Ihre E-Mail-Adresse für das SoSci Panel anmelden und damit wissenschaftliche Forschungsprojekte unterstützen.

E-Mail: Am Panel teilnehmen

Die Teilnahme am SoSci Panel ist freiwillig, unverbindlich und kann jederzeit widerrufen werden. Das SoSci Panel speichert Ihre E-Mail-Adresse nicht ohne Ihr Einverständnis, sendet Ihnen keine Werbung und gibt Ihre E-Mail-Adresse nicht an Dritte weiter.

Sie können das Browserfenster selbstverständlich auch schließen, ohne am SoSci Panel teilzunehmen.

Eva Großpietsch, FOM – 2020

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