

DIGITAL MEDIA EDUCATIONAL PROCESSES OF HEALTH AND NURSING PROFESSIONALS. CURRENT DEVELOPMENTS IN GERMANY

Astrid Seltrecht¹
Franziska Josupeit²

ABSTRACT: In the age of the industrial revolution 4.0 the question arises as to how far digitization, which is taking place in all areas of life and work, can help meet the challenges of caring for patients or relieve the burden on nursing staff. In the health sector, including professional care, digitization is taking place at a rapid pace. In hospitals, digitization means demand-oriented support by means of information technology or artificial intelligence. Nursing staff in Germany, but also in other countries, are required in occupational everyday life to repeatedly engage in the implementation of new digital technologies and to use these appropriately. So, what is needed is digital competence which leads to responsible and independent handling of digital technologies. Due to the rapid digital progress, this digital competence must enable every working person to react to technical innovations in everyday working life. This requirement of a formal education in view of these digital competences leads to the question, to what extent the curriculums in the training and continuing education of nursing staff are already geared toward digital literacy training. The following article describes the results of a document analysis. The documents are a variety of legal and curricular regulations from the area of training and continuing education in the care sector.

Keywords: digital competence, health sector, vocational training, computer-related self-efficacy, document analysis, curricula

Shortage of Skilled Labor in the Care Sector

In Germany (approximately 83,000,000 inhabitants), there are currently 4.1 million people in need of care, in accordance with Volume XI of the German Social Security Code (Federal Statistical Office, 2020, p. 2). Eight hundred thousand people in need of care are being cared for by trained nursing staff in long-term care facilities (Federal Statistical Office 2020, p. 3). The number of people in need of care, including the care recipients being cared for in care facilities, continues to rise steadily in Germany. Additionally, there is an annual number of cases of almost 20 million patients who are receiving treatment in hospital. The demand for nursing professionals is thus very high solely on the basis of the large number of care recipients to be cared for. The nursing professionals doing their work in the various service areas are, however, under a lot of physically and psychologically strain in some cases. The pressures lead to subjectively different levels of stress. This stress, in turn, leads to a high number of sick days or to exit of the nursing profession. The nursing professionals staying in the profession are additionally burdened by the departure of their colleagues and by the constant training of new nursing staff.

¹ University of Magdeburg, Germany, Department of Vocational Education and Human Resources Development, astrid.seltrecht@ovgu.de

² University of Magdeburg, Germany, Department of Vocational Education and Human Resources Development, franziska.josupeit@ovgu.de

There are already various strategies in Germany to counteract this shortage of careers. Firstly, trainees are specifically recruited. Secondly, nursing professionals are to be kept in the profession (“Training and qualification campaign care of the elderly”). In the introduction of a new caring profession, it is endeavored to do justice to both of the above strategies at the same time: The three vocational qualifications in the areas of pediatric care, nursing of adults, and geriatric care, have been replaced by the training to become a nursing specialist (f/m) since 2020. With this, the aim is to

- strengthen the nursing profession,
- extend the area of responsibilities, and
- to achieve vocational competence for people of all ages in all service areas (acute inpatient, long-term inpatient, outpatient).

This new vocational training will not, however, be able to solve the shortage of skilled workers on its own. In the age of the industrial revolution 4.0, however, the question arises as to how far digitization, which is taking place in all areas of life and work, can help meet the challenges of caring for patients or relieve the burden on nursing staff. This question directly leads to the question to what extent digitization is a substantive element in the training and continuing education of nursing specialists.

Digitization: Solution for a Structural Problem?

In the health sector, including the professional care, digitization is taking place at a rapid pace. In hospitals, digitization means demand-oriented support by means of information technology or artificial intelligence. A digitized hospital, for example, includes the following areas:

- human-machine interaction for the diagnosis, treatment, and aftercare of patients;
- digital documentation of the care process;
- digital communication between the various medical functional areas and care units of a hospital;
- digital goods management (medical therapeutic products and aids, catering, etc.);
- digital patient information system; and
- digital employee information system, etc.

Such digitization has, however, not yet reached all institutional subsectors. Nursing staff in Germany, but also in other countries, are required in occupational everyday life to repeatedly engage in the implementation of new digital technologies and to use these appropriately. Therefore, what is needed is digital competence which leads to responsible and independent handling of digital technologies. Due to the rapid digital progress, this digital competence must enable every working person to react to technical innovations in everyday working life, without the specific innovations having been addressed in training and continuing education in each case.

Development of Digital Media Literacy as Preparation for a Digital Working World

To prepare the next generations for the digital challenges in the world we live and work in, the Conference of Ministers of Education (the consortium of the ministers of

education of the 16 German federal states) have issued the policy document “Education in the Digital World” (Secretariat of the Conference of Ministers of Education [KMK] 2016, Version 2017) as a recommendation framework for all educational institutions. It contains six areas of competence, in which starting from the year 2018/2019, children, young persons, and adults are to be trained from the time they start school:

1. Searching, processing, and storing;
2. Communicating and cooperating;
3. Producing and presenting;
4. Protecting and operating safely;
5. Problem solving and taking action; and
6. Analyzing and reflecting (KMK 2016, Version 2017, pp. 16-18).

This requirement of a formal education in view of these digital competences leads to the question, to what extent the curriculums in the training and continuing education of nursing staff are already geared toward digital literacy training.

Aim and Research Issue

The following article describes the results of a document analysis. The documents are a variety of legal and curricular regulations from the area of training and continuing education in the care sector. The aim is a survey of the extent to which curricula for training and continuing education address digitization in the care sector and the extent to which the use of digital methods is incorporated in curriculum.

The results of the systematically performed analysis of curricula also serves as the basis for the evaluation of interviews with teachers and trainees in nursing in the research project “DiMediCa.”: The project “Digital Medical Care - Digital Medical Care. Digitization processes in the training and continuing education in the health and care sector” (DiMediCa) tracks, among other things, the objective to generate conditions for the implementation and use of digital media from the perspective of teachers and from the perspective of trainees by means of qualitative and quantitative research. On this basis, recommendations for action for schools and teaching are then to be developed. From 2018/10 to 2021/09, the project is supported by the Federal Ministry of Education and Research (BMBF) (Bünning et al, 2019). As professional pedagogical action must always be analyzed in the context of curricula, the analysis of relevant curricula is the basis for the DiMediCa project. If, for example, no professional competencies for digitally supported nursing action are the subject of a nationwide or statewide curriculum, individual teachers cannot be accused of failing to take digitization in nursing into consideration. The result may, at best, record that the curricula fail to do justice to digitization in the world of life and work and therefore provide training and continuing education that does not meet the demands. In this case, the problem lies at the macro level with regard to the fit between societal development, occupational needs, and vocational training. The analysis of the curricula serves to uncover these interdependencies.

Theoretical Foundation

Competent handling of digital technologies in the care sector and the use of digital media in training and continuing education are indirectly connected: Dealing with specific digital technologies can only be addressed to a limited extent in theoretical and practical lessons - especially since the development of digital technologies is taking place at a rapid pace. The next generation can only be successfully prepared for the vocational challenges by the development of digital competencies in general.

A yardstick for digital competence is the computer-related self-efficacy. Computer-related self-efficacy identifies the confidence of a person to cope with computer-related challenges. Computer-related self-efficacy is based on the concept of self-efficacy expectations, as defined by Albert Bandura (Bandura, 1977). Self-efficacy has an influence on frustration tolerance, motivation, stamina, and the time it takes a person to recover from failures. Self-efficacy also has an influence on whether actions are initiated pro-actively. Self-efficacy therefore reflects the extent to which a person assesses him/herself in terms of coping with challenges in life and work. Accordingly, computer-related self-efficacy means one's own confidence in being able to meet challenges connected with computers. Computer-related self-efficacy can be measured by predictors: the number of known applications, the duration of digital media use, computer ownership. Furthermore, with increased expectation of computer-related self-efficacy, persons independently initiate and carry out more actions at the computer and manage to deal with failures more effectively.

In an analysis of the DiMediCa project (Arndt & Seltrecht, 2021), trainees for the care profession were surveyed with the help of a questionnaire. Three-hundred and sixty questionnaires were received in response. The validated number of returns is 255 questionnaires. The result shows that the expected computer-related self-efficacy correlates with the number of the known computer application and the duration of the computer use. In relation to the gender-specific differentiation it can be noted that there is no significant difference regarding computer-related self-efficacy expectation between male and female trainees. However, trends are emerging in the data that female students tend to rate themselves worse than male students. It also reflects that self-assessment of computer self-awareness is dependent on one's own reflective ability: If the reflective ability is higher, the self-awareness in terms of dealing with the computer is more pronounced. It is also shown that the expectation of computer-related self-efficacy is connected to the computer ownership. There is a significant difference between persons who own a computer and those who do not own a computer: Owners of computers have a significantly higher expectation of computer-related self-efficacy than persons not owning a computer to which they have access at any time (Arndt & Seltrecht, 2021).

If digital competencies are related to computer-related self-efficacy, work can be done in training to increase expectations of computer-related self-efficacy: by providing trainees with their own terminal devices, by internal differentiation between trainees, and by promoting self-assessment (Arndt & Seltrecht, 2021).

The question remains whether digitization should be part of the curriculum at all, or to what extent, and to what extent digital media should be a means and method of training.

Methodical Concept

The restructuring of the vocational training for the caring profession requires the examination of the federal curriculum recommendation and examination of state-specific curricula. This work is a prerequisite if schools are to meet their statutory obligation to prepare an internal school curriculum for training. As the training to become a nursing specialist in Germany takes place at various learning facilities, the different curricular requirements must also be analyzed as distinguished from each other. After completing a three-year training program, nursing specialists have the opportunity to take part in a wide range of specialized training courses. For this purpose, there are curricula available in the individual Federal states.

In the analysis of the curriculum as basis of the analysis of qualitative interviews, the following statutory and curricular regulations were included:

- Pflegeberufegesetz (PflBG) (Law on nursing professions),
- Ausbildungs- und Prüfungsverordnung für die Pflegeberufe (PflAPrV) (Vocational School Training and Examination Regulations for nursing professions),
- Recommendation of the expert commission in accordance with Section 53 PflBG for a framework curriculum,
- State curriculum Part 1 and Part 2 of the Federal State of Saxony-Anhalt, and
- Recommendations of the German Hospital Federation (Deutsche Krankenhausgesellschaft (DKG)) for further nursing education.

The curricula mentioned were subjected to a deductive analysis. Firstly, the curricula were examined with regard to content-related references to digital technologies. Secondly, the curricula were analyzed for methodological indications regarding the use of digital media within teaching and learning processes.

Empirical Results

Law on Nursing Professions: Digitalization in the Care and Digital Media in Training

The Law on nursing professions (PflBG) contains only one reference to digital technologies within professional care. Only higher education is intended to enable students to "access areas of research in professional nursing based on the latest validated findings and to be able to transfer research-based solutions to problems as well as new technologies to their professional activities" (Law on nursing professions [PflBG], Section 37 (3), Item 3). This legislation does not explicitly refer to "digital media literacy". The training imparts the "professional and personal competencies required for professional nursing activities, including the underlying methodical, social, intercultural

and communicative competencies and the underlying learning competencies as well as the ability to transfer knowledge and to self-reflect." (PflBG, Section 5).

Vocational School Training and Examination Regulations for Nursing Professions: Digitalization in the Care and Digital Media in Training

The Training and Examination Ordinance for the Nursing Professions (PflAPrV) also provides for the documentation of nursing measures and observations in the nursing documentation with the aid of digital documentation systems as proof of acquired competencies for the intermediate examination in accordance with Section 7 PflAPrV. With reference to Section 9 PflAPrV, competencies in the use of digital nursing documentation systems are also tested as part of the state examination.

Recommendation of the Expert Commission in Accordance with PflBG for a Framework Curriculum: Digitalization in the Care and Digital Media in Training

The framework curriculum for the training to become a nursing specialist (f/m) is a recommendation of an expert commission that was set up on the basis of the Nursing Professions Act, among other things, to develop precisely such framework curriculum. The framework curriculum relates to the theoretical and practical lessons at a school of nursing. In the framework curricula of the expert commission, there are already references to digital technologies in nursing in several curricular units (CE):

- CE 01: Reflection of prior nursing experience and learning biography, including digital competencies;
- CE 02: digital documentation systems, digital tools to assist in mobility support and positioning, digital nursing documentation systems, digital measuring instruments, digital patient records;
- CE 04: digital tools for digital tools for health-promoting/preventive information and counseling services, knowledge research and evaluation using digital information and communication technologies;
- CE 06: digital emergency information systems and emergency call systems, digital early warning systems;
- CE 07: digital assistance systems, e.g., exoskeleton or computer with a voice synthesizer;
- CE 08: digital companion/smart home technology;
- CE 09: Digitization, digital assistance systems, digital networks in the social environment; and
- CE 10: situational application of digital tools, accessing scientifically based knowledge and epidemiological data from pediatric care using digital information and communication technologies (see also Federal Institute for Vocational Education and Training [BIBB], 2020, pp. 33-198).

There are no explicit references to the use of digital media in theoretical and practical lessons.

State Curriculum Part 1 and Part 2 for the Federal State of Saxony-Anhalt: Digitalization in the Care and Digital Media in Training

The Federal State of Saxony-Anhalt has developed its own state curriculum pursuant to 53 PflBG, based on the framework plan of the expert commission (BIBB). Part 1 and Part 2 of the state curriculum relate to the first two years of training. This state curriculum contains learning fields (LF) that correspond to the curricular units of the framework curriculum of the expert commission, pursuant to Section 53 PflBG. The learning fields are subdivided once again into learning field units (LFU). The learning field units contain references to digital technologies in the following way:

- LFU 01.01: Reflection of the (learning) biography (incl. digital competencies);
- LFU 02: Trainees prepare to participate in the organization and implementation of the care process and the associated digital or analog documentation;
- LFU 02: Documentation of implemented care measures and observations in the care documentation also with the assistance of digital documentation systems and participation in the evaluation of the care process on this basis (I.1.f);
- LFU 02 A.01: Technical and digital tools to support the mobility support and positioning and regulations on their availability (e.g., Medical Devices Act);
- LFU 02 A.01: Provision of mobility support to people in their day-to-day activities and, if required, use of technical and digital tools;
- LFU 02 A.02: Technical and digital tools to support the mobility support and positioning and regulations on their availability (e.g., Medical Devices Act);
- LFU B.01: Use of care documentation systems (analog/digital), obtaining information on the skin condition and documenting implemented body care and oral hygiene;
- LFU B.02: Use of care documentation systems (analog/digital), obtaining information on nutritional status, and documenting the care provided;
- LFU B.03: Use of care documentation systems (analog/digital), obtaining information on elimination and documenting the same;
- LFU B.04: Use of care documentation systems (analog/digital), obtaining information on health condition, and documenting the care provided;
- LFU B.04: Competent use of digital measuring devices and technical aids;
- LFU 04.01: Use of technical/digital tools for health-promoting/preventive information and consulting services (e.g., health apps, telecare, etc.) and critical, professional reflections on the services offered;
- LFU 04.02: Use of technical/digital tools for health-promoting/preventive information and consulting services (e.g., health apps, telecare, etc.) and critical, professional reflection on the services offered;
- LFU 05.01: Knowledge research and evaluation, including the use of digital information and communication technologies;
- LFU 05.02: Knowledge research and evaluation, including the use of digital information and communication technologies;
- LFU 06.01: Digital emergency information systems and emergency call systems, digital early warning systems;

- LFU 07.01: Implementation of targeted training to support coping with everyday life, taking into account biographically determined habits, circumstances, and social support systems, as well as using technical and digital assistance systems;
- LFU 07.01: Exploration or excursion with regard to situationally suitable technical and digital assistance systems (e.g., exoskeleton, computer with a voice synthesizer);
- LFU 07.02: Exploration or excursion with regard to situationally suitable technical and digital assistance systems (e.g., exoskeleton, computer with a voice synthesizer);
- LFU 07.02: Observation and reflection task of a training course in the use of selected technical and digital assistance systems (if necessary, also analysis of a videotaped example in compliance with data protection);
- LFU 09.01: Social developments influencing people's lives and health progressions (behavioral and situational prevention): Technological upgrading, digitalization, abundance, poverty, food availability, delimitation of work, cultural and religious diversity; and
- LFU 09.02: Social developments influencing people's lives and health progressions (behavioral and situational prevention): Technological upgrading, digitalization, abundance, poverty, food availability, delimitation of work, cultural and religious diversity (Burchert et al, 2020a, pp. 13-62; Buchert et al 2020b, pp. 10-74).

The state curriculum for the training to become a nursing specialist (m/f) in the Federal State of Saxony-Anhalt does not contain any explicit references to the use of digital media in the theoretical and practical lessons.

Recommendations of the German Hospital Federation (Deutsche Krankenhausgesellschaft) for Further Nursing Education: Digitalization in the Care and Digital Media in Continuing Training

The German Hospital Federation (DKG) issues recommendations for specialty training for selected areas of professional nursing. If a Federal State does not provide its own regulations for further training, the recommendation by the DKG may be used as a model for state legislation. There is no state legislation for further training in the Federal State of Saxony-Anhalt, so that the recommendations by the DKG are used to formulate further training.

The recommendation by the DKG does not contain any references to digital technologies in the care sector, nor any references to the use of digital media in further nursing education.

Discussion

Professional nursing activities are barely conceivable today without knowledge of digital technologies. In accordance with the professional challenges, the training for nursing specialists contains a large number of references to the areas in which the next

generations must also be trained with regard to digital competencies. The references listed under Chapter 5 in this article refer explicitly to *digital* technologies. The framework curriculum of the expert commission according to Section 53 PflBG and the state curriculum contain further references to prepare trainees for the use of modern technologies, technological developments or modern information and communication technologies as they occur in professional nursing.

The extent to which teaching and learning processes reflect the digitization taking place in society through the use of digital media in theoretical and practical lessons is not provided in the statutory and curricular regulations. A suggested professionalism of teachers, supported by collective and individual professionalization, assumes that lessons include engagement with digital media as a learning object and as a learning tool. The connection between the use of digital media in lessons and preparation for using digital technologies in professional care must be reflexively produced by teachers. A scientific course of studies, in which nursing professionals are scientifically trained to become nursing teachers, offers the opportunity to a) recognize these connecting lines and b) consider them pedagogically in the preparation, implementation and follow-up of lessons.

The confidence of nursing professionals to deal with new digital technologies on an ongoing basis can be scientifically captured with the concept of self-efficacy. Such self-efficacy is independent of specific digital technologies. If someone dares to use new technologies, the specific digital tool is subordinate. In this respect, the use of digital media in lessons is already contributing to the promotion of self-efficacy regarding digital technologies.

Teachers, in turn, must learn to understand these connections themselves in academic studies a) with their trainees in mind and b) with themselves in mind. Teachers who, at times, belong to the generation of the *digital immigrants*, but at least to the generation of the *informal digital natives* (Seltrecht, 2020), must themselves work on their own digital competencies throughout their lives in order to professionally develop pedagogical digital and other competencies in trainees. A university didactic concept that considers the dual logic of action of nursing teachers and starts with the training of digital competencies forms the basis for teachers to enable them to prepare their trainees for technologically advanced professional care.

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