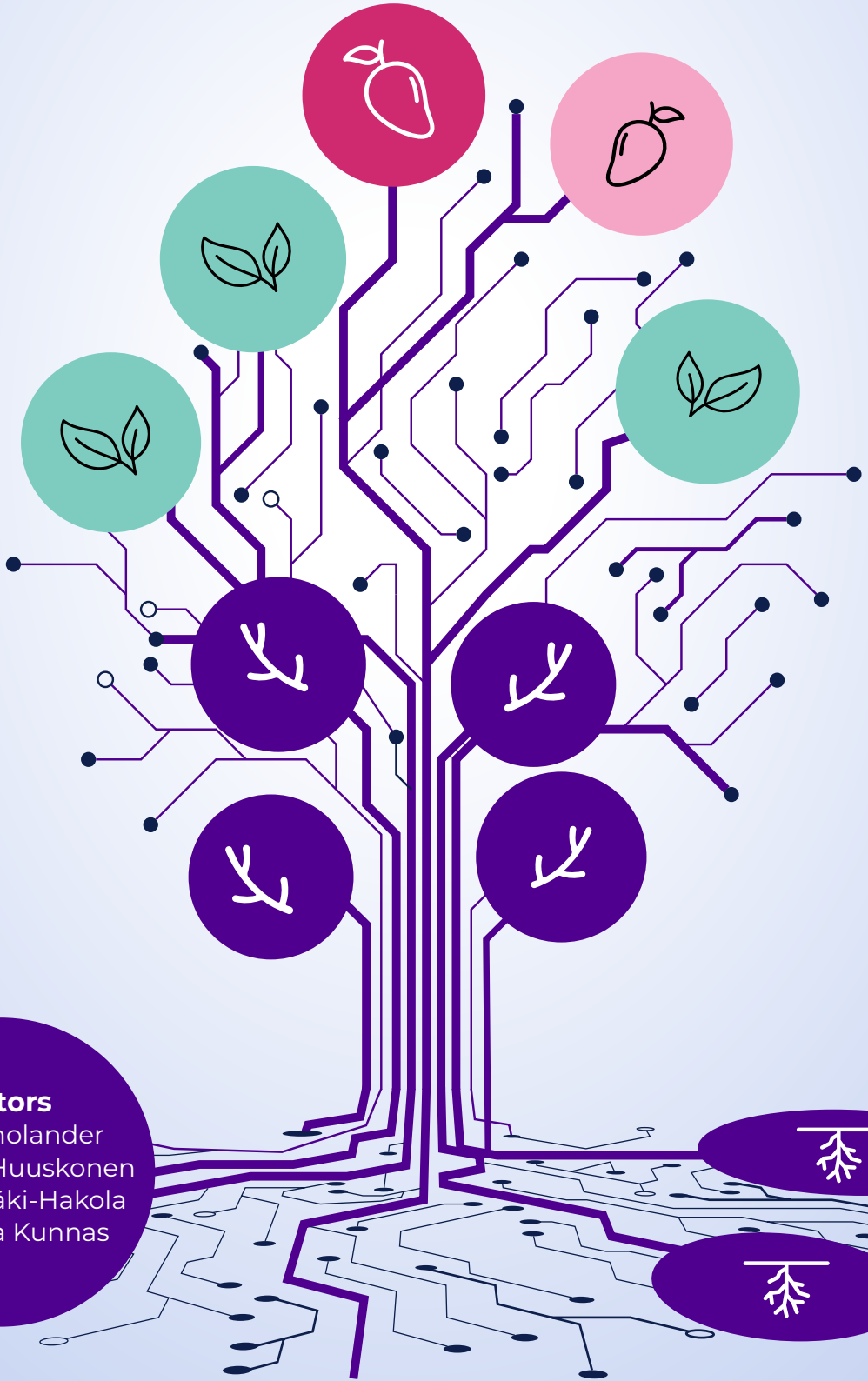
Tampere University of Applied Sciences

SmartNurse Methodology

Integrating Digital and Active Learning into Nursing Education

A Guide for Teachers and Students



Editors
Nina Smolander
Annukka Huuskonen
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Developing Teachers' and Student Nurses' Competencies in Digital Nursing - SmartNurse, Erasmus+ CBHE project

February 2024

Tampere University of Applied Sciences

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SmartNurse

UNIVERZA V LJUBLJANI
University of Ljubljana

UNIVERSIDAD GERARDO BARRIOS
Líderes en Gestión del Conocimiento

UNIVERSIDAD AUTONOMA DE AGUASCALIENTES

Universidad de El Salvador
Hacia la libertad por la cultura

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Forewords

Doris Alicia Sánchez de Elías

The nursing profession has undergone significant transcendence and evolution over the years. Each of the processes that underpin nursing interventions is based on scientific foundations that contribute to improving the quality of healthcare provided to users.

In the 21st century, the COVID-19 pandemic has drastically altered the course of human history. Educational institutions were forced to transform their classrooms from traditional in-person settings to virtual environments, leading to the development of new learning strategies and a paradigm shift in education. Technological development has opened the doors to a global communication world where barriers of time, culture, and language have disappeared, providing opportunities to acquire new knowledge.

This book is a testimony of the empowerment of nursing to transform the reality of health through the application of active learning, electronic media, and digital tools. These innovations will enhance the quality of life for individuals, enabling them to embrace cultural change and actively participate in their own responsibility regarding health, especially those suffering from chronic illnesses.

Therefore, it is imperative that all nursing professionals be at the forefront in handling technology in various care settings. The SmartNurse project has enabled nursing professionals, educators, and students to acquire knowledge that will benefit the population of El Salvador.

I want to express my sincere gratitude to the Tampere University of Applied Sciences in Finland, University of Ljubljana in Slovenia, the Autonomous University of Aguascalientes and the Autonomous University of San Luis Potosí in Mexico, and, of course, our esteemed colleagues in the University of El Salvador, the Specialized Institute of Higher Education for Health Professionals of El Salvador and the Gerardo Barrios University in El Salvador for making the realization of a dream possible in the heart of America, in the 'thumb' of our region.

Doris Alicia Sánchez de Elías
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Forewords

Francisco Cadena Santos

The current SmartNurse project will lead us to equip our skills laboratories and implement new nursing equipment. Technology and digitalization will provide opportunities for nursing to confront challenges and discover new ways to access health services, adapting to the evolving societal norms and seeking methods to preserve health with the assistance of technologies that are increasingly essential not just for communication but also as facilitators in healthcare. Nursing must align with this digital growth, which supports society in healthcare; consequently, nursing professionals need to intensify their preparations for technology adoption. This involves conducting trials to familiarize themselves with all technologies and advancements aimed at enhancing population health through technology, be it smartphones, networks, or platforms utilized by both nursing professionals and individuals seeking healthcare tailored to their health circumstances.

The professional growth of nursing has engendered changes in recent years, requiring increased involvement in utilizing technology as an important tool in contemporary healthcare delivery, both within homes and communities. The challenges introduced by this new SmartNurse system will prompt us to contemplate achieving competitiveness in the direct care that nursing professionals traditionally provide. As previously mentioned, this endeavour is no longer an individual undertaking; rather, it signifies direct care that utilizes the new system in this work.

Globalization and technology are compelling us to adapt to novel forms of health education and healthcare. In Mexico, it can be acknowledged that numerous nursing education institutions have encouraged an increased utilization of new technological tools by nursing graduates, thereby broadening the scope of nursing work leaning on the SmartNurse system.

The population growth in Mexico is elevating health indicators, with technology and digitalization emerging as paramount instruments in healthcare. It is imperative to emphasize that these tools will enable individuals to safeguard their health and ensure immediate care during health crises, utilizing comprehensive health services that underscore efficiency and quality for the population.

Nursing professionals, when interacting with this new way of delivering healthcare, will witness benefits reflected in economic aspects and cultural changes to preserve health.

Dr. Francisco Cadena Santos

Full-Time Professor at the Nursing Faculty in Nuevo Laredo, Autonomous University of Tamaulipas, and Researcher at Level 1 in the National System of Researchers (SNI).
President of the Mexican Federation of Associations of Nursing Faculties and Schools (FEMAFEE).

1

Introduction

Annukka Huuskonen, Jožica Čehovin Zajc, Tina Gogova, Marija Milavec-Kapun and Nina Smolander

The increasing prevalence of chronic diseases in Latin America presents significant challenges for the healthcare sector. The SmartNurse project, Developing Teachers and Nursing Students´ Competencies in Digital Nursing, funded by the Erasmus+ program, addresses these challenges by developing a context-specific methodology for nursing education. Through partnerships with universities in El Salvador and Mexico, the initiative integrates active learning methods and digitalization into the nursing curriculum, aiming to enhance self-care support for chronic diseases. This e-book is one of the key outputs, providing a comprehensive account of the project with the goal of inspiring positive changes in healthcare education and, ultimately, healthcare services. The SmartNurse project, through international collaboration, facilitates knowledge exchange and skill development, contributing to transformative advancements in nursing education. This chapter introduces the SmartNurse project, and outlines the content of the e-book.

Latin America is facing increased healthcare demand due to a growing number of patients with chronic diseases (PAHO, n.d.). Deaths for non-communicable diseases have been increasing in Mexico and El Salvador since 1990's, being 478 deaths per 100 000 persons in Mexico in 2019, and 477 in El Salvador (Institution of Health Metrics and Evaluation, 2023). The increasing demand for care delivery required for patients with non-communicable diseases necessitates investments in nursing education. In Mexico, the number of private universities and nursing schools has surged over the past two decades, resulting in a substantial increase in the nursing workforce. The Mexican health system employs approximately 300,000 nurses (Instituto Nacional de Estadística y Geografía, n.d.; Lee et al., 2022), with 46% having attained university-level education by 2019 (Nigenda et al., 2022). The Nursing Profession Supervisory Board (JVPE) (n.d.) in El Salvador reports nearly 36,000 registered nursing professionals, with almost 10,000 holding a Bachelor of Nursing degree. In comparison, in 2020, a total of 10,096 students were enrolled in healthcare studies at various academic levels in El Salvador (Ministry of Education, n.d.). In 2018, there were 1.8 nurses and midwives per 1,000 inhabitants in El Salvador (World Bank, 2023). In comparison, there was a ratio of 2.91 nurses per 1000 inhabitants in Mexico in 2020 (OECD 2022).

Access to healthcare in El Salvador has improved in various ways over the last two decades, with key indicators such as vaccination coverage, maternal and infant mortality showing significant improvements (World Bank, 2019). However, the need to address the growing burden of noncommunicable diseases has also increased. Despite these positive changes, numerous barriers to accessing healthcare services persist, including financial and geographical factors, as well as issues related to the availability and acceptability of healthcare services. These challenges impact the delivery of comprehensive, efficient, and quality services, particularly for vulnerable populations (CEPAL, 2020). In Mexico, the availability or lack of health insurance significantly influences access to healthcare, particularly concerning chronic diseases like diabetes (Pérez et al., 2021).

Technology, information, and communication technologies (ICT) and digitalization offer avenues to tackle these challenges, providing novel approaches for accessing healthcare services (Cherrez Ojeda et al., 2018a) and reinforcing self-care support (Chérrez-Ojeda et al., 2018b), a fundamental aspect of patient-centered chronic disease management (Bartlett et al., 2020). Contemporary ICT can reduce healthcare access inequalities, promoting innovation, especially for underserved populations and in rural areas. In Mexico, telemedicine and ICT use is rising (Galicia Abogados, SC. 2023). El Salvador's healthcare digital transformation strategy has boosted telemedicine and tech utilization (Ministry of Health, 2023). Despite advancements, Latin America faces technological, organizational, and socio-cultural challenges, like infrastructure issues, digital disparities, and adult illiteracy (CEPAL, 2020; Curioso, 2019). As technology and digitalization evolve, nursing education must equip professionals for current and future needs. Nurses' digital skills are vital for applying technology meaningfully in everyday practice (Egbert et al., 2019).

> ***Nurses' digital skills are vital for applying technology meaningfully in everyday practice.***

The evolution of nursing education is imperative to shape competent professionals capable of addressing the dynamic needs of society, particularly in primary healthcare (Cassiani et al., 2017). Future nurses in Latin America require robust digital competencies (Kleib et al., 2022), self-care support skills (Byrne et al., 2022), and critical and innovative thinking abilities to leverage rapidly advancing technology and telehealth solutions (Cházaro, 2023). These skills can be cultivated through student-centered active learning methods (Hartikainen et al., 2019) and digital pedagogical solutions integrated throughout nursing education (Díaz-García et al., 2022), aligning with our foundational understanding of learning and pedagogical principles.

During the Covid-19 pandemic, HEIs globally were forced to move their education to the digital environment completely or almost completely. However, due to the lack of time and knowledge for pedagogical preparation, online education has often been simply delivering and storing educational, without substantial investment into finding and adopting more appropriate online pedagogies (Crawford et al., 2020; Rienties & Toetenel, 2016). During this Covid-19 pandemic many students were burdened with a large amount of online teaching, while they got by with superficial learning (Nolan et al., 2021). Innovative pedagogies, digital tools, and methods to deliver quality and inclusive education in online environments became imperative as well as teachers' familiarity with the active learning methods to be able to adapt them into digital environments. Covid-19 pandemic showed the importance of using digital technology in learning process along with appropriate didactic methods; where teachers and students needs some pre-knowledge and skills. (Divjak, 2022.)

The SmartNurse Project and Consortium

The SmartNurse project, Developing Teachers and Nursing Students' Competencies in Digital Nursing, was a three-year-long (11/2020-11/2023) EU-funded Erasmus+ Capacity Building in Higher Education (CBHE) project (Erasmus+, n.d.). The goal of this international cooperation project was to develop nursing education in partnering Latin American Higher Education Institutions (HEIs) in El Salvador and Mexico, focusing on digital health promotion, and supporting the self-care of patients with chronic conditions. The SmartNurse project also addressed institutional systems and challenges while enhancing cooperation with the EU, fostering intercultural awareness.

> ***The goal of the SmartNurse project was to develop nursing education in partnering Latin American HEIs in El Salvador and Mexico, focusing on digital health promotion, and supporting the self-care of patients with chronic conditions.***

The inception of the SmartNurse project arose from the recognition by Latin American educators of the need to modernize the nursing education curriculum to better respond to the challenges and opportunities presented by digitalization in healthcare. The increasing strain on healthcare services due to lifestyle changes and a rising number of chronic diseases leads to diminished access to healthcare services. Latin American partners also identified a deficiency in people's self-management skills and gaps in the culture of self-management. The potential of digital solutions in self-care and patient education remains largely untapped.

The project involved a total of seven HEIs and was coordinated by Tampere University of Applied Sciences (TAMK) from Finland. The three partners from El Salvador were the Specialized Institute of Higher Education for Health Professionals of El Salvador (IEPROES), University of El Salvador (UES), and Gerardo Barrios University (UGB). The two Mexican partners were the Autonomous University of Aguascalientes (UAA) and the Autonomous University of San Luis Potosí (UASLP). In addition to TAMK, the University of Ljubljana (UL) from Slovenia supported the project as a European program country (Picture 1)

Picture 1. The national flags of the SmartNurse consortium
(Picture taken by Nina Smolander, 2023)

In the planning stage of the SmartNurse project, there was a distinct emphasis on active and innovative collaboration with key stakeholders from partner universities. This approach ensured that the project's content in the application process and throughout the project closely aligned with the educational needs of the target countries, considering the current situation. The consortium designed the SmartNurse project to address the needs in Latin American nursing education, aiming to equip nursing teachers with competence in active, digital learning methods. Specifically, the project aimed to prepare the future generation of nursing professionals with digital competences for health promotion and primary care among patients with chronic diseases.

Picture 2. The SmartNurse consortium in Aguascalientes at the campus of The Autonomous University of Aguascalientes (Picture taken by Nazario Hernandez Reyes 2022)

Furthermore, it fostered a consortium where knowledge and expertise exchange were actively conducted throughout the project's duration, resulting in innovative solutions and a desire to continue collaboration (Picture 2).

The SmartNurse project was initiated before the Covid-19 pandemic, starting in November 2020. However, a significant portion of the project period unfolded during the pandemic, right from the beginning, without even the kick-off meeting taking place in person. This had a considerable impact on the project work for the entire consortium. Despite the challenges faced during the project initiation, it also highlighted the imperative of enhancing digital pedagogic methods and digital competences for nursing teachers and students.

The Objectives and Workflow of the SmartNurse Project

The main objective of the SmartNurse project was to improve nursing education and digital methodologies related to health promotion, prevention, and basic nursing management of chronic diseases within the scope of primary health care in Latin American partner countries. The project aimed to achieve this objective through three goals:

1. Implementing an updated curriculum using the SmartNurse Methodology in Latin American partner institutions.

2. Enhancing the digital educational skills and pedagogical approaches of nursing teachers in Latin American partner institutions.

3. Ensuring the adoption of updated pedagogical methods and tools in nursing education across Latin American partner institutions.

To achieve these goals, the project consortium developed the SmartNurse Methodology, focusing on upgrading nursing education with a focus on digital and pedagogical methods in the areas of health promotion and primary health care.

The project work was divided into different work packages, where literature reviews were conducted to establish the theoretical foundation of the SmartNurse Methodology, teacher trainings were conducted, various phases of the methodology were piloted, the methodology was integrated into curricula, feedback was collected from the conducted pilots, and the project results were disseminated and implemented (Figure 1).

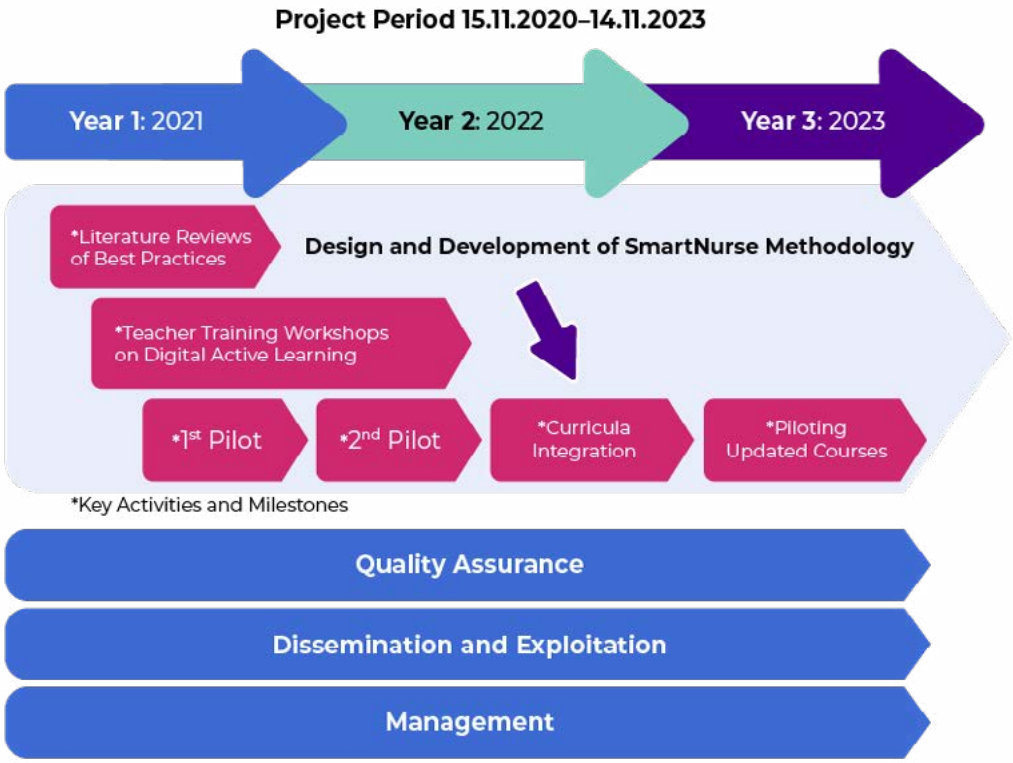

Figure 1. Workflow graph with Key activities and Milestones of the SmartNurse Project

The lead universities for the work packages were both HEIs from Erasmus+ program countries Finland and Slovenia as well as Latin American partner HEIs. All partner universities actively participated in the activities of each work package.

Content and Structure of the SmartNurse E-Book

This e-book presents the journey and results of the SmartNurse project. Additionally, it offers further reading suggestions on related topics to share the experiences gained during the project and inspire nursing schools, teachers, and professionals to embrace the Smart-Nurse Methodology.

The e-book begins with the forewords, contributed by the Honorable Doris Alicia Sánchez de Elías (El Salvador) and the Honorable

Dr. Francisco Cadena Santos (Mexico), offering valuable perspectives on the project's themes.

This opening chapter introduces the SmartNurse project, its background, and project objectives. Additionally, it provides an overview of the e-book's content, structure, and concise information about each chapter.

Chapter 2 presents the exploratory literature reviews that serve as the foundation for the SmartNurse Methodology. The themes explored for the theoretical base include Nursing students' experience of active learning methodologies (2.1), Aspects of pedagogical strategies and digital technology affecting nursing students' motivation (2.2), as well as Digital tools supporting the learning of nursing students (2.3). Additionally, Experiences of health professionals in using digital technologies in primary health care (2.4) and Teachers' experiences with digitalization in the teaching of the nursing career (2.5) were investigated to complement the theoretical aspects from the perspectives of postgraduates and educators.

Chapter 3 focuses on the primary output of the project, the SmartNurse Methodology. It showcases early illustrative versions, offering initial insights into the methodology (3.1). The chapter provides detailed information about the methodology and its final illustration (3.2). It delves into key elements, including pedagogical principles (3.3), professional growth of nursing students (3.4), active learning methods (3.3), digital competences (3.6), and improvement of self-care (3.7).

Chapter 4 details the pilot implementation process (4.1) throughout the project. Furthermore, it unveils the experiences of participants from partner universities during teacher trainings and the implementation of new teaching and learning methods in each partner HEI (4.2). This chapter also discusses examples of using active learning methods by each partner HEI (4.3-4.7). The pilot results (4.8) from students and teachers who participated in the pilots are presented, along with the accumulation of teachers' digital competences (4.8.1-4.8.3).

Chapter 5 outlines the nursing curriculum development process (5.1) and the integration of the SmartNurse Methodology (5.2) in different partner institutions. Additionally, this chapter offers recommendations at the institutional, work team, and individual levels on how to best benefit from the SmartNurse Methodology (5.3).

In the final chapter, Chapter 6, a discussion is presented, reflecting on the project journey, our achievements, and the lessons learned during the SmartNurse project.

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2

Explorative Enquires of Literature Review (2020–2022)

The SmartNurse Methodology draws its theoretical foundation from a multifaceted approach, incorporating the results of literature reviews conducted during the project, the empirical knowledge and experiences of consortium members and the insights gleaned from prior Erasmus+ initiatives, DigiNurse and DigiCare projects (Read more in Chapter 3.1). Within this chapter, we delve into the literature reviews undertaken by the partner Higher Education Institutions (HEIs) within the consortium, detailing their processes and outcomes (Chapters 2.1-2.5). The SmartNurse Methodology encompasses concepts derived from these reviews, addressing key themes such as nursing students' encounters with active learning methods, the influence of pedagogical strategies and digital technology on student motivation, and the implications of digitalization on nursing and nursing education. The outcomes of these literature reviews profoundly shape the content and illustration of the SmartNurse Methodology, providing a comprehensive understanding (Read more in Chapter 3).

2.1 Nursing Students' Experiences of Active Learning Methodologies

Juan Luna Gómez, José López Pérez, Jorge Henríquez Rodríguez and Mayra Henríquez de Cortez

The insights gained from nursing students' direct experiences with active learning methods play a pivotal role in shaping the SmartNurse Methodology and seamlessly incorporating active learning practices into nursing education in Latin America. This chapter unfolds the outcomes of the literature review conducted by the University of El Salvador (UES). The article derived from this literature review, Experiencias de los estudiantes de Enfermería con las metodologías de aprendizaje activo (https://doi.org/10.33064/55lm20234379), is available in Spanish in LUX Medica, Vol. 18 Núm. 55 (2023): Número Especial, https://revistas.uaq.mx/index.php/luxmedica/issue/view/407.

Active learning methods, such as problem-based learning (PBL), clinical simulation, and role-playing, are designed to yield significant learning outcomes for students (Read more in Chapter 3.5). Implementing these active learning techniques in nursing education requires a thorough understanding and analysis of the diverse experiences students undergo when learning through active methodologies. This understanding is crucial because students, who play a central role in their learning, experience the transformative effects of these methods. This involvement is evident in various scenarios, both virtual (Mäkinen et al., 2023) and face-to-face (Liu et al., 2020), highlighting the importance of acknowledging and exploring students' perspectives (Mingorance Estrada et al., 2019; Nguyen et al., 2016)

Methods

The search and retrieval of information was conducted using the EBSCO Host, Pubmed, and LILACS databases. Keywords such as “experience,” “nursing students,” “methods,” and “active learning” were employed for the search. To refine the search, Boolean operators like AND and NOT were applied. The publication year was limited to the range of 2017 to 2021, and only articles available in full text and open access in English, Spanish, and Portuguese were considered. A total of 32 articles were initially retrieved, with 10 ultimately meeting the inclusion criteria and addressing the research question: What are the experiences of nursing students with active learning methodologies? These selected articles underwent analysis using inductive content analysis (Kyngäs et al., 2019).

Results

When engaging in active learning methods, students reported experiencing an Active Role in their Learning Process, a Desire to Influence the Teaching Process, and Becoming Prepared for Real Health Situations. An overview of the results in different categories is presented in Figure 2.

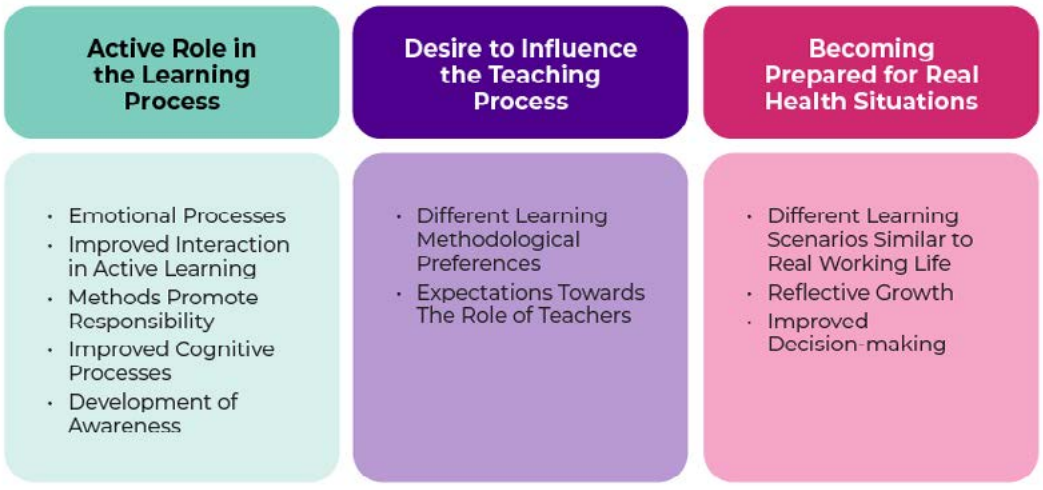

Figure 2. Nursing students’ experiences of active learning methodologies

The nursing students experienced that the active learning methodologies enhance **their active role in the learning process.** The active role encompassed emotional processes as integral to learning, fostering responsibility, cognitive processes, and the development of awareness.

Students expressed various emotional responses to active learning, such as increased confidence (Ahlstrom & Holmberg 2021), fun (Ahlstrom & Holmberg 2021; Hardie et al. 2020), success (Ahlstrom & Holmberg 2021), and higher levels of satisfaction (Branney & Priego 2018). Additionally, students encountered embarrassing situations (Al-Natour et al. 2021).

Students reported that active learning methods promote responsibility in their learning, particularly in collaborative work within the active method (Branney & Priego 2018). They felt that interactive situations fostered a sense of responsibility (Al-Natour et al. 2021) and provided opportunities for them to take on more responsibility in their role with the population (Wang & Ji. 2021). Students demonstrated improved preparation, as evidenced by increased participation (Branney & Priego 2018), and they believed that video recording encouraged a greater sense of responsibility (Branney & Priego 2018).

Active learning resulted in better interaction, as students noted that these methods improved their interaction with the professional environment and strengthened soft skills, which they considered crucial. According to students, video recording encouraged more teamwork (Ahlstrom & Holmberg 2021), and virtual reality was interactive (Hardie et al. 2020). Students also believed that virtual exams were more dynamic (Ahlstrom & Holmberg 2021). Internships promoted reciprocal training between the nurse and student, and teaching was reciprocal in the teacher-student relationship (Pinto & Marin. 2021). Interaction fostered trust, encouraged the exchange of ideas, solicited opinions, improved communication, and kept the mind engaged (Al-Natour et al. 2021).

The students also experienced improved cognitive processes when engaging with active learning methodologies. These methods generated active thinking (Wang & Ji. 2021), enhanced overall understanding (Hardie et al. 2020; Svensson et al. 2020; Al-Natour et al. 2021) and facilitated deep learning along with its associated requirements (Svensson et al. 2020). Active learning methods not only improved attitudes but also aided in addressing performance issues and overcoming students' limitations. This was particularly significant as students with learning difficulties were able to achieve positive results (Al-Natour et al. 2021). Additionally, learning through videos was perceived as a quick and effective way to acquire knowledge (Hsu et al 2019).

The students' active role in the learning process was evident in how active learning methods fostered the development of awareness. Students experienced that engagement was highly active in simulation-based learning (Wang & Ji. 2021), and interactive learning created awareness of students' actions (Al-Natour et al. 2021).

Students also felt **a desire to influence the teaching process** through active learning methodologies, expressing diverse expectations regarding the role of teachers and preferences for learning methodologies.

Students' expectations regarding the role of teachers highlighted underscored the need for teachers to enhance guidance, provide effective instructions, and adeptly utilize virtual learning environments. This is essential for enabling students to successfully engage in activities and derive significant learning from them (Branney & Priego 2018). Specific suggestions included improving instructions for virtual exams (Ahlstrom & Holmberg 2021) and enhancing teachers' ability to correct mistakes and assist students in maintaining focus (Svensson et al. 2020). In instances of Problem-Based Learning, students emphasized the importance of tutors comprehending and managing the method effectively (Svensson et al. 2020). Moreover, challenges related to internet access were identified as barriers to implementing preferred learning methods (Ramos et al. 2020).

The students exhibited varying preferences for learning methodologies. While many favored team learning (Branney & Priego, 2018), some expressed a preference for traditional face-to-face teaching over distance learning (Ramos et al., 2020; Al-Natour et al., 2021; Langegård et al., 2021). Conversely, others leaned towards online classes, appreciating the flexibility to review them at their convenience (Ramos et al., 2020). Students emphasized the importance of clinical training, considering it essential for acquiring competencies, especially in nursing careers (Ramos et al., 2020).

The nursing students experienced that the active learning methods were instrumental to **become prepared for the real health situations.** This preparation involved exposure to diverse learning scenarios mirroring real-world work environments, leading to improved decision-making and reflective growth.

Active methods, employing scenarios akin to actual working conditions, provide a prelude to the work environment (Pinto & Marin, 2021). They enable students to familiarize themselves with various health situations (Wang & Ji, 2021; Pinto & Marin, 2021), assume different roles of health professionals (Pinto & Marin, 2021) in their future workplace (Wang & Ji, 2021), and enhance their responsiveness to real-life situations (Pinto & Marin, 2021).

According to the students, active learning methods contribute to better decision-making by assisting them in justifying their actions in nursing care (Pinto & Marin, 2021). They believe that these methods enhance their ability to adhere to good professional practices (Pinto & Marin, 2021; Al-Natour et al., 2021) and apply problem-solving techniques accurately (Pinto & Marin, 2021).

Reflective growth in active learning involves interactive and meaningful learning, transforming the learner (Pinto & Marin. 2021). Active methods promote reflection (Pinto & Marin. 2021; Al-Natour et al. 2021). Internships integrate reflective thinking into practice, providing both theoretical and practical learning opportunities for students (Pinto & Marin. 2021).

Conclusion

Active learning methods promoted and developed practical and attitudinal skills and the practice of values, leading to significant learning outcomes. In their reflections on experiences with active learning methodologies, students highlighted the development of critical, scientific thinking, effective communication skills, practical skills, assertive problem-solving, expression of emotions, and the active application of human and ethical values. Consequently, integrating these methodologies into study programs at various training levels will empower nursing students to assume leader roles, fostering significant learning that enables them to provide comprehensive care to individuals, families, and communities, guided by values, morals, and ethics in diverse professional settings.

The incorporation of active learning methods can enhance students' performance, allowing them to play an active and leading role in their learning process. Students reported that these methods provided real-life experiences in various health environments, enabling them to recognize the role and functions of professionals working independently and collaboratively with health teams across different fields. Clinical simulation, internship, role playing and PBL were deemed essential for the integral formation of the nursing student at different levels.

Students also expressed individual preferences for different methods, emphasizing the importance of teachers continually updating themselves on the correct handling and application of active learning methods. The results strongly advocate for the inclusion of the SmartNurse Methodology in the curricula of educational institutions and emphasize the need for ongoing teacher capacity building.

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2.2 Aspects of Pedagogical Strategies and Digital Technology Affecting Nursing Students' Motivation

Mariely Acosta Alvarez, Carlos Arévalo Mercado, Silvia Gonzales Flores, Nery Guerrero Mojica and Lizeth Solano Romo

In order to formulate the content of the SmartNurse Methodology, it was important to investigate perspectives influencing the motivation of nursing students. From the standpoint of active, digital learning methods used in education, it was crucial to explore how digital technology impact the study motivation of nursing students. The project team at the Autonomous University of Aguascalientes (UAA, Mexico) conducted a literature review on this topic, and this chapter presents the summary of their review and the results of the review.

Given the inherently stressful nature of the nursing discipline and the pivotal role that motivation plays in the performance of nursing students during their undergraduate studies (Díaz-Agea et al., 2021; Murphy et al., 2021), we believe that the development and implementation of effective teaching practices by educational and administrative staff (Lateef & Mhlongo, 2019) particularly in relation to motivation, is of critical importance. Simultaneously, both before and during the COVID pandemic, competent utilization of digital education technology, coupled with the design and application of evidence-based pedagogical methods, has emerged as a core theme in modern educational practice (Langegård et al., 2021).

In this context, our research question was: Which aspects related to pedagogy and digital technology affect the motivation of nursing students?

Methods

The literature review was conducted using the EBSCO academic metasearch service. The accessed databases included BMC Nursing, PubMed, Gale Academic, SAGE Knowledge, and Emerald Insight. The time frame for selecting articles was between 2015 and 2021. Search criteria included keywords related to nursing students, information technology (and similar terms), motivation, engagement, and pedagogy (and related terms). The inclusion criteria consisted of articles addressing objectives related to the motivation of nursing students, with the context of the articles being related to the use of information technology and teaching methodology or pedagogy. Articles that were literature reviews were excluded. A total of 10 articles were selected for the literature review after screening titles, abstracts, and full-text reads (Figure 3).

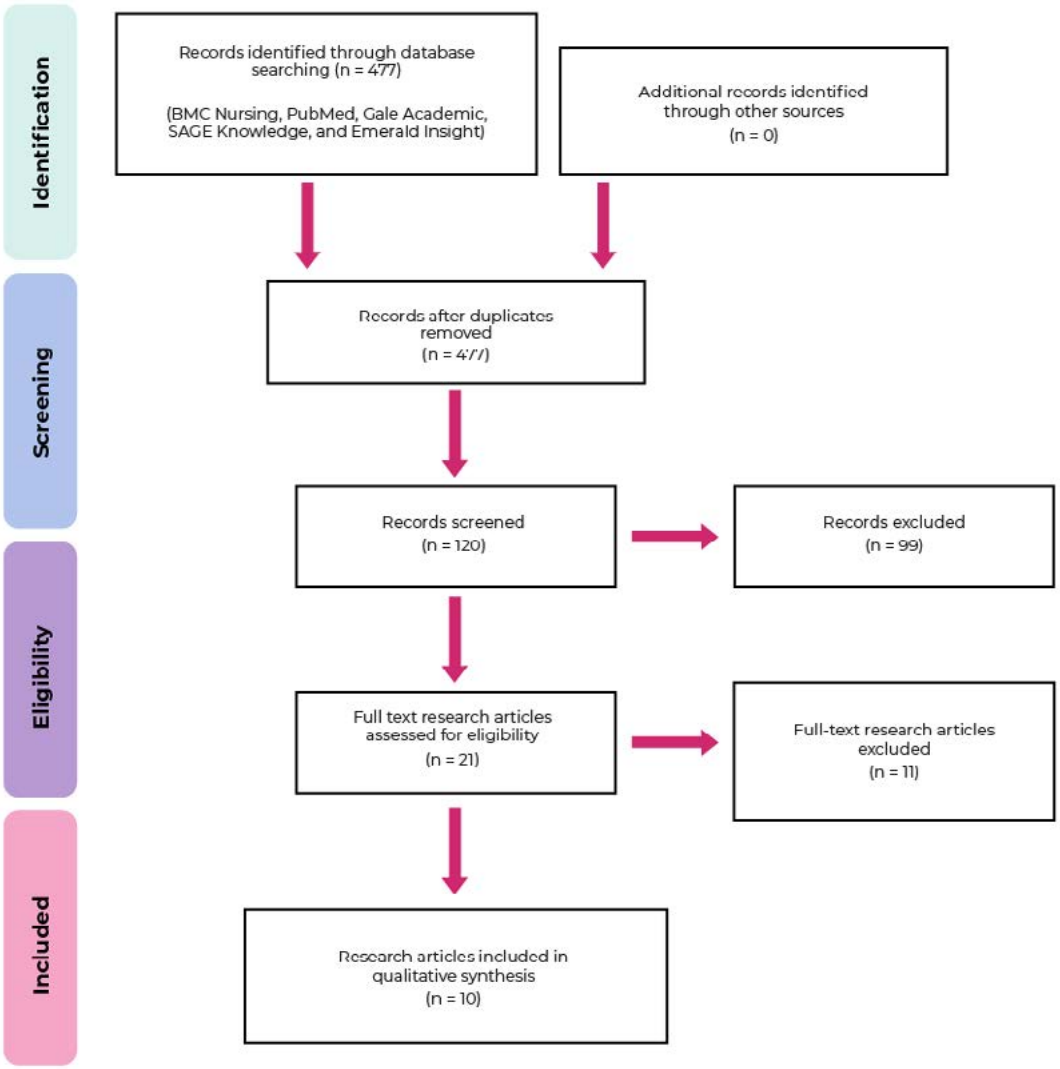

Figure 3. Prisma Flow chart of literature search strategy

Results

As a result, we identified four main categories that educators and nursing programs should consider to foster and maintain the motivation of nursing students, especially during their first years. These categories include **Teaching Performance, Student Performance, Social Context and Background** of the Student, and **Program Support Services** (Figure 4).

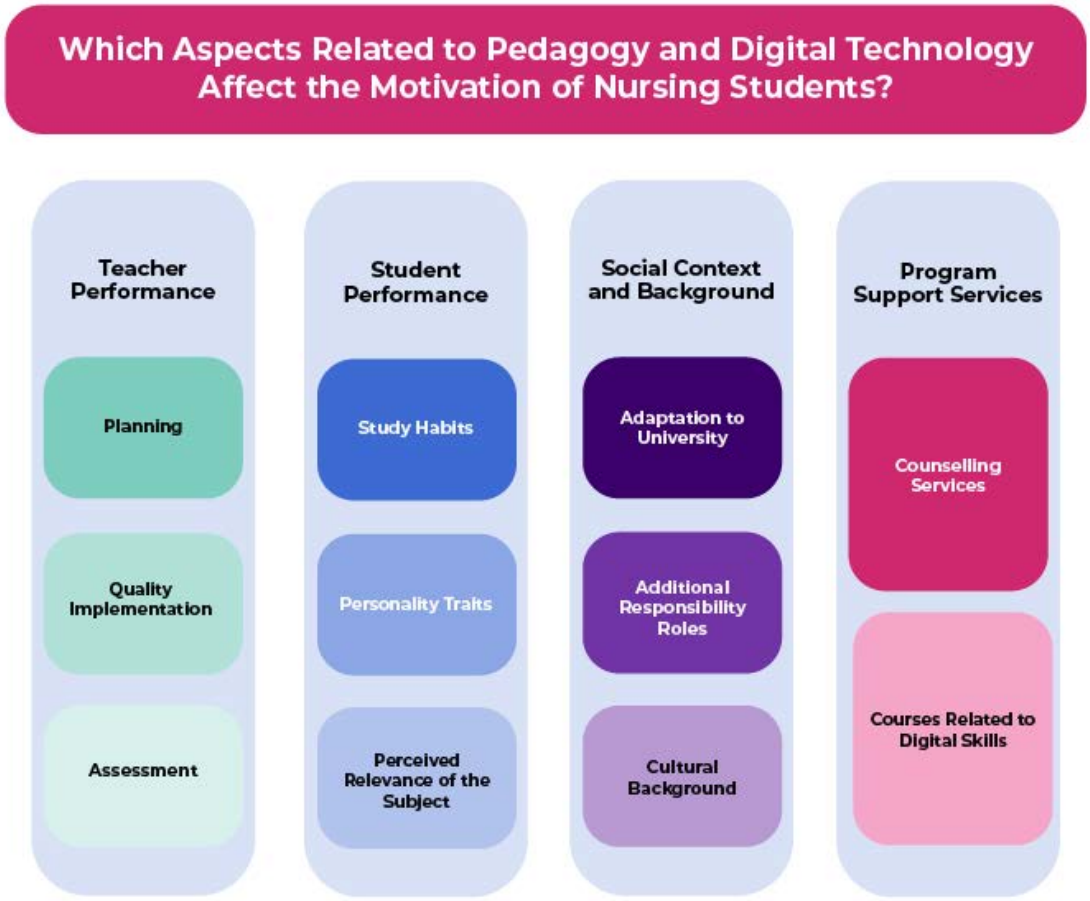

Figure 4. Aspects of pedagogy and digital technology affecting the motivation of nursing students

The category of **Teaching Performance** pertains to how individual teachers apply a range of skills and practices in their day-to-day activities and how these activities are perceived by the students. For instance, the planning of learning activities involves the interactive, organized, and engaging structure and content. This encompasses the selection of technological resources aligned with teaching methodologies and suitable for the content of the learning subjects. Quality implementation refers to how these planned activities are actually carried out during courses, accompanied by timely feedback and effective methods (Bartlett et al., 2016; Chow & Wong, 2020; Mäenpää et al., 2020) for assessing students' performance.

The second category is **Student Performance,** which delineates how students perceive their own performance and how, in reality, this performance reflects their learning outcomes and goals, subsequently influencing their motivation. Factors such as effective study habits (Busebaia & John, 2020; Tower et al., 2015) (e.g., an organized study environment, time management) as well as inherent personality traits (e.g., maturity, introversion or extroversion, social aptitude) are closely related to and relevant for the degree of motivation. Additionally, we identified that the student's perception of the subject's relevance to their profession (Tower et al., 2015) influences their level of engagement during courses. In connection with the previous category, the element of relevance can be influenced by the planning and performance of the teacher.

The third identified category is the **Social Context Background** (Choi, 2016; Tower et al., 2015) of nursing students. The sociocultural background influences students' motivation levels. For instance, when the beliefs and knowledge of the students themselves are considered in the production of educational materials, it adds greater meaning to these materials, fostering in-depth learning. Social aspects, such as adaptation to university life — particularly during the first year of the bachelor's program — impact students' motivation levels (e.g., guidance from students in higher semesters has been shown to aid in adjustment). Additionally, any additional responsibility roles that nursing students hold within their families, such as providing economic support, can affect their physical and emotional capacity to handle academic workloads and thus influence their perceived degree of motivation (Haraldseid et al., 2016; Phillips & O'Flaherty, 2019).

The fourth category is **Program Support Services**, perceived as an effective operation at the institutional or faculty level, such as tutoring or counseling services within the nursing program (e.g., university induction and adaptation courses, counseling for lagging or irregular students, study skills courses, etc.). The existence of these services

impacts the student's perception of support at the institutional level, thereby influencing their motivation (Hsu et al., 2019; Lee et al., 2018). In this context, when the nursing program offers curricular or extracurricular courses (e.g., nursing practices relevant to their professional choice where the student identifies), related to learning digital and information search and management skills, it also has a positive influence on students' motivation (De Oliveira et al., 2017; Mäenpää et al., 2020).

Conclusions

Finally, while teachers' and students' performance may be considered self-explanatory factors influencing students' motivation, the social context, background, and program support services are often overlooked in relation to nursing students' motivation. These aspects present opportunities for modern curriculum designs and the implementation or refinement of even more contemporary institutional services. Furthermore, they could be pertinent for teaching and administrative staff in Latin American nursing programs aiming to bolster students' motivation.

The findings, particularly regarding the impact of students' performance on their motivation, align with studies related to the construction of self-efficacy, which is fundamental to motivation and academic performance (Mukti & Tentama, 2020; Thevenin et al., 2016).

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2.3 Digital Tools Supporting Learning of Nursing Students.

Claudia Acevedo González, Aracely Díaz Oviedo, Edgardo García Rosas, María Venegas Cepeda and Leticia Villarruel Hernández

The SmartNurse Methodology incorporates, as a central theme, digital learning, digital tools, and environments, as well as their potential in supporting nursing education. The significance of digitization in education became particularly important during the COVID-19 pandemic, and its integration into the SmartNurse Methodology, based on theoretical knowledge, is crucial. This information can enhance the training of nursing teachers, thereby supporting the education of nursing students. This chapter unveils the outcomes of the literature review conducted by the project team at the Autonomous University of San Luis Potosí (UASLP, Mexico). The article resulting from this literature review, "Herramientas digitales en la formación de Enfermería", is available in Spanish in LUX Medica, Vol. 18 Núm. 55 (2023): Número Especial. The results section of this chapter is a replica of the results published in the LUX Medica article (González et al., 2023).

Digital education has become an essential tool that enables individuals to connect and access the world of information to meet current challenges (Díaz-García et al., 2022). Nursing education is not exempt from this reality; numerous studies have been conducted that provide evidence of the significance of digital innovation (Arkorful et al., 2020; Chan et al., 2020; Männistö et al., 2020) and the use of digital tools in classrooms (Sebri et al., 2016) and skills laboratories within higher education spaces (Hart et al., 2019; Sáiz-Manzanares et al., 2022). The relevance achieved by employing digital tools to enhance learning and develop students' skills in the health sector experienced its greatest growth during the COVID-19 pandemic (Langegård et al., 2021). Given this reality, it is imperative to gather information about the impact of their use. Therefore, a literature review was conducted to understand the evidence published in the last five years regarding how digital

tools support the learning of nursing students. Through this literature review, it was possible to identify how the use of these tools has supported the learning of nursing students and contributed to improving the training of nursing professionals.

Methods

This literature review utilized the PICO method (Patient/Population-Intervention/Exposure-Comparison-Outcomes) to formulate the research question (Cumpston et al., 2021). Following the PICO steps, the primary question was: How do digital tools support the learning of nursing students? One of the search tools employed was the PubMed Database, utilizing terms such as digital tools, learning support, nursing students, and other related alternatives. The criteria for including articles in the research were original articles published between 2017 and 2021, in the English language, with a focus on educational interventions using a quantitative or qualitative approach. A total of 120 articles were identified, and after applying the inclusion criteria, 14 articles were selected. Figure 5 illustrates this search process.

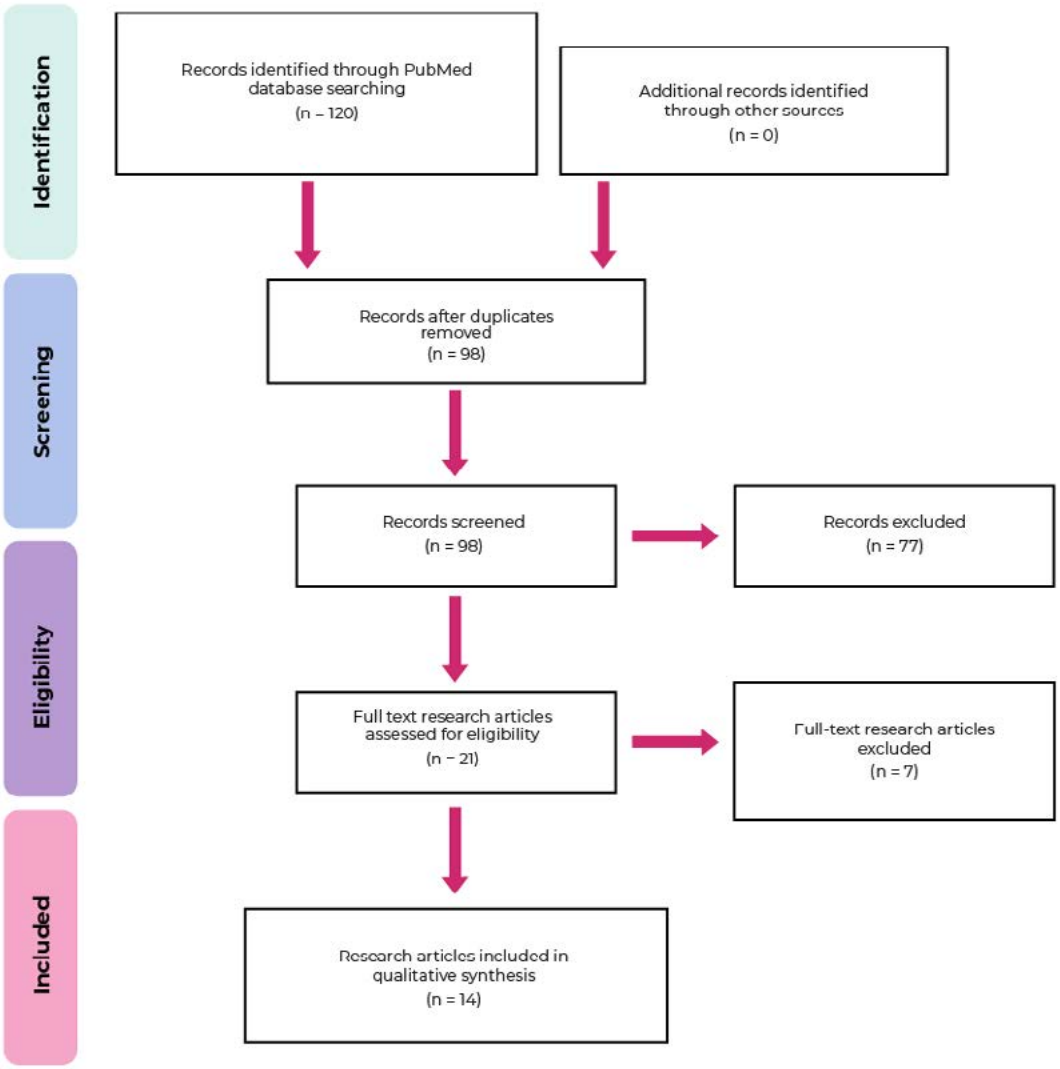

Figure 5. Prisma Flow chart of literature search strategy

Results

The systematic literature review included a total of three articles from England, two from Australia, two from Spain, two from the United States of America, and one from each of the following countries: Germany, Canada, Finland, Norway, and Portugal.

The analysis of the selected literature revealed various subcategories, which, when grouped based on conceptual similarity, led to the identification of four main learning categories that are strengthened

through the use of digital tools in nursing education: **Socialization** and **professional role; Socio-emotional skills**, **Thinking skills**, and **Skills for continuous learning** (Figure 6).

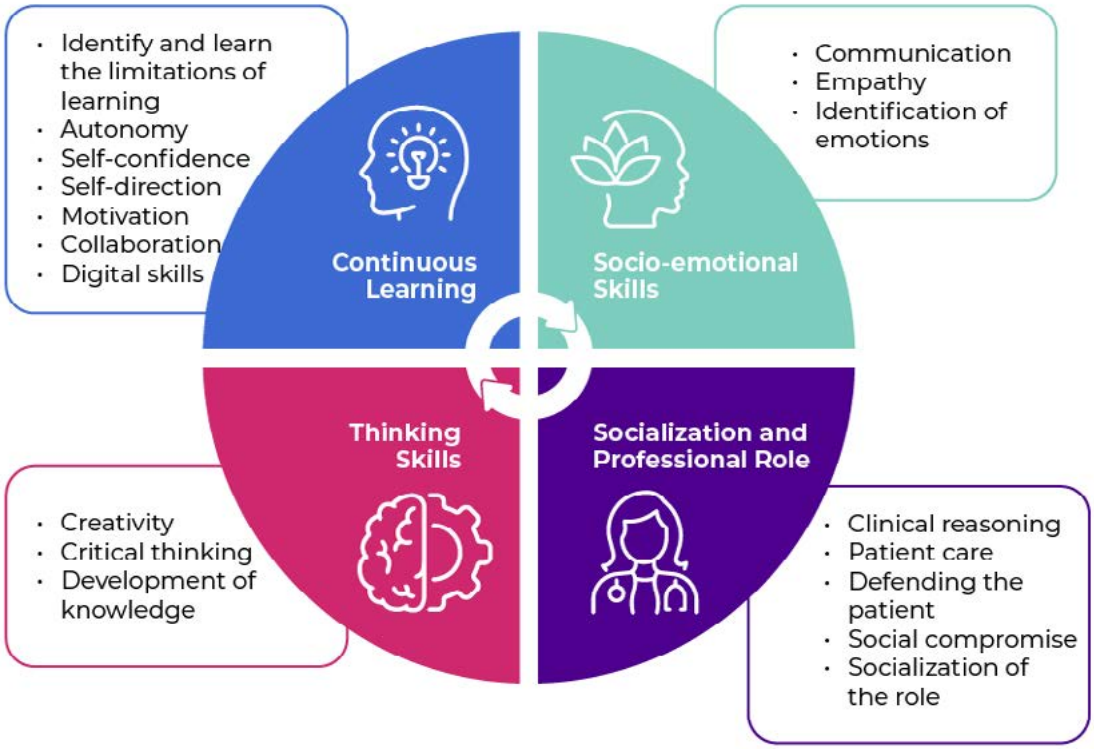

Figure 6. Enhanced learning with use of digital tools (González et al., 2023, modified)

Socialization and Professional Role

Regarding learning about the role of nursing, digital tools have played a significant role in it since their inception in the pivotal tasks in the formation of professional role. This literature review will account for the contribution the digital tools have had to the training of nursing professionals. The socialization and professional role category was formed by the following subcategories: clinical reasoning, patient care, defending the patient, social compromise, and socialization of the role. The use of simulation, digital scripts, and virtual patients strengthened clinical reasoning, as students developed their diagnostic skills, resolved situations, and made clinical decisions (Egilsdottir et al., 2021; Peddle et al., 2023;

Heinonen et al., 2023; Padilha et al., 2019). Some authors point out that digital techniques of experiential active learning improve the clinical reasoning of nursing students (Rodríguez-Almagro et al., 2021).

According to the analysis of the literature related to this category, it is reflected that care, as one of the central axes of nursing education, was a subcategory enriched with digital tools. It supported students in being able to identify the multitasking involved in care, the various points of interaction with the patient, and facilitated a better perception of clinical situations, information, and meaningful signals. On the other hand, different studies indicate that the use of m-learning toolkits allows for the development of clinical skills and encourages the application of academic learning in practice (Egilsdottir et al., 2021; Deschênes et al., 2020; Bramer 2020). Other tools that, according to the literature, contributed to the development of this category were scripts and digital stories (Deschênes et al., 2020; Rodríguez-Almagro et al., 2021; Beck & Neil, 2021; De Castro & Levesque, 2018).

Another significant finding in nursing student education is related to learning the role of patient advocate, for which the use of virtual patients and digital stories proved useful. These tools contributed to students engaging in patient safety, assessing risk situations, becoming advocates, and fostering their social commitment (Peddle et al., 2023; Beck & Neil, 2021; Vizcaya-Moreno & Pérez-Cañaveras, 2020). On the other hand, it is also mentioned that virtual patients helped students experience behaviors, scenarios, and roles in the nursing profession, assisting them in “knowing how to be” and supporting them in “feeling like nurses.”

Socio-Emotional Skills

Socio-emotional skills in nursing education are crucial when it comes to human interaction in care. As a result of the review, this category was configured by communication skills, abilities to identify emotions, and skills related to empathy.

According to the literature analysis regarding the use of digital tools, some of them, such as digital stories, Blackboard, m-learning toolkits, and MOOCs, developed communication skills, active listening, and use of other languages in nursing students. They also facilitated a more dynamic communication process between teachers and students (Egilsdottir et al., 2021; Beck & Neil, 2021; De Castro & Levesque, 2018). Additionally, the use of virtual patients supported young learners in identifying the complexity of communication with patients.

For nursing professionals, identifying emotions is important for providing humanized care. The support of teaching with virtual patients, digital stories, and boards, according to findings in the analyzed literature, allows students to assess the sincerity of others, convey difficult feelings, develop sympathy, harness the affective dimension of learning, experience emotional burden, and identify guilt, fear, and terror. Among the information in the literature, it is noted that digital storytelling helped students understand how people experience illness (Beck & Neil, 2021), and virtual patients motivated them to feel present in healthcare interactions.

It is worth noting that empathy is enhanced by communication skills and the identification of emotions, as one of the pillars of nursing care. Similarly, it was enriched with the use of the aforementioned tools, as they improved the ability to empathize (Rodríguez-Almagro et al., 2021; Beck & Neil, 2021; De Castro & Levesque, 2018). In this regard, the comment of a student stands out: “Virtual patients helped me put myself in the patients’ shoes.”

Thinking Skills

Thinking skills and creativity are considered enhancing elements of learning in nursing students. It was identified that the use of virtual patients, the m-learning toolkit, MOOCs, digital stories, scripts, and digital tales contributed to the development of creativity, critical thinking, and knowledge.

On the other hand, the process of constructing students' knowledge was favored by the depth of discussions, the promotion of reflection, and the connection and transfer of content that facilitated easier recall. Students learned through repetition, established connections between data and situations and perceived it as assistance when they were under pressure and received feedback (Egilsdottir et al., 2021; Peddle et al., 2023; Beck & Neil, 2021; Vizcaya-Moreno & Pérez-Cañaveras, 2020; Hart et al., 2020). It can also be noted that digital scripts enhanced discrimination, generalization, and knowledge connection, stimulated cognitive resources for high-level and deep learning, and favored cognitive support (Deschênes et al., 2020). It is important to clarify that these active digital strategies also enhanced student-centered learning (Padilha et al., 2019; Bramer, 2020).

The development of critical thinking, which is considered an important cognitive skill within nursing that enables reflection, deductions, conclusions, and decision-making, was also confirmed with the use of digital tools. For instance, digital stories helped organize ideas and reflections, encouraged the use of analytical skills, supported clinical thinking, and fostered problem-solving abilities. Simulation strengthened decision-making; digital scripts promoted situated cognition, and the MOOC favored the development of learning in a structured environment (Egilsdottir et al., 2021; Peddle et al., 2023; Deschênes et al., 2020; Beck & Neil, 2021; Vizcaya-Moreno & Pérez-Cañaveras, 2020). It is worth mentioning that findings indicate digital stories as contributors to improving the creative skills of nursing students (Beck & Neil, 2021; De Castro & Levesque, 2018).

Continuous Learning Skills

As is well known, learning is not limited to the school system. Having skills that allow nursing students to learn in all areas and moments of their professional life will contribute to them performing their discipline effectively. was formed by self-confidence, self-direction, autonomy, motivation, collaboration, skills to identify learning limitations, and digital skills.

The use of virtual patients and digital scripts developed self-confidence in young learners to respond to practical situations. Digital scripts were useful for them to validate their own knowledge by comparing it with that of experts (Deschênes et al., 2020), and the virtual classroom boosted their confidence and autonomy (Bramer, 2020). These tools also contributed to the development of self-direction and self-efficacy.

On the other hand, maintaining motivation for learning can become a challenge for nursing students. Evidence was found that the use of virtual simulation, online activities, YouTube videos, and digital stories excited students and stimulated learning. This made the students feel involved, entertained, and attracted in such a way that it improved their academic engagement (Egilsdottir et al., 2021; Heinonen et al., 2023; Deschênes et al., 2020; Vizcaya-Moreno & Pérez-Cañaveras, 2020; Wesselborg, 2020; Johnston et al., 2018). The data indicate that students prefer virtual tutorials, such as online videos, interactive games, and virtual learning environments (Petty, 2017).

Another aspect that was favored with the use of the previously mentioned digital tools was the development of collaboration skills and joint learning. Virtual patients helped students work collaboratively; online activities also stimulated collaboration (Heinonen et al., 2023; Bramer, 2020), while narratives and digital stories promoted community learning and the creation of collaborative ventures (Beck & Neil, 2021; Vizcaya-Moreno & Pérez-Cañaveras, 2020).

It was found that the skills to identify learning limitations are a metacognitive tool, as students recognize challenges to overcome or learn what should not be done. Studies showed that the feedback students receive during activities with digital media allows them to identify knowledge gaps and, therefore, reduce their anxiety and social isolation (Bramer 2020; Wesselborg 2020). Likewise, the use of virtual patients enabled them to perceive their limitations in learning, especially from their mistakes (Heinonen et al., 2023).

To conclude, digital skills are considered to play a key role in the lifelong learning of nursing students today, as they enable, among other things, access to information, evaluation, and utilization for patient care. In addition, students reported better experiences with technology (Heinonen et al., 2023).

Conclusions

As a result of the review, it was identified that digital tools supported students' learning in developing social-emotional skills, thinking skills, and the ability to actively learn and socialize in the professional role of nursing. The results of the literature review support the importance of using digital tools in the academic nursing training, and furthermore, it is exciting for students to be actively engaged in the learning process.

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2.4 Experiences of Health Care Professionals in Using Digital Technologies in Primary Health Care

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In the formulation of content for the SmartNurse Methodology, a pivotal step involved an examination of the experiences of nursing professionals in deploying digital technology within primary care. This exploration not only addresses the current challenges faced by the nursing field but also serves as a foundation for tailoring nursing education content to meet the evolving demands of the current and future professional landscape. The project team from the Specialized Institute of Higher Education for Health Professionals of El Salvador (IEPROES, El Salvador) conducted a literature review on this subject, and this chapter provides a concise overview of their findings.

The objective of the nursing profession is to effectively care for patients, which is why it is crucial for professionals to adapt to emerging changes. In the digital age, new care modalities are integrated to provide follow-up to outpatients suffering from chronic degenerative diseases (Isidori et al., 2022). An example of this is the use of information and communications technology to deliver health services, expertise, and information over distance (Liddy et al., 2008). This approach allows the health status of the patient to be monitored from home, providing guidance tailored to their needs, their family, and the environmental factors that could be influencing their health status. In developing nursing education on digital healthcare, it is essential to consider the experiences of nursing professionals in using telemedicine (Mensah et al., 2023). Therefore, the research question for this literature review was: What are the experiences of healthcare professionals in the use of digital tools in primary healthcare?

Methods

This literature review employed the PICO methodology to formulate the research question (Cumpston et al., 2021). Various terms were combined as follows: (P) Nurse, Health Care worker, Caregiver; (I) Digital technology, M-Health, E-Health, Tele-Health, Digital Health Care; (C) Primary care, Primary Health Care, First Level Health Care, Self-Management; (O) Experience, Implementation, Application, Use, Practice, Benefit. The search was conducted using the EBSCO database, and 25 articles were initially associated with this question. These articles were distributed among team members for thorough review. Ultimately, 16 articles, published between 2016 and 2020, were identified to address the research question. The analysis of these articles was conducted using inductive content analysis (Kyngäs et al., 2019).

Results

Through the coding process, both positive and negative experiences in using digital tools were identified. The positive experiences encompassed improved work processes and nurses' empowerment. These experiences describe how the use of specific digital tools facilitates and organizes information for virtual assistance to users. Nurses reported motivation derived from using digital tools, as well as an improvement in their relationship with the community. On the other hand, negative experiences were associated with challenges in nursing relationships and digital adaptation, along with technical challenges. These challenges included a preference for traditional care, resistance to change, communication difficulties, work overload, and inadequate skills in using and managing digital tools. The summarized results are presented in Figure 7.

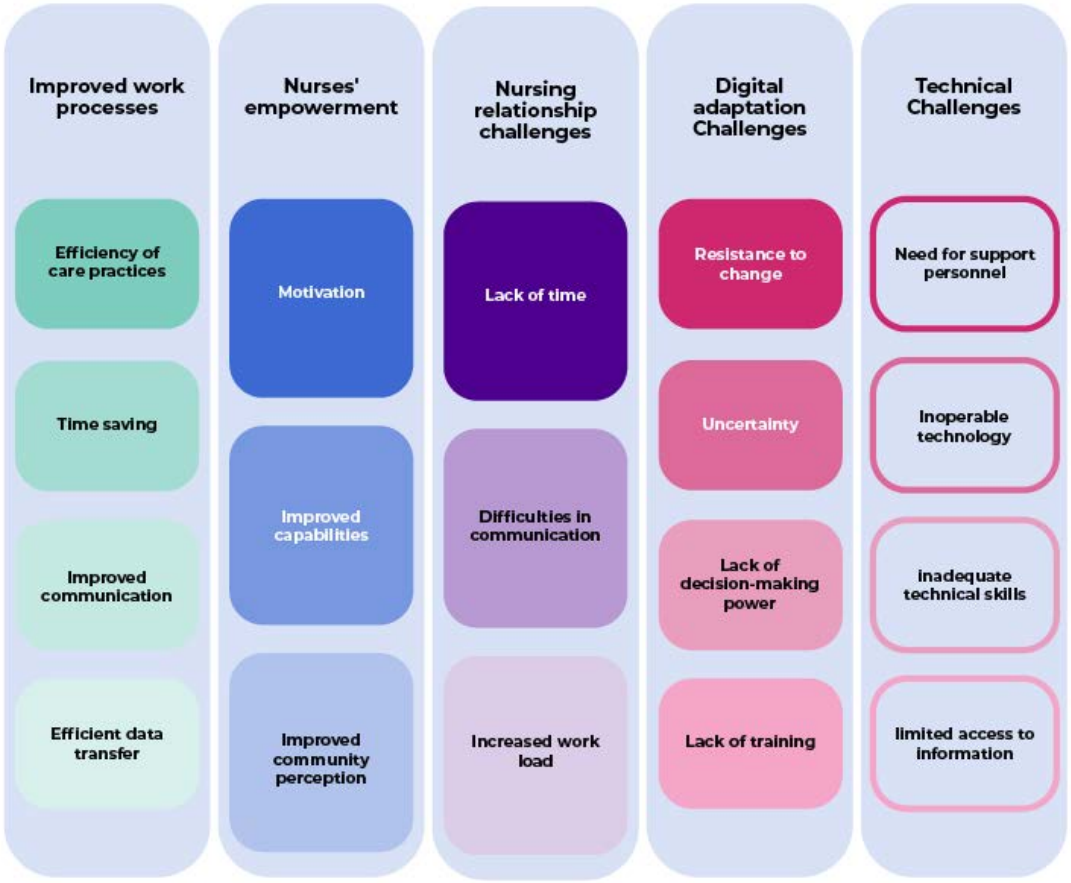

Figure 7. Experiences of nursing professionals in using digital technologies in primary healthcare

The nursing professionals had experienced **Improved work processes** when using digital technologies in primary health care. The improved work processes meant efficiency of care practices, time saving, improved communication and efficient data transfer.

In terms of **Efficiency of care practices**, Health Care Professionals (HCPs) have observed a changed workflow with the use of digital tools (Bauer et al., 2020). The digitization of records, improving work efficacy, has played a crucial role in this change (Bauer et al., 2020). Consequently, the adoption of digital tools has transformed care delivery, improving its availability (Odeh et al., 2014) and overall care efficiency (Heyworth et al., 2013). The implementation of eHealth has proven valuable (Heyworth et al., 2013) and beneficial to patients (Smith et al., 2014), particularly in

care units where the necessity for office and home visits has decreased (Liddy et al., 2008).

HCPs have noted a reduction in errors when cross-referencing medication orders with primary care physician's orders (Odeh et al., 2014). On a different note, alerts generated by the unit have proven invaluable in identifying emerging health issues and monitoring long-term trends (Liddy et al., 2008). The adoption of new tools has enhanced coordination among HCPs (Brandt et al., 2018). The improvement has been particularly evident in monitoring child growth and displaying vaccination schedules, aiding in identifying defaulters through color-coded entries, thereby facilitating communication with mothers (Brandt et al., 2018).

HCPs emphasize their role in encouraging patients to deeply assimilate health information, considering patients as partners for better outcomes when well-educated about their conditions and behaviors (Heyworth et al., 2013). Providers suggest that technology-based solutions, particularly involving Electronic Health Records, could enhance the overall process (Kolltveit et al., 2016). Nurses express positive experiences with telehealth, asserting that the externality of telehealth does not affect consultations when using appropriate software (Smith et al., 2014; Zaidi et al., 2020). HCPs find digital communication useful, especially when integrated with continuity of care (Zaidi et al., 2020).

HCPs have acknowledged that digitalization is **Time saving**, leading to a reduction in work duration (Brandt et al., 2018). Telemedicine has also been recognized as a time-saving solution (MacDonald et al., 2018), owing to the timely information provided by eHealth technology (Heyworth et al., 2013). The direct patient contact facilitated by Secure Messaging (SM) was perceived as a means to reduce the time spent in "phone tag," according to the perspective of HCPs (Kolltveit et al., 2016). Consequently, HCPs expressed the belief that, over time, they could efficiently and swiftly handle digital queries (Zaidi et al., 2020).

Health Care Professionals (HCPs) noted **Improved communication** in telehealth projects because the communication with staff was enhanced (Bauer et al., 2020). The use of various apps facilitated community interaction and provided information via mobile phones (Brandt et al., 2018). HCPs emphasized the critical role of communication in staying connected with patients, sharing stories, and underlined the importance of positive messages for measurable outcomes and effective communication (Das et al., 2015). Establishing an empathic relationship before asynchronous eHealth coaching and initiating digital coaching with an initial face-to-face meeting were considered essential for building a strong and compassionate relationship (Das et al., 2015).

Subsequently, the use of the interactive, web-based register facilitated the delivery of practical care (Entezarjou et al. 2020). HCPs asserted that patients, by gaining access to information and e-Health, became more informed about better health outcomes, leading to enhanced patient empowerment (Heyworth et al., 2013). Consequently, patients could develop a holistic view and better understand their health situation (Heyworth et al., 2013). HCPs found digital communication to be useful (Zaidi et al., 2020) and emphasized the significance of eHealth in fostering collaborative relationships with patients and among HCPs. Patients and HCPs have transitioned to a collaborative teamwork approach, expressing a desire for access to various strategies for communicating with patients (Heyworth et al., 2013; Zaidi et al., 2020). In this context, the term “alliance” represents a range of approaches between HCPs and patients, highlighting patients’ choices and the collaborative nature of teaching (Heyworth et al., 2013). With time HCPs feel they can communicate easily with patients as they can fully express their concerns (Zaidi et al., 2020). Additionally, HCPs report that some patients prefer online communication over face-to-face interactions, considering the use of an eHealth portal as a beneficial tool to communicate and to promote recommended postsurgical regimens (Johansson & Ivarsson, 2019), as software provides an effective means to ask relevant questions (Zaidi et al., 2020). Finally, HCPs using

SM agreed that many patients' questions were streamlined, and requests were addressed by the most appropriate member of the team (Kolltveit et al., 2016).

Work processes also improved through **Efficient data transfer**, as HCPs reported that they could enter information in a single mobile device, thereby achieving greater efficiency in information registration with the use of mHealth. This was evident in their ability to comparatively record the vaccination of children. The use of technology resulted in participants improving the quality of documentation. (Brandt et al., 2018.) The utilization of interactive, web-based registers enabled the systematization of documentation (Entezarjou et al., 2020), and access to patients' information helped HCPs understand what patients referred to during consultations (der Cingel et al., 2021). HCPs predominantly used eHealth resources for information compared to other technologies (Heyworth et al., 2013). All professionals obtained more patient information from online sources (Johansson & Ivarsson, 2019), expressing surprise at the rich and vast information available (Johansson & Ivarsson, 2019). HCPs appreciated having a well-balanced amount of information, neither too much nor too little. Compared with regular phone calls, HCPs found automated patient interview more feasible. (Zaidi et al., 2020.) Physicians noted that it was helpful when notes on patients' use of telehomecare units were made in their charts; they found that data from the telehomecare units helped them assess patients' stability (Thies et al., 2021). On the other hand, patients informed about their health situation through eHealth found the information more clinically useful, as the technology provided precise and accessible information (Heyworth et al., 2013).

Nurses' Empowerment included motivation, improvement of capabilities and the improved community perception.

Using digital technologies increased **Motivation**, as the nurses felt curious and excited about utilizing digital technologies, and with time,

they felt positive attitude toward it (Zaidi et al., 2020). Nurses were aware that remote support is more practical for some patients (der Cingel et al. 2021) and found telehealth units to be very useful (Liddy et al., 2008). The replacement of registers by a mobile phone (Brandt et al., 2018) and the implementation of digital platforms (Zaidi et al., 2020) brought excitement into their work (Brandt et al., 2018; Zaidi et al., 2020). HCPs were enthusiastic about the potential of digital technologies to improve medication reconciliation (Kolltveit et al., 2016), and most expressed a desire to remain digital (Zaidi et al., 2020).

As an **Improvement of capabilities**, nurses pointed out a positive change in their practice when using technology (Entezarjou et al., 2020) because they identified innovation and enhancement in the learning process. HCPs also showed perseverance in dealing with technological problems and became more skilled in solving them (MacDonald et al., 2018). HCPs also experienced an **Improved community perception**, including the positive effect of using and introducing apps in building up their image in the community, as the community trusted and showed them respect (Brandt et al., 2018). HCPs were pleased about the possibility of getting recognized for their hard work (Brandt et al., 2018).

When using digital technologies in primary health care, nurses experienced **Nursing relationship challenges**, including lack of time, workload increase and communication difficulties.

The **Lack of time** meant that the nurses found it challenging to view patient information due to their limited time in primary health. Therefore, they had to schedule time to provide support, which proved to be a good solution (der Cingel et al. 2021). They were also concerned about how the management of digital information could lead to unmanageable responsibilities and therefore impact their time (Heyworth et al., 2013). They reported organizational challenges, such as time constraints on when to do their work, and the time required for

handling postings was significant (Johansson & Ivarsson, 2019). HCPs expressed that updating records and the triaging process took much longer than they had expected (Smith et al., 2014).

Increase in workload was described as a concern about how the management of digital information could create unrealistic expectations for patients in terms of assignments (Heyworth et al., 2013) and how digitization increased their workload (Odeh et al., 2014). Nurses managed to fit telehealth in their day-to-day work, even with their busy timetables (Smith et al., 2014). HCPs expected more flexibility in performing their work, but they had to prioritize normal work routines (Johansson & Ivarsson, 2019). On the other hand, at the beginning, HCPs felt that it could be a lot to handle (Zaidi et al., 2020), considering organizational challenges due to busy working hours (Johansson & Ivarsson, 2019).

Experienced **Communication difficulties** when using digital technologies included organizational challenges related to communicating in writing with patients online (Johansson & Ivarsson, 2019). and a loss of communication when done via text (Zaidi et al., 2020). Additionally, there was a lack of feedback from the patient, which led to a need to approach things differently from what the HCPs were used to in face to face-coaching sessions. This often resulted in pauses in the process, making them wonder what is going on (Das et al., 2015).

Digital Adaptation Challenges included resistance to change, uncertainty, lack of decision–making power, resistance to change and lack of training.

Resistance to change manifested as preferences for traditional care. HCPs described that they are not used to communicating with patients online (der Cingel et al., 2021) and believe that personal contact should not be replaced (Thies et al., 2021) because they feel a face-to-face approach is more effective. They find it challenging not to give advice to patients as they were used to, resulting in a preference for

face-to-face methods (MacDonald et al., 2018). Some HCPs do not consider remote support as real support (der Cingel et al., 2021) because their typical tools to elicit feedback were not applicable. In fact, some HCPs were reserved about emailing patients (Heyworth et al. 2013). Due to resistance of change, some HCPs did not provide support via email to their patients (der Cingel et al. 2021) and chose not to suggest the use of eHealth (Thies et al., 2021). They also reported organizational challenges such as lack of incentives as underpinning for their work (Johansson & Ivarsson, 2019).

As part of digital adaptation challenges, according to HCPs, the use of digital tools created Uncertainty because more structured forms of communication should be investigated (Johansson & Ivarsson, 2019). They felt that there is no certainty whether the use of telemedicine has increased their competences (Entezarjou et al., 2020). Some nurses believed that telehealth did have its place but should be clearly defined (Thies et al., 2021). Others believe they cannot cope with eHealth (Thies et al., 2021) or expressed skepticism to the usefulness of digital technologies (Zaidi et al., 2020). Similarly, HCPs suggest that videocalls create too much of distance (Thies et al., 2021) and did not think that the implementation of telehealth should be a priority for local National Health Services (Smith et al., 2014). HCPs suggest that a lower frequency use of tech does not necessarily mean a less positive perception (der Cingel et al., 2021). The effective use of available tools cannot be guaranteed (Heyworth et al., 2013), and they experience uncertainty in the implementation of digital platform (Zaidi et al., 2020).

HCPs considered that they didn't have participation in developing the telehealth service, which meant **Lack of decision-making power**. Their views on the telehealth service were not considered in decision making (Smith et al., 2014). HCPs wished to maintain digitalized, and they longed for access to different strategies of using eHealth, preventing burden or abuse. As a result, the HCPs declared their needs are not supplied with the resources they have (Heyworth et al., 2013), and they

believed that the local health services could do a lot to support the success of the service (Smith et al., 2014).

Lack of training was an experienced challenge, and nurses highlighted a lack of formal e-health training in nursing training programs (Odeh et al., 2014) and their need to be trained to make better use of eHealth (Bauer et al., 2020). They also believed that more input and training would enhance and ensure the success of telehealth (Smith et al., 2014). After all, nurses believe they need more knowledge on eHealth (Thies et al., 2021).

Technical challenges that HCPs experienced in using digital technologies in primary health care included the need for support personnel, inoperable technology, inadequate technical skills, and limited access to information.

Regarding the **Need for support personnel**, nurses felt it was important to have backup personnel if something goes wrong (Odeh et al., 2014), and they believed that training support staff to assist with medication reconciliation could improve the process (Kolltveit et al., 2016). Nurses highlighted the shortage of staff working on telehealth and suggested that having an administrator to deal with non-significant triggers would overcome the overload issue (Smith et al., 2014).

Inoperable technology was a challenge because HCPs expressed that the incompatibility of computer systems is time-consuming; nurses' computer systems were not integrated with each other, and they had to enter multiple data systems to get a complete picture of patient (Odeh et al., 2014). They also expressed that before using the app, they got tired of using many registers (Brandt et al., 2018), and they were not satisfied with the resources available to run the service (Smith et al., 2014). Technical problems discouraged them (MacDonald et al., 2018). As a result, HCPs feel overwhelmed because of the inefficiencies of the electronic health records (Heyworth et al., 2013). Nurses consider the user-friendliness of tools to be important to show patients to avoid fragmented

information (Thies et al., 2021). Physicians were concerned about the medicolegal liability associated with receiving time-sensitive data (Liddy et al., 2008), and HCPs reported that remote support can be difficult if patients are not available by phone (der Cingel et al., 2021). In fact, they identified the multi-step process for Secure Messaging (SM) registration as a challenge to widespread patient adoption of SM and complained about the need for separate log-in-to the SM service. Finally, they complained about the slow network speeds (Kolltveit et al., 2016).

Equally important, **Inadequate technical skills** were challenging for HCPs as they found that the system was complicated (MacDonald et al., 2018), and they noted that a lengthy opt-in process and requirements are barriers to increasing SM use among patients. They also identified less technically savvy elderly patients for SM registration as a challenge to widespread the adoption of SM. HCPs also expressed frustration with their inability to easily access SM (Kolltveit et al., 2016), the system was sometimes a bit cumbersome and difficult to handle (Öberg et al., 2018). Finally, HCP feared that if computer errors would occur, they could not solve the technical problem, and that situation may affect patients' health (MacDonald et al., 2018; Öberg et al., 2018).

HCPs got frustrated when unable to see information given to patients, and outgoing emails do not confirm whether HPC mails are read (der Cingel et al., 2021) because of Limited access to information. They also reported difficulty in clearly displaying reconciled medications in electronic health records (Kolltveit et al., 2016). Thus, the HPCs recognized the patients' concerns and needs about systems are wider than they can assist (Heyworth et al., 2013).

The experiences of using digital technologies for some HCPs have enhanced the efficiency of healthcare delivery, particularly in treating chronical diseases, vaccination processes, and reducing time for office and home visits (Brandt et al., 2018). Digital apps empower patients in self-care, as some prefer on-line coaching sessions during consultations

(Heyworth et al., 2013). Access to patients' information helps HCPs understand what patients refer to during consultations. In terms of motivation, some HCPs are curious and excited about using digital technologies and implementing digital platforms because remote support is more practical. On the contrary, for others, the use of technologies has been challenging, increasing work time and load, especially in the triaging process (Smith et al., 2014). They reported communication problems due to incomplete patient information. Some HCPs preferred traditional face-to-face nursing practices, as remote support is deemed inefficient without personal contact (der Cingel et al. 2021), Nurses found the multi-stage process difficult to achieve, and patients may not have free access to digital tools. Concerns were raised about the inefficiencies of the electronic health records, as computer errors could potentially affect patient's health. Resistance to changing traditional healthcare delivery methods to the use of digital tools was also noted.

Conclusion

This literature review offers an overview of the experiences related to the implementation of digital tools to improve nursing work, with a focus on preventing chronic noncommunicable diseases and promoting self-care in the patient. The findings highlight the advantages and encourage the utilization of digital healthcare, while also identifying challenges that can be addressed through appropriate capacity building. These results can inform the design of the SmartNurse Methodology and the integration of comprehensive digital competencies into nursing education.

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2.5 Teachers' Experiences with Digitalization in the Nursing Education

Laura Chavarría de Cocar, Brenda Gutiérrez de Medina, Sandra Martínez de Diaz, Marvin Montoya Amaya, Claudia González Quintanilla and Salvador Manzanares

The insights derived from the experiences of nursing teachers with digitalization in nursing education are integral to the development of the SmartNurse Methodology and enhancing its effectiveness in Latin American nursing education. This chapter elucidates the findings of the literature review conducted by Gerardo Barrios University (UGB, El Salvador). The article derived from this literature review, Experiencias de los docentes con la digitalización en la enseñanza de la carrera de Enfermería, (Chavarría de Cocar et al., 2023, is available in Spanish in LUX Medica, Vol. 18 Núm. 55 (2023): Número Especial.

Reflecting on one's teaching experience involves considering the personal journey a teacher undergoes at various moments in pedagogy. It encompasses the question of "what to do as a teacher" (El Atmani & Madrane, 2023). While not every occurrence may be labeled as an "experience," it becomes one when it leads to change, transformation, and learning (Armstrong & Asselin, 2017). Teachers undergo preparation encompassing methods (Haddeland et al., 2021), knowledge, theories (Chang et al., 2023), behaviors, values, and strategies (Alhonkoski et el., 2022; Marques, 2018) to effectively impart knowledge. It is crucial for teachers to grasp the context and realities of their students for the learning process to be truly meaningful (Azevedo et al., 2021).

By December 2019, the emergence of the new pandemic significantly altered the landscape of education. Despite the pre-existing use of digitization and virtual tools in training, the pandemic catalyzed a transformative shift towards a fully digital educational realm. In 2020, teachers found themselves compelled to adapt and innovate, particu-

larly in the realm of distance learning. Face-to-face classrooms were no longer feasible due to health concerns, necessitating the adoption of distance education and acknowledging the imperative of social isolation (Langegård et al., 2021). This research delves into a comprehensive literature review, aiming to shed light on the experiences of nursing teachers both before the onset of the COVID-19 pandemic and during the current circumstances.

The research question was: **What are the experiences of teachers with digitalization in the nursing education?**

Methods

The research took the form of a literature review, and the databases explored included Ebsco, Scielo, Redalyc, Dialnec, and Google Scholar. The Pico method (Patient/Population-Intervention/Exposure-Comparison-Outcomes) was employed to frame the research question (Cumpston et al., 2021). The search terms utilized encompassed teaching experience, nursing teachers, virtuality, teachers and ICT, nursing teaching experience, nursing teachers, and digitization (along with related or similar terms).

Inclusion criteria were set for articles published in English or Spanish between the years 2016–2022, utilizing qualitative methodology, and focusing on research related to nursing teachers or the Faculty of Health Sciences.

A total of nine articles were chosen for inclusion in the literature review following the screening of titles, abstracts, and full-text readings. These selected articles originate from diverse locations, including Canada, New Zealand, the Kingdom of the Netherlands, Australia, Norway, the Lambayeque Region, Argentina, and Ecuador.

Results

Teachers report positive and significant experiences with digitization in the context of nursing education, which **Greater efficiency in teaching, Positive attitude, Challenges in teaching,** and **Changes in work demands**. A summary of the results is visually depicted in Figure 8.

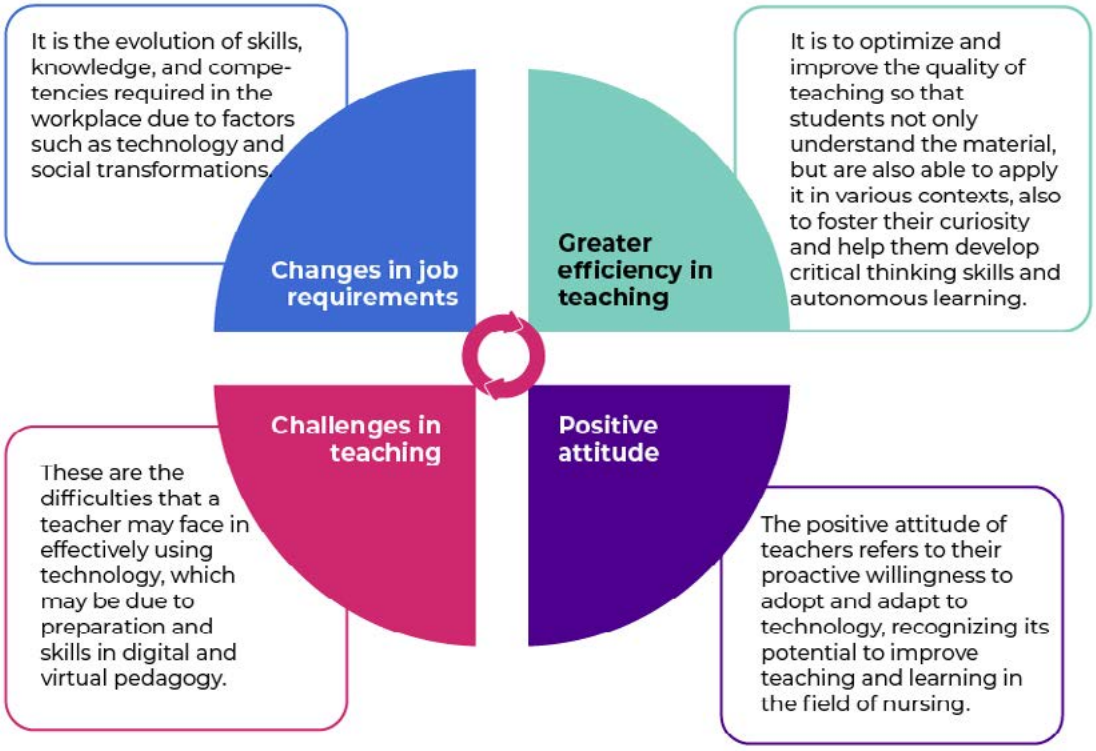

Figure 8. Teachers' experiences with digitalization in the nursing education

Greater efficiency in teaching with the use of digitization that provides an advanced learning process, while achieving continuity and achievement of objectives (Vandenberg & Magnuson, 2021). Most teachers perceive ICTs as valuable resources for nursing education, altering the focus of education. They serve as alternative means of communication, enabling students to submit assignments online (Nsouli & Vlachopoulos, 2021) and facilitating the construction and sharing of knowledge through mobile devices (Mackay et al., 2017). Furthermore, the transfer of knowledge, the creation of easy access to information (Nsouli & Vlachopoulos, 2021), and the establishment of a welcoming

learning environment through virtual tools that complement clinical practice (Vandenberg & Magnuson, 2021) contribute to enhanced teaching efficiency.

According to teachers, various interactive platforms can be employed to facilitate meaningful and collaborative learning (Vandenberg & Magnuson, 2021). Teachers expressed satisfaction with learning outcomes and student participation, fostering a supportive learning environment (Vandenberg & Magnuson, 2021). This is achieved through the utilization of diverse visual, auditory, and kinesthetic learning styles (Mackay et al., 2017). For instance, teachers may incorporate the use of 3D images, such as those depicting human body organs, as illustrated by Nsouli & Vlachopoulos (2021).

According to nursing teachers, digitalization is fostering optimized collaboration and communication. The teachers underscored the importance of student involvement in the application of new technological learning methods, highlighting the use of mobile phones as a tool for student-teacher interaction (Nsouli & Vlachopoulos, 2021). Moreover, the ability to promptly respond to students' emails and messages is facilitated by digitization (Nsouli & Vlachopoulos, 2021). The digital landscape enables individuals to traverse various scenarios and countries within a span of twenty-four hours, overcoming physical mobility challenges. This allows for seamless sharing with professionals worldwide through the utilization of virtual tools and platforms (Vandenberg & Magnuson, 2021).

The **Positive attitude** that teachers bring to each activity they undertake translates into student participation in learning through ICT, providing a sense of fulfillment for the teacher (Nsouli & Vlachopoulos, 2021) and fostering a positive stance toward digitization. Virtual platforms and ICT are deemed indispensable in nursing education, prompting teachers to strive for innovation by trying something new each year (Nsouli & Vlachopoulos, 2021), even in the minutiae

(Borgobello et al., 2019). This proactive approach is characterized as a self-directed endeavor (Nsouli & Vlachopoulos, 2021), turning personal effort into a valuable learning experience (Mackay et al., 2017).

Teachers also encountered **Challenges in teaching** related to digitization, which encompass both its benefits and drawbacks (Meum et al., 2021) from the teacher's perspective. At times, achieving active discussions with students unaccustomed to virtual learning proved challenging (Meum et al., 2021). Additionally, teachers faced difficulties in digital pedagogy, where some acquired ICT knowledge for personal interest, expressing the belief that digital tools should not replace face-to-face learning (Hart et al., 2019). Teachers reported limited experience in using digital tools for teaching (Vandenberg & Magnuson, 2021), uncertainty about the purpose of employing digital methods (Meum et al., 2021), and expressed reluctance to place themselves in vulnerable situations (Simes et al., 2018). According to teachers, educational methods for utilizing e-learning were perceived as lacking, with a reported absence of guidelines (D'Souza et al., 2017; Nsouli & Vlachopoulos, 2021). However, they expressed a willingness to embrace pedagogical simulation if provided with training, guidance, and support (D'Souza et al., 2017; Simes et al., 2018).

The teachers express the need for technical support, highlighting instances when they feel isolated in dealing with technical issues (D'Souza et al., 2017; Borgobello et al., 2019). This sense of isolation is exacerbated by the limited or nonexistent experience and training in equipment usage (D'Souza et al., 2017; Borgobello et al., 2019). Moreover, teachers note a lack of information available on application usage (Mackay et al., 2017), and they find themselves in the position of advising students on how to use these applications (Meum et al., 2021). Teachers express the need to advocate for the resources required (Simes et al., 2018), and they share concerns about anxiety arising from the absence or loss of Internet connection (Simes et al., 2018). They express a desire for annual training to stay current in simulation skills (Simes et

al., 2018), recognizing the importance of maintaining credibility in the eyes of students (D'Souza et al., 2017). Teachers also reported instances when they faced challenges in putting a simulation into practice and utilizing the teaching and learning forum (Borgobello et al., 2019). While initial barriers to technology use have become routine in teaching and learning, teachers express a strong desire for ongoing training with equipment, tools, strategies, and digital platforms to ensure their proficiency in simulation skills (Simes et al., 2018).

Digitalization has brought about **Changes in work demands**, with teachers experiencing anxiety regarding simulation expectations (Simes et al., 2018). This necessitates a reflection of creativity (Borgobello et al., 2019) and flexibility (Borgobello et al., 2019; 9) even in minor aspects, transforming the virtual classroom into a dynamic and interactive way (Borgobello et al., 2019), with the ability to adapt content in digital environment (Borgobello et al., 2019). Teachers find themselves needing to adapt content in digital environments to cate the needs of students (Borgobello et al., 2019), taking roles such as a videoconference coordinator, content producer, technical problem solver, and the owner of technological devices (Arandojo & Martín, 2017) for universal use. Additionally, teachers express the feeling of becoming a remote psychologist in response to the evolving demands (Arandojo & Martín, 2017).

In addition to this, teachers encountered changes in their workload, involving the necessity to invest time in learning and managing various tools (Nsouli & Vlachopoulos, 2021; Simes et al., 2018; Borgobello et al., 2019). This included maximizing the use of mobile phones (Mackay et al., 2017), requiring more time for simulation preparation (Arandojo & Martín, 2017), and addressing emails (Mackay et al., 2017). On the other hand, teachers acknowledged that virtual meetings save time (Hart et al., 2019), and the exchange of simulation scenarios between teachers, along with a bank of scenarios (Simes et al., 2018), contributed to a reduction in teacher's workload. Teachers underscored the significance of resources for success, viewing e-learning as a financial investment

by the organization in teachers to deliver education to nursing students (Simes et al., 2018).

Conclusions

Many teachers view ICTs as invaluable resources for nursing training, reshaping the educational focus, and providing alternative channels for communication and information. Teachers exhibit a positive attitude towards the utilization of ICTs and virtual platforms, deriving satisfaction and creating positive scenarios for digitalization that are now considered essential in nursing education.

Teachers gained the experience that integrating digitalization into the educational process enhanced teaching efficiency. They employed various strategies, tools, and technological resources that not only facilitated continuity but also enabled them to achieve their educational objectives.

Teachers also conveyed challenges associated with the use of digitalization, occasionally experiencing incapacity in teaching due to factors such as inadequate preparation, lack of student motivation, and interest. At times, they felt a deficiency in digital pedagogy, as much of the knowledge acquired stemmed from their personal interest. There was an expressed need for technical support, with teachers noting instances where they felt isolated in dealing with technical issues.

Teachers encountered an escalation in work demands as they were required to infuse creativity into minor aspects, transforming the virtual classroom into a dynamic and interactive environment. Additionally, they had to adapt content in digital environments to meet the diverse needs of students while navigating the problem-solving process. To support this, Higher Education Institutions must ensure the provision of technicians and an ample supply of technological devices for universal use. This should be recognized and incorporated as a financial

investment, given that these elements are pivotal factors in the digitalization of the teaching-learning process.

As per the literature review, it is evident that both teachers and students require training to fully leverage the advantages of digitalization in nursing education and healthcare. The SmartNurse Methodology offers a structured approach and practical methods for incorporating technological resources, fostering the development of digital skills, and enhancing the teaching-learning process through the application of active methodologies. This methodology aims to cultivate competencies among nursing students and professionals engaged in the care of individuals with non-communicable diseases, families, and communities.

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3

The SmartNurse Methodology

The significance of online nursing education is on the rise, giving rise to regional and institutional demands for the delivery of high-quality online education within nursing institutions. The incorporation of technology and active learning approaches in Latin American partner countries represents a significant stride towards the digitalization of nursing education. The SmartNurse project aligns with this objective by formulating the SmartNurse Methodology. This pedagogical framework, grounded in active learning, is designed to foster the development of digital health competences throughout nursing education. This chapter outlines the SmartNurse Methodology developed in the project, delineating its various sections, and elucidating the interconnections between them.

3.1. Development Process of the SmartNurse Methodology

Annukka Huuskonen

The SmartNurse Methodology is a pedagogical framework, based on active learning to develop digital health competences during the professional growth of nursing students to improve selfcare in the individual, family, and community to deal with non-communicable diseases. The foundation of the methodology is based on the results of literature reviews conducted in the project (Read more in Chapter 2), empirical expert knowledge from the project participants, and pilots conducted during the project to enhance the methodology. This chapter provides a compact overview of the process of developing the SmartNurse Methodology.

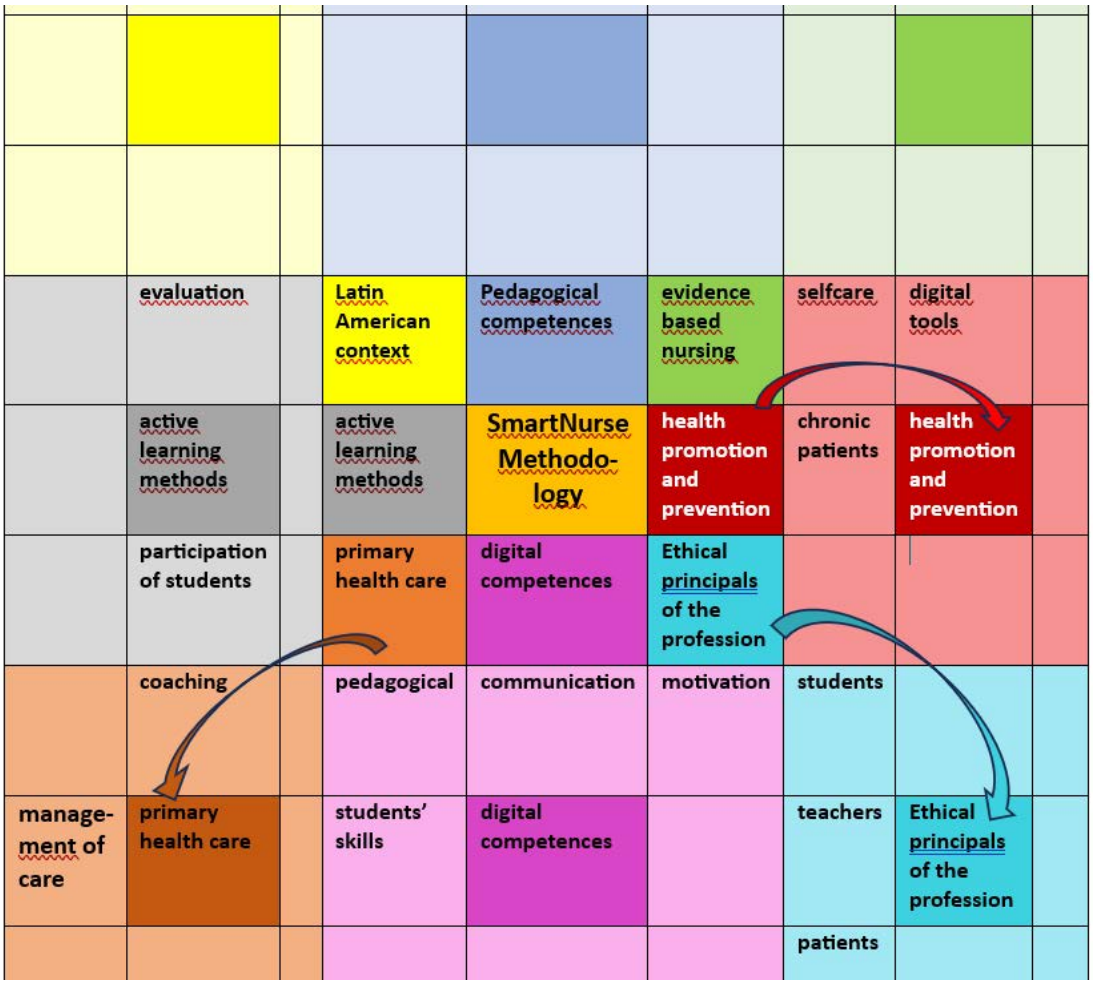
The primary objective of the SmartNurse project was to improve nursing education and digital methodologies related to health promotion, prevention, and the fundamental management of chronic diseases in the context of primary health care within Latin American partner countries. The project pursued this overarching goal through three specific objectives: updating the curriculum using the SmartNurse methodology in partner institutions, enhancing the digital educational skills and pedagogical approaches of nursing teachers in these institutions, and implementing updated pedagogical methods and tools in nursing education across partner institutions.

To achieve these objectives, the project consortium developed the SmartNurse Methodology, aiming to advance nursing education in the realms of digital and pedagogical methods, particularly in the areas of health promotion and primary health care. The development process involved comprehensive literature reviews of best practices (Read more in Chapter 2), along with webinars, trainings, workshops, and pilots within the field of nursing education.

Developing a methodology proved to be a novel undertaking for the partners, necessitating extensive discussions to establish a shared understanding of the expected outcomes. Deliberations focused on whether the methodology should take the form of a conceptual model or a process description. The result effectively encompasses both aspects. The process of developing the methodology commenced with online workshops dedicated to defining key concepts and identifying the evidence required, laying the foundation for research questions that would guide literature reviews and inform the theoretical underpinnings of the methodology.

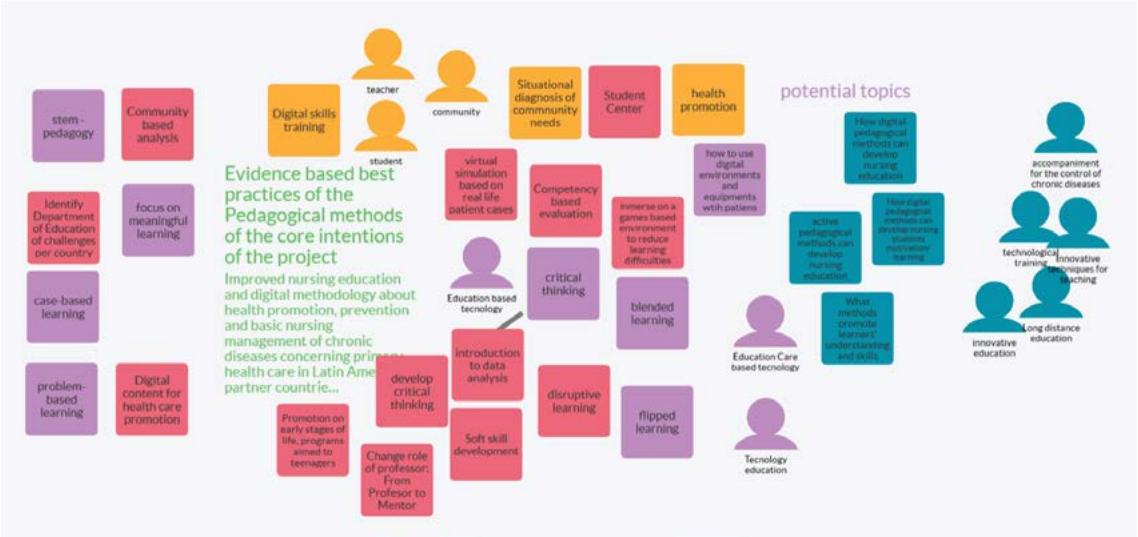
> ***The process of developing the methodology commenced with online workshops dedicated to defining key concepts and identifying the evidence required.***

At this stage, the consortium used various online tools and brainstorming methods to produce innovative content for the methodology and work efficiently in the online environment. In the initial phase of creating the methodology, the Lotus flower method was utilized (Ridley, n.d.). With the Lotus flower method (Picture 3), 'petals' form around the main concept, creating a flower that includes sub-concepts related to the main concept. This method facilitated the exploration of the key components of the concept and aided in breaking down the content of these components.



Picture 3. An Example of the Lotus Flower Technique Used to Develop the SmartNurse Methodology

The consortium's online collaboration also involved the use of various collaborative online boards (Picture 4), which were utilized by consortium members to brainstorm ideas for the SmartNurse Methodology. Thus, before our transnational meetings, consortium members had the opportunity to test various digital environments and applications that they could also integrate into their online teaching.



Picture 4. Example of an online brainstorming session in English for the SmartNurse Methodology design

Although the pandemic initially prevented the organization of planned international meetings, the need for personal exchange of ideas remained evident. Online collaboration was effective and accessible, but personal exchange of thoughts and ideas was extremely fruitful when we met each other in person.

The theoretical foundation of the SmartNurse Methodology incorporates elements derived from the theory base explored in independent sister projects. The DigiNurse project concentrated on digital patient coaching by nurses in the European context, while the DigiCare project aimed to enhance healthcare curricula through the digitalization of patient self-management and coaching in the Asian context (See Read more suggestions at the end of this chapter). The theoretical underpinning of the SmartNurse Methodology was broadened through literature reviews (Read more in Chapter 2) that delved into pedagogics (Read more in Chapter 2.1, 2.2) and the digital competences of teachers (Read more in Chapter 2.5), students (Read more in Chapter 2.3), and nursing professionals (Read more in Chapter 2.4).

In tandem with the literature review efforts, teacher trainings were initiated to bring practical perspectives to the initial stages of

methodology development (Read more in Chapter 4.2). Also, pilot cycles one and two were planned and executed during the ongoing methodology development. This approach allowed the methodology to benefit from valuable practical insights gathered by partner teams as it evolved (Figure 9). Subsequently, drawing on the experiences of partner teams (Read more in Chapters 4.3-4.7), the results from the pilot phases (Read more in Chapter 4.8) played a pivotal role in refining the SmartNurse Methodology.

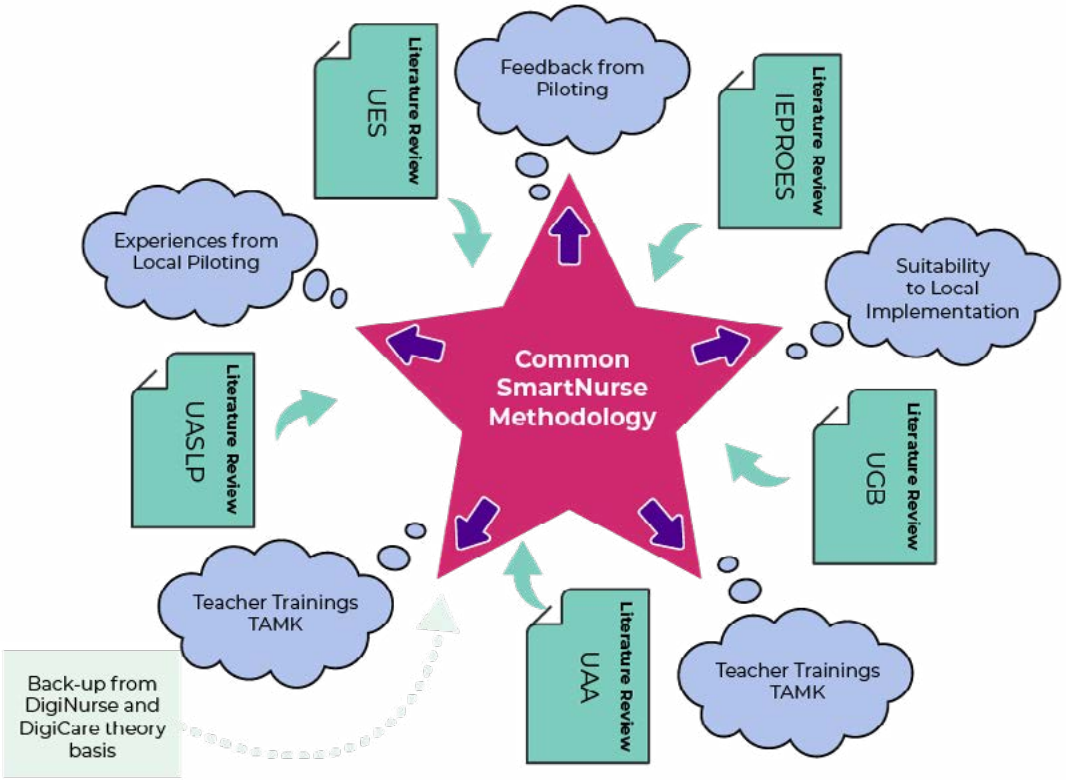


Figure 9. Theory and practice contributing to the formation of the SmartNurse Methodology

In the second transnational meeting in Tampere, the definition of the SmartNurse Methodology was agreed: The SmartNurse Methodology is a pedagogical framework, based on active learning to develop digital health competences during the professional growth of nursing students to improve selfcare in the individual, family, and community to deal with non-communicable diseases. The definition itself contained the most essential key concepts which are discussed in detail in Chapter 3.3 -3.7.

During the second transnational meeting, held in Tampere, consensus was reached on the definition of the SmartNurse Methodology: it is a pedagogical framework grounded in active learning. Its aim is to develop digital health competences throughout the professional development of nursing students, enhancing their ability to promote self-care within individuals, families, and communities in addressing non-communicable diseases. The definition encapsulates the fundamental key concepts.

> ***The SmartNurse Methodology is a pedagogical framework grounded in active learning. Its aim is to develop digital health competences throughout the professional development of nursing students, enhancing their ability to promote self-care within individuals, families, and communities in addressing non-communicable diseases.***

Following the conclusion of the initial two pilot rounds, the design of the third pilot round aimed to seamlessly integrate the methodology into selected courses at each partner university. The methodology was intentionally crafted to be sufficiently generic, allowing for adaptation and implementation across various curricula. This adaptability ensures its applicability throughout nursing studies, enabling integration into different year courses and diverse higher education institutions. Consequently, the integration processes of the methodology are detailed in Chapter 5.

The consortium aimed to create a visual representation of the methodology, intending to elucidate the roles and connections of key concepts. Numerous versions of the SmartNurse Methodology image were explored before settling on the final shape and concept selection. Many of these images conveyed action, movement, or a journey (Figure 10).

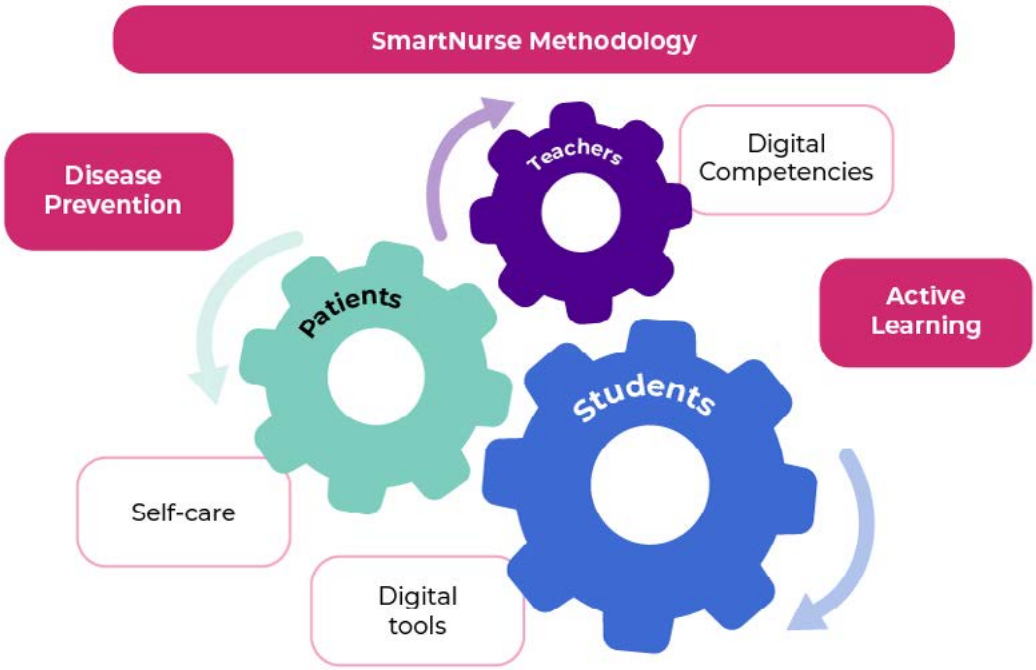
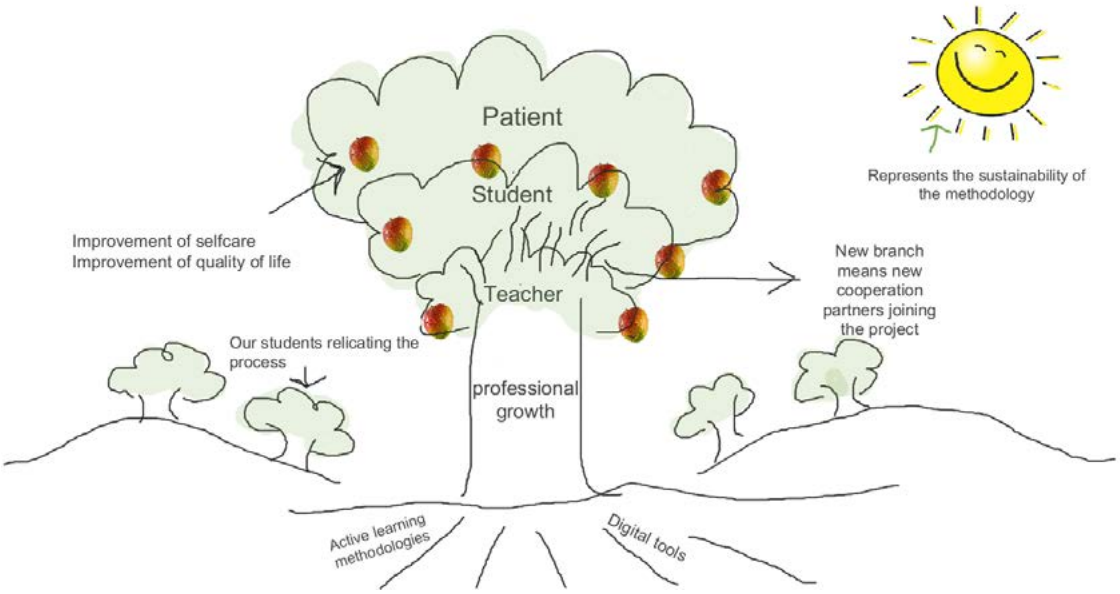


Figure 10. Early version of the SmartNurse Methodology

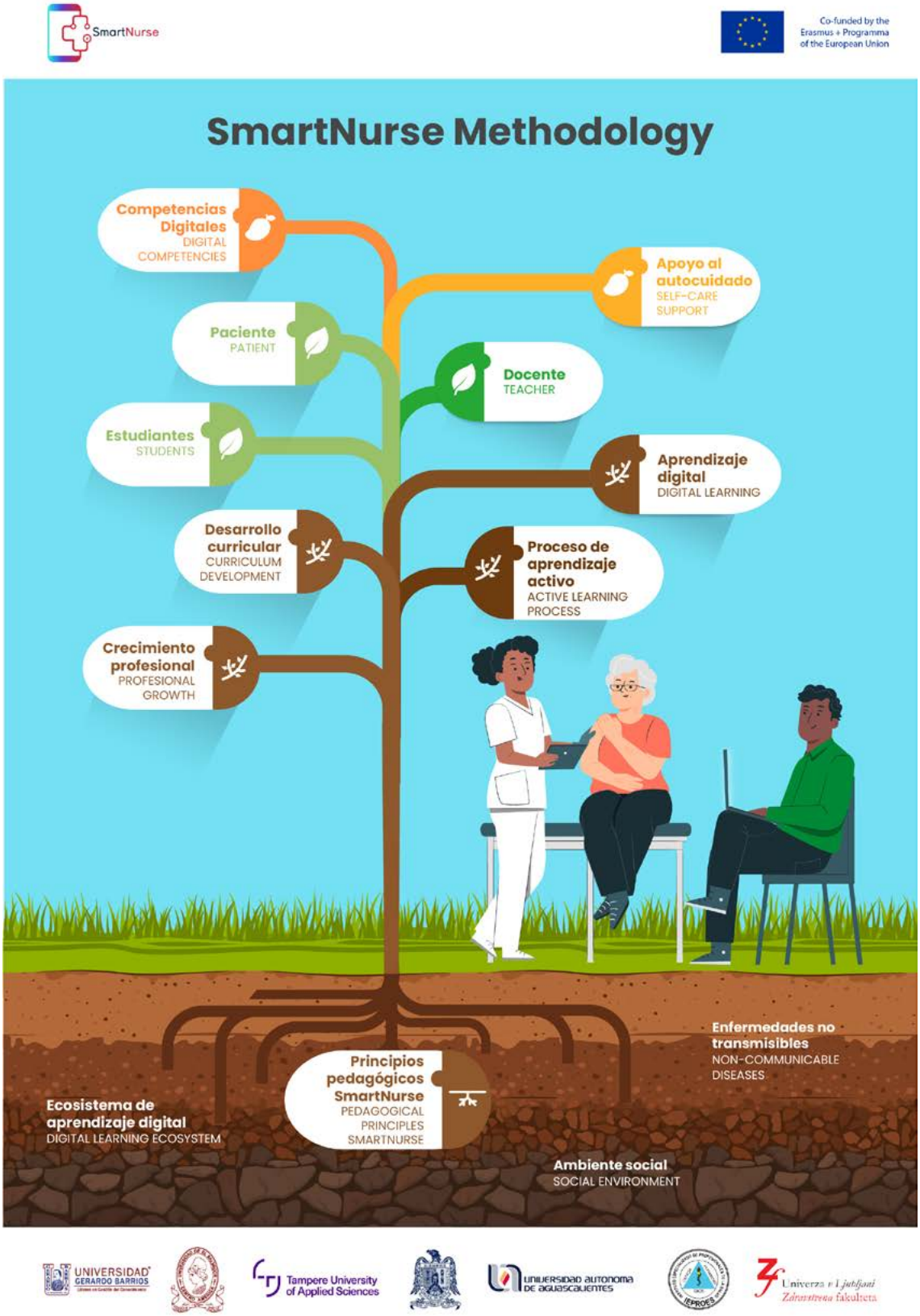
In the end, a tree—an emblem symbolizing growth and development—resonated with all partners as the chosen image. This specific representation successfully encapsulated the methodology, serving as both a conceptual framework and a dynamic process. The image vividly portrayed influencing factors, essential elements for growth, and the intended outcomes, drawing a parallel to the fruits of the tree.

In the final stages of methodology development, the consortium collectively decided on a symbolic representation—a tree, chosen for its significance in symbolizing growth and development (Picture 5). This choice resonated profoundly with all partners, as the image of the tree successfully encapsulated the essence of the SmartNurse Methodology. It served a dual purpose as both a conceptual framework and a dynamic process.



Picture 5. A developed version of the SmartNurse Methodology (Picture by Karen Sánchez Núñez, 2020)

The completed, final illustration (Picture 6) vividly portrayed influencing factors, essential elements for growth, and the intended outcomes, drawing a parallel to the fruits of the tree. This final illustration not only symbolized the culmination of collaborative efforts but also explicitly reflected the omnipresence of digitalization in the healthcare field.



Picture 6. SmartNurse Methodology (Picture Designed by Yanci Michelle Sosa Cueva, 2023)

The tree, its surroundings and active participants using the methodology metaphorically represented the growth of the SmartNurse Methodology in the technologically evolving landscape of healthcare and nursing education.

Read more

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3.2 Overview of the SmartNurse Methodology

Melissa Calderón, Lizeth Solano, Nery Guerrero, Silvia González, Juan Luna Gómez, Jorge Heríquez Rodríguez and Annukka Huuskonen

The SmartNurse Methodology is the main output of the SmartNurse Erasmus+ project, and the entire consortium has been actively involved in its development and piloting (Read more in Chapter 4). This methodology is a pedagogical framework and designed to cultivate digital health literacy among nursing students, aiming to enhance individual, family, and community self-care in the battle against non-communicable diseases. Additionally, it seeks to elevate the competencies of Latin-American nursing educators in the realm of digitalized nursing education through the integration of active learning methods. In this chapter, a compact overview of the SmartNurse Methodology is presented, elucidating its various components and their interconnectedness.

The final illustration of the SmartNurse Methodology tree (Figure 11) utilizes metaphors with ground, roots, branches, leaves, and fruits. This design effectively emphasizes the digitalization and interconnectedness of the key elements within the methodology, such as pedagogical principles, the professional development of nursing students, active learning methods, digital competences, and the enhancement of self-care.

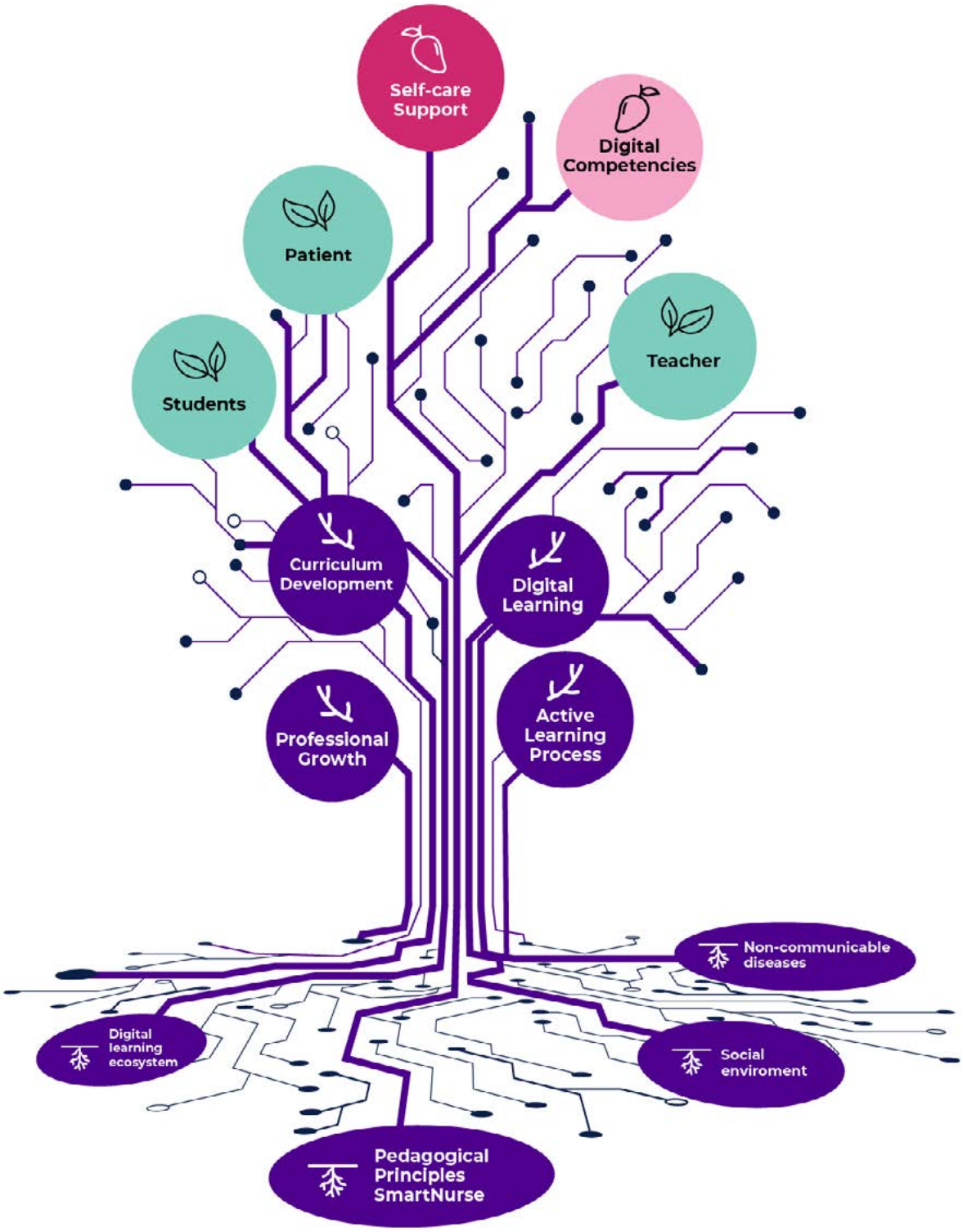

Figure 11. SmartNurse Methodology

The ground layer defines the context and conditions that influence the methodology and its implementation (Figure 12). This context shapes the needs, opportunities, and constraints in deploying the SmartNurse methodology, significantly impacting how we apply our pedagogical principles and employ various methods. The contextual factors encompass organizational and societal culture, perceptions of change and challenges, as well as infrastructure considerations, including internet access. Resources, on the other hand, encompass both tangible equipment and the skills, knowledge, and time of teachers required to grasp new methods and tools. In this context, we specifically examine the influence of non-communicable diseases, the social environment, and the digital learning ecosystem.

Figure 12. The ground layer of the SmartNurse Methodology

The increasing global prevalence of **non-communicable diseases**, particularly in Latin American societies, serves as the reason and motivation for the development of the SmartNurse methodology. The Americas exhibit the highest prevalence of overweight and obesity, a primary risk factor for numerous non-communicable diseases (Pan American Health Organization, 2018; Population Reference Bureau, 2013), contributing to 30-39% of premature deaths in individuals under 60 years old (Population Reference Bureau, 2013). Addressing this challenge necessitates new approaches to healthcare systems and education, ensuring effective management of the growing number of patients with chronic conditions.

The social environment encompasses the economic, cultural, and social context in which the SmartNurse Methodology is implemented. The physical surroundings and available resources play a pivotal role in shaping the pedagogical options for integrating digital capacity building. Consequently, the SmartNurse Methodology may manifest differently in various societies and organizations.

Within this methodology context, the social environment extends to themes such as resistance to change, cultural acceptance, and adherence to social norms, values, and attitudes. Culture and social context significantly influence the utilization of digital and active learning methods. Simultaneously, the implementation of the methodology contributes to shaping organizational culture and social norms, impacting the roles of teachers and students or nurses and patients.

The digital learning ecosystem is a consequence of the ongoing globalization process, compelling society to rely more on information technologies, a shift that extends to both formal and informal education. For instance, the rapid development of artificial intelligence poses challenges to traditional teaching and learning methods while simultaneously opening new opportunities in education. The adoption of digital technologies has significantly enhanced society's access to information. Additionally, the field of digital health is gaining prominence in Latin America, encompassing the development and utilization of various digital technologies to enhance health and healthcare services (World Health Organization, 2021, p. 11).

The ongoing and future digitalization within a society shape how the SmartNurse Methodology is applied and underscores the necessity of integrating it into nursing education. This integration is crucial to meet the evolving demands on nursing competencies in the face of technological advancements and changing healthcare landscapes.

These contextual factors contribute to and influence the foundation, which is **rooted in the pedagogical principles of the SmartNurse**

Methodology. The learning paradigms of constructivism, connectivism, the competency-based approach, and the socio-formative approach collectively shape the core of the SmartNurse methodology (Read more in Chapter 3.3).

The methodology tree consists of **four branches** (Figure 13), each delineating the means to achieve the objectives and deriving nourishment from the underlying pedagogical principles. These branches encompass professional growth (Read more in Chapter 3.4), curriculum development (Read more in Chapter 5.1), the active learning process (Read more in Chapter 3.5), and digital learning (Read more in Chapter 3.6).

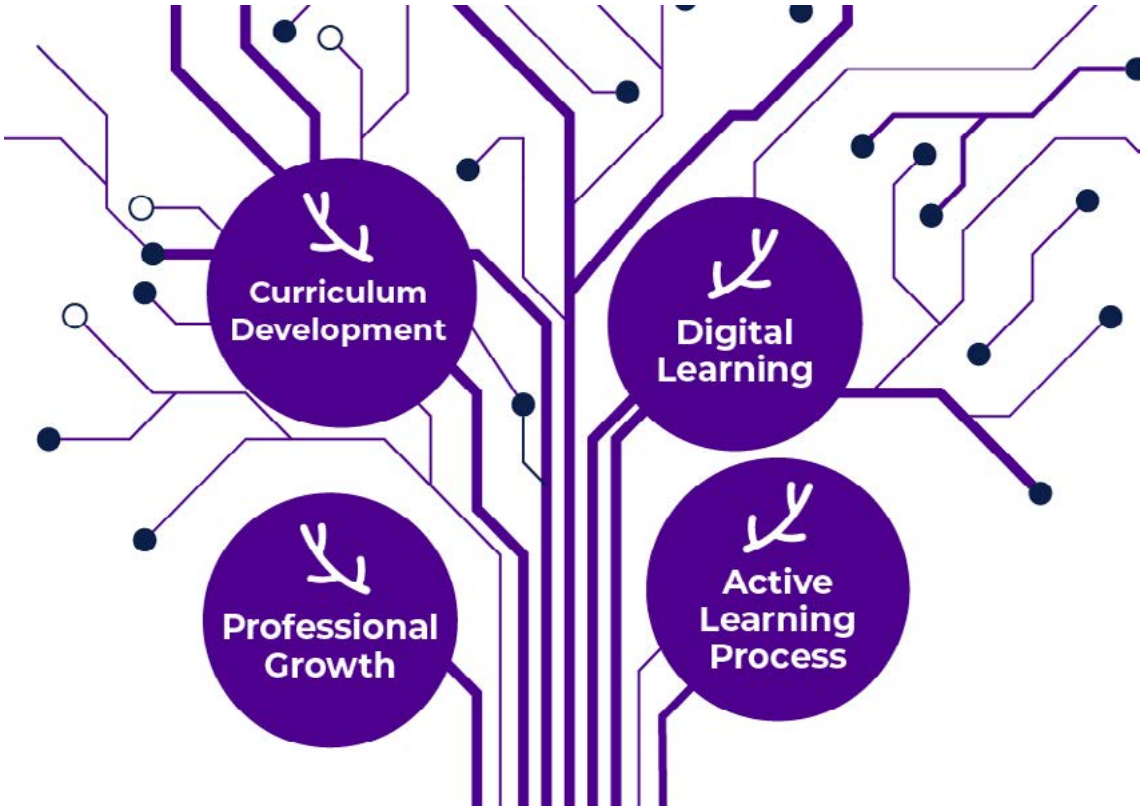

Figure 13. The four branches of the SmartNurse Methodology and the means to reach the objectives.

The professional growth of nursing students throughout their studies encompasses not only the acquisition of essential skills and knowledge for the profession but also the development of their professional identity. This involves cultivating a value base, fostering ethical

understanding, and nurturing professional behavior. Achieving holistic professional growth is facilitated by employing pedagogical principles and active learning methods that encourage interaction, reflection, and a sense of responsibility.

It's important to note that professional growth extends beyond undergraduate studies; it is a lifelong learning process. This principle equally applies to nursing professors who continually enhance their digital and pedagogical skills and adapt their learning paradigms through the utilization of the SmartNurse Methodology (Read more in Chapter 3.4).

Curriculum development entails making changes or modifications to study plans, course implementation descriptions, and academic programs in both formal and informal ways. This involves incorporating active learning methodologies supported by digital tools and environments during the training of nursing professionals, with the aim of fostering meaningful learning experiences. A more in-depth explanation and examples of how the SmartNurse Methodology is integrated into the curriculum can be found in Chapter 5.

The active learning process is a fundamental component of the SmartNurse Methodology, serving as both a method of teaching and a mode of learning in nursing education. Additionally, it provides nursing students with tools to employ in patient guidance, health education, and the support of self-care. Active learning methods are discussed from the nursing education perspective in Chapter 3.5, with examples of their application provided in Chapter 4. The discussion of active learning in the context of self-care support is further explored in Chapter 3.7.

Digital learning refers to the incorporation of digital technologies into the teaching-learning process (Rennie et al., 2020). It is important to note that digital learning does not inherently equate to active learning; however, digital platforms and tools serve as valuable assets for teachers to facilitate active learning. This includes the utilization of applications and virtual platforms.

In nursing education, digital learning offers two significant advantages. Firstly, it contributes to the development of digital competencies for learning. Secondly, it enhances competences and creativity in adapting technology for health education, utilizing digital platforms and tools in healthcare, and providing support for self-care.

The SmartNurse methodology engages **nursing teachers, students, and patients**. In the illustration, they are depicted as the leaves of the tree (Figure 14), emphasizing their close relationship and the active process that unfolds among them.

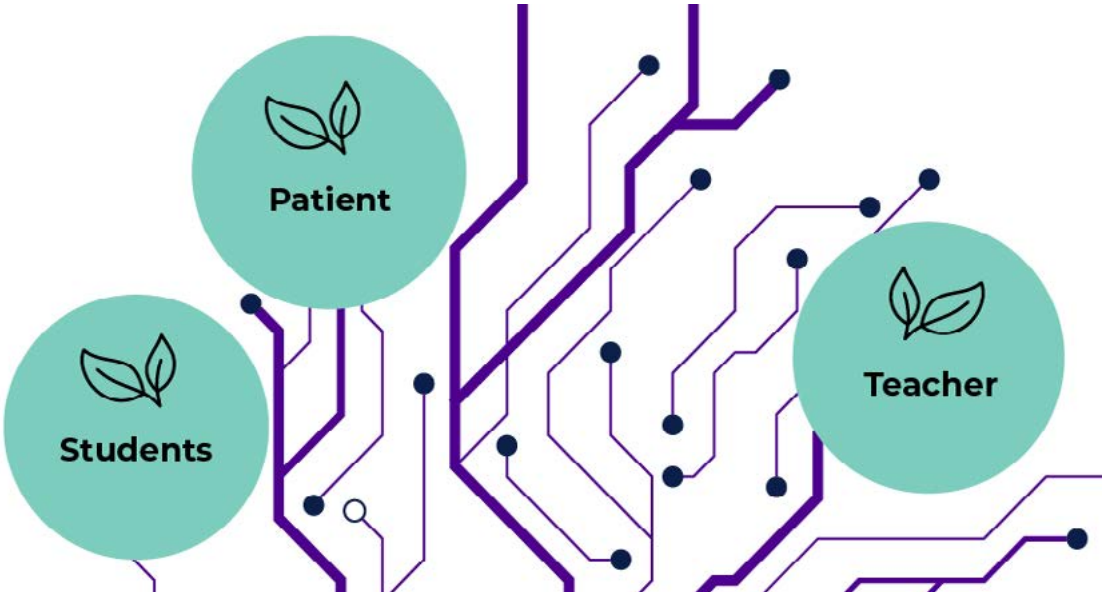

Figure 14. The active individuals in the SmartNurse Methodology

The teacher serves as the facilitator of the student's learning, utilizing digital tools and promoting active learning. Once the student has acquired professional competences, including digital skills, they transition into the role of a facilitator for the patient and their family. The goal is to foster self-care skills for improved health, particularly in non-communicable diseases. Neither the teacher nor the student is a passive beneficiary; each plays an active role in using technology, developing their competences, and contributing to the learning process. Each participant has something valuable to teach and share with others.

The primary outcomes of the SmartNurse Methodology are depicted as the central fruits, focusing on enhanced **digital competences** and **self-care support** (Figure 15).

Figure 15. The central fruits of the SmartNurse Methodology

Digital competences (Read more in Chapter 3.6) encompass the knowledge, skills, attitudes, and strategies necessary for the safe, efficient, and pertinent use of information technologies in communication and the teaching process, as well as in healthcare. Although applied in somewhat different ways, digital competences are relevant for all stakeholders - students, teachers, and patients.

Nursing teachers need to master digital pedagogics to enhance learning outcomes. Students require these competences to navigate and contribute to the increasingly digitized healthcare field. Patients, on the other hand, can utilize digital competences for accessing eHealth services, engaging in online peer-support, obtaining reliable information, or utilizing various self-care-promoting tools and applications.

Another key objective of the methodology is the enhancement of **self-care support** (Read more in Chapter 3.7). This aspect focuses on leveraging the benefits of technology to improve patients' self-care actions and, consequently, enhance their overall health comprehensively.

Read more

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3.3 Pedagogical Principles of the SmartNurse Methodology

Laura Chavarría de Cocar, Brenda Gutiérrez de Medina, Claudia González de Quintanilla, Sandra Martinez de Diaz and Marvin Montoya Amaya

The SmartNurse Methodology has been shaped by various educational paradigms, drawing on pedagogical principles rooted in theories of constructivism and connectivism, coupled with competence-based and socio-formative approaches. Each of these paradigms brings essential elements to enhance nursing students' education and their progression within the SmartNurse Methodology. In this chapter, we offer justification for integrating them into the SmartNurse Methodology and delve into the pertinent learning theories and pedagogical approaches.

The SmartNurse Methodology facilitates the establishment of positive learning environments, emphasizing meaningful learning through the integration of technological resources, innovation, and creativity. The incorporation of technology in education is both innovative and dynamic, fostering collaboration and motivation. Teachers employ active methodologies supported by digital tools, thereby cultivating competencies, and encouraging profound learning experiences among students. Subsequently, this acquired knowledge is applied in patient care, contributing to health promotion and education (Garrido, 2003).

The essence of meaningful learning is contingent upon the adoption of methods that activate students' independent thinking. As outlined by Asunción (2019), active methodologies embody key aspects such as student-centeredness, the promotion of constructive learning, teamwork, critical thinking, and the adoption of a comprehensive perspective on reality. This approach emphasizes a sensitive and humane education, integrating Information and Communication Technologies (Figure 16).

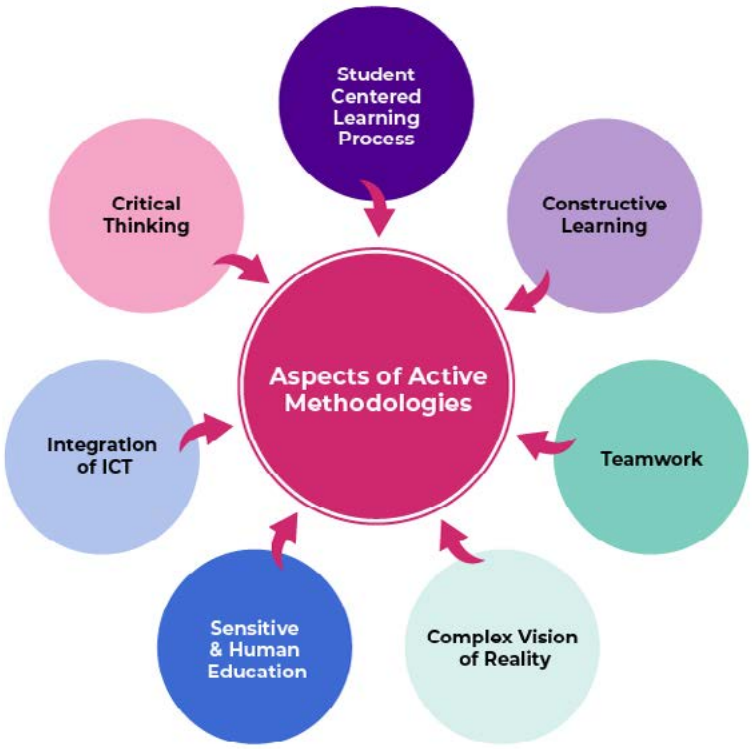

Figure 16. Fundamental aspects of active methodologies. (Asunción, 2019, modified)

The deployment of teaching strategies and techniques by nursing educators is grounded in their comprehension and viewpoint on the process of teaching and learning. The SmartNurse Methodology goes beyond introducing novel methods and technological tools into nursing education; it commences with thoughtful considerations of learning theories and pedagogical approaches. These foundational aspects shape how the methodology is implemented in the everyday context of nursing programs.

Learning theories

The purpose of learning theories is to elucidate and comprehend the nature of learning (Stewart, 2012). The SmartNurse Methodology is grounded in two key theories of learning: constructivism and connectivism.

Constructivism, stemming from psychological analysis, informs pedagogical practices across educational levels. Emphasizing the signifi-

cance of teaching grounded in reasoning and critical thinking, it aims to foster meaningful learning. According to this theory, individuals construct their own knowledge and are the architects of their learning process (Serrano & Pons Parra, 2011). In constructivism, student-centered teaching is pivotal. It's noteworthy that these pedagogical principles are extended to patient education, enabling individuals to derive meaning and significance in the self-care of their health (Tünnermann Bernheim, 2011).

> ***Individuals construct their own knowledge and are the architects of their learning process***

Constructivism is foundational in nursing education and is integrated into the SmartNurse Methodology. It employs active pedagogical methods and fosters digital competencies, enabling students to meld their prior knowledge with newly acquired insights. Guided by the teacher as a facilitator, this approach emphasizes using existing knowledge as a starting point, while also valuing students' capacity to construct their own knowledge through exploration and research. Through a collaborative and actively participatory environment, educators can facilitate the process of knowledge construction, equipping students with the tools and support necessary for both academic and personal development (Figure 17) (Tovar et al., 2013).

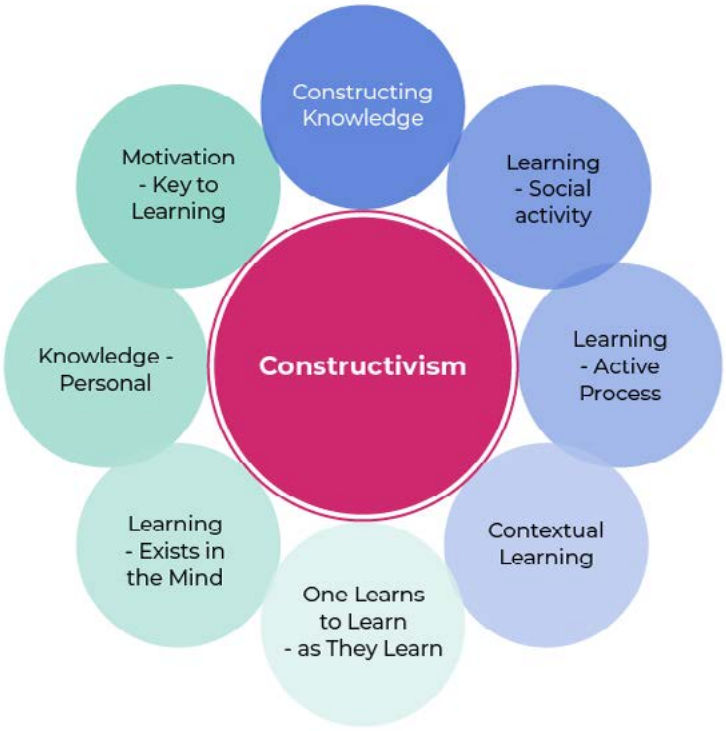

Figure 17. Main points of the constructivism (Kurt, 2021, modified.)

Promoting learning processes that foster critical and reflective thinking, along with active knowledge development, is crucial. Transformative learning theory, developed by Mezirow in 1991, focuses on cognitive processes during the reevaluation of existing understandings, resulting in shifts in perspective. The SmartNurse Methodology highlights the importance of critical reflection using active teaching methods and digital tools, fostering a secure learning environment (Steward, 2012). Deviating from traditional models facilitates more meaningful and enriching learning, empowering students as active protagonists in their knowledge acquisition process. This approach cultivates autonomy, creativity, and analytical skills, better equipping students to effectively navigate the challenges of both present and future worlds. (Alomá Bello et al., 2022.)

Starting from the premise that knowledge is constructed, educators promote active student participation and maintain a continuous dialogue with them. The SmartNurse Methodology adopts Vygotsky's

social constructivism (1978), where teachers serve as intentional guides and supports. The teacher, acting as a facilitator, employs “scaffolding” within the “zone of proximal development” to aid in the construction of new learning. Scaffolding offers diverse levels of support and learning structures, incorporating didactic actions to establish a positive, collaborative environment conducive to knowledge construction. This is grounded in the scientific and technological heritage accumulated throughout human history (Ortiz, 2015; Stewart, 2012).

> ***The teacher is a facilitator for the construction of new learning***

The psycho-pedagogical principles integral to the constructivist the SmartNurse Methodology encompass meaningful learning and active, collaborative learning. Meaningful learning acknowledges the student’s existing knowledge and positions them at the core of the learning process. In this regard, the teacher’s role is pivotal as an educational facilitator, fostering curiosity, reflection, and critical thinking. Through dialogue and interaction, active knowledge construction is promoted, enabling nursing students to cultivate a more profound and meaningful understanding of the subject matter (Ausubel, 1983 in Agra et. al. 2019).

Active and collaborative learning, recognizing learning as a dynamic, continuous process, aims for students to actively engage and establish connections with the world around them. This involves working in small groups, requiring prior preparation by teachers. (Contreras et al., 2019.) Collaborative learning enhances students’ pedagogical skills, including planning, and fortifies teachers’ abilities related to implementation and evaluation of this approach, fostering closer ties with the academic context (Serrano & Pons, 2011).

The SmartNurse Methodology embraces constructivism for nursing education, emphasizing a student-centered approach. It values active knowledge construction, collaboration, reflection, and contextualization in real clinical situations. This prepares future nursing professionals effectively and ethically, leveraging technological resources.

Connectivism emphasizes the significance of networks and connections in the acquisition of knowledge and skills. Applying connectivism in nursing education entails utilizing digital and social environments' networks and resources to enhance student learning and equip them for current, effective nursing practice. This learning theory necessitates an open mindset toward online collaboration, lifelong learning, and continual adaptation to new technologies and available resources.

> ***Utilizing digital and social environments' networks and resources enhance student learning and equip them for current, effective nursing practice.***

Connectivism posits that learning transpires through the establishment and sustenance of connections within a network of information and knowledge, aligning well with the digital age and the swiftly evolving nature of knowledge in contemporary society (Goldie, 2016; Siemens, 2005).

This theory advocates for the utilization of personal learning environments to cultivate technological competencies (Ramos, 2018). Connectivism underscores the importance of skills such as searching and organizing information and the ability to perceive connections (Cueva Delgado et al., 2019; Siemens, 2005, modified). Key principles of connectivism (Figure 18) include viewing decision-making as a learning process and recognizing that the capacity to know (or learn) is more crucial than existing knowledge.

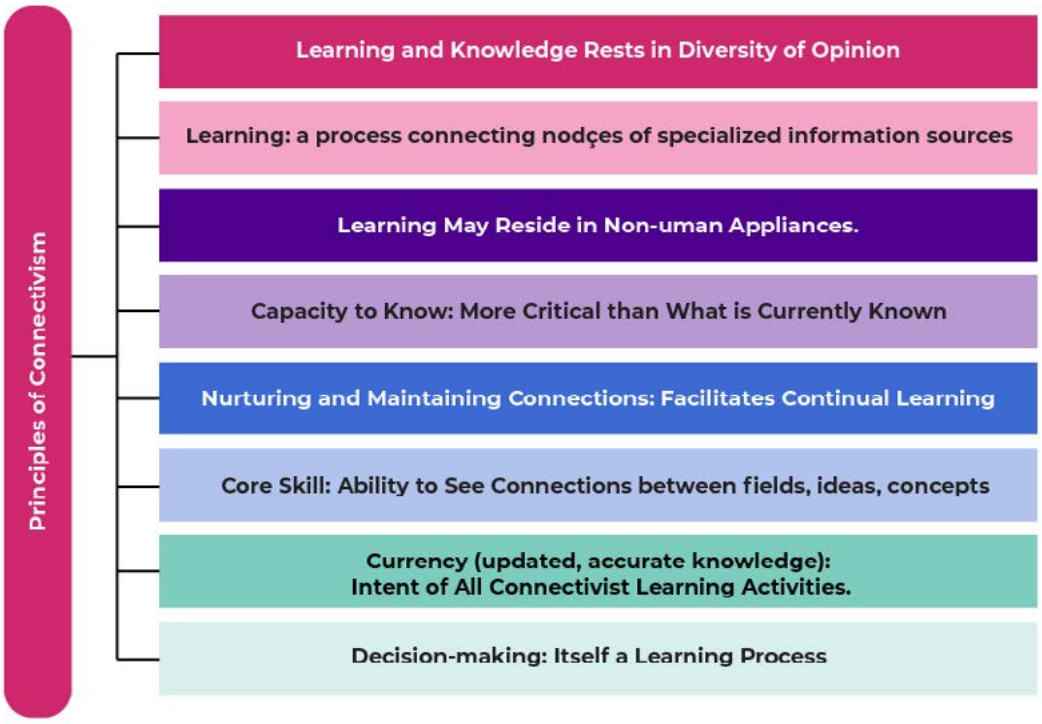

Figure 18. Eight principles of connectivism. (Siemens, 2005, modified.)

The SmartNurse Methodology acknowledges the significance of connectivism as a theoretical foundation, leveraging digital technologies. This underscores the necessity for teachers to be proficient in utilizing technological tools, facilitating updated and meaningful learning experiences for students.

Pedagogical approaches

Implementing constructivist learning theory necessitates a corresponding influence on curriculum design. Viewing knowledge as a relative and dynamic construction (Agra et. al. 2019) highlights that the curriculum should move beyond isolated facts or skills (content-led curricula). Instead, it should delve into real phenomena and problems encountered in the daily work of nursing professionals. This contextual and applied approach not only deepens conceptual understanding but also equips students to tackle authentic challenges in their professional practice (Kandiko & Blackmore, 2012).

Applying knowledge and skills across diverse situations is essential to meet the challenges of a rapidly changing world (Tynjälä 2002, 67; Rauste von-Wright et al., 2003, 175-204). Epp et al. (2021) assert that constructivist learning theory forms the basis for the nursing education curriculum, offering a new structure (Epp et al. 2021). This underscores the importance of two pedagogical approaches, competency-based and socio-formative, in the implementation of the SmartNurse Methodology (See Chapter 5.1 for more on curriculum development).

The competence-based approach is integral to the SmartNurse Methodology, reflecting the essential need in the training of nursing professionals to excel in the current healthcare system. It is imperative for students to cultivate both generic competencies, such as communication, research, and the use of information and communication technologies, and profession-specific technical competencies. This dual focus enables effective performance in professional, social, and personal contexts. Competence-based education facilitates knowledge construction through reflection and critical thinking (Epp et al. 2021). Implementing appropriate learning techniques in the classroom is crucial for fostering such knowledge construction (Núñez-López et al., 2018).

Competency-based nursing education focuses on preparing students with the essential skills, knowledge, and competencies for delivering high-quality patient care. This approach ensures their readiness to confront the challenges of modern healthcare and deliver safe, effective care. It emphasizes active teaching methodologies and the utilization of technology for providing information and instructions to patients.

The socio-formative approach advocates for strategies focused on human development that extend beyond the traditional separation of knowledge and skills in summative evaluations. This approach introduces innovative methods enabling students to contemplate ethical and moral dimensions in applying knowledge to address environmental and social issues (Martínez-Iñiguez et al., 2021).

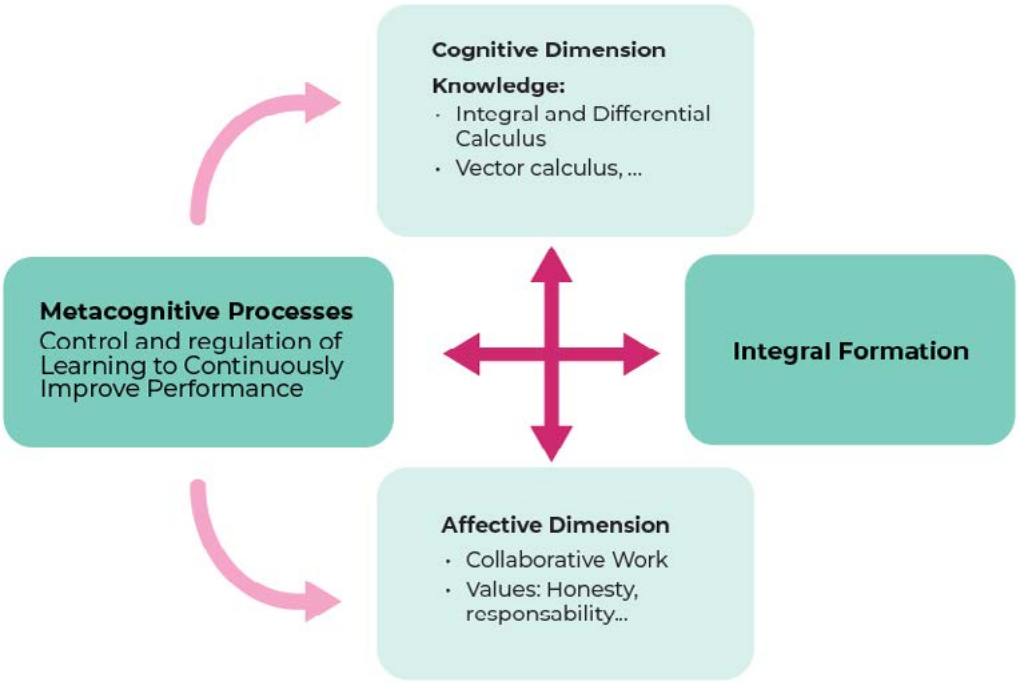

Figure 19. Socio-formative checklist. (Rodriguez Peralta et al., 2018, modified.)

The socio-formative approach emphasizes performance demonstration through evidence, showcasing the application of knowledge in practice (Figure 19). Achievement is evaluated against set criteria to determine competence attainment, moving beyond mere knowledge levels. This approach also identifies areas for improvement in the student. (Tobón et al., 2015.) For instance, in simulation pedagogics, nursing students are assessed not only on theoretical knowledge but also on skills, communication abilities, use of biomedical equipment, and decision-making in nursing interventions. This comprehensive evaluation encourages creativity, innovation, and collaborative teamwork.

In socio-formative training, competencies are regarded as integral skills enabling the effective identification, interpretation, argumentation, and resolution of contextual problems. Demonstrating competence, ethical commitment, and a continual dedication to improvement, these competencies systematically integrate aspects

such as interpersonal skills, harmonious coexistence, task execution, and in-depth knowledge (Tobón et al., 2015).

> ***Competencies systematically integrate aspects such as interpersonal skills, harmonious coexistence, task execution, and in-depth knowledge.***

Socio-formative education aims to prepare individuals for the knowledge society by fostering ethical and moral aspects and promoting collaborative problem-solving through the use of Information and Communication Technologies (ICT). Rooted in the ethical life project, entrepreneurship, collaboration, knowledge concretization, and metacognition (Tobón et al., 2015), this approach in nursing education integrates various knowledge domains for addressing real patient situations. Nursing students employ their knowledge, skills, attitudes, and aptitudes, working both individually and collaboratively with the health team. Patients are actively engaged, receiving education and support for managing their health and self-care. Methodological strategies and digital tools are employed to facilitate learning, shaping innovative nursing professionals capable of making informed decisions, providing holistic care, and creatively addressing future challenges in the healthcare system.

In the SmartNurse Methodology, the socio-formative approach shapes how teachers assess student competencies, emphasizing learning methods such as project-based learning, problem-based learning, where knowledge is integrated based on real contextual situations.

Read more

Innovative education practices

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3.4 Professional Growth in Nursing Education

Jorge Henríquez Rodríguez, Mayra Henríquez de Cortez, Juan Luna Gómez, José López Pérez and Annukka Huuskonen

The SmartNurse Methodology views the professional growth of nursing students, and graduated nursing professionals as integral to its framework. It entails a supportive and guiding role for nursing teachers throughout nursing education, fostering competence in reflecting on professional development for both nursing students and practicing nurses in the clinical field throughout their careers. This chapter delves into the progression of professional growth, beginning with undergraduate nursing programs and extending throughout the entirety of a nursing career.

Professional growth is integral to professionalization, involving continuous development of knowledge, skills, and qualities for enhanced competence in the professional market. It is a philosophy of perpetual improvement, driven by self-demand and academic enhancement. The process extends beyond undergraduate education, emphasizing lifelong learning. (Nokelainen, 2008.) In the SmartNurse Methodology, we address professional growth for both nursing students and teachers.

Professional growth initiates in undergraduate nursing programs, shaping registered nurses with diverse skills and a distinct professional identity. Identity, a core professional aspect, reflects how individuals present themselves and aligns with their values and beliefs. Professional identity, defined by one's perception within a profession or the collective identity of the profession, is integral to professional existence and presentation (Maginnis, 2018). Grounded in social identity and self-categorization theories, the development of professional identity occurs through professional socialization during nursing training and clinical practices (Maginnis, 2018).

> ***Professional identity, defined by one's perception within a profession or the collective identity of the profession, is integral to professional existence and presentation.***

The professional growth of a nursing student occurs as a phased process (Figure 20), wherein experiences and observations are made based on one's own knowledge, beliefs, values, and norms within the professional culture. These perceptions of oneself and the profession, in turn, evolve through reflection on experiences, giving rise to new meanings and learning. As the student learns and adjusts their actions, they redefine themselves as actors in their field, thus shaping their professional identity into a new phase. These stages unfold at both conscious and subconscious levels (Ora-Hyytiäinen, 2004).

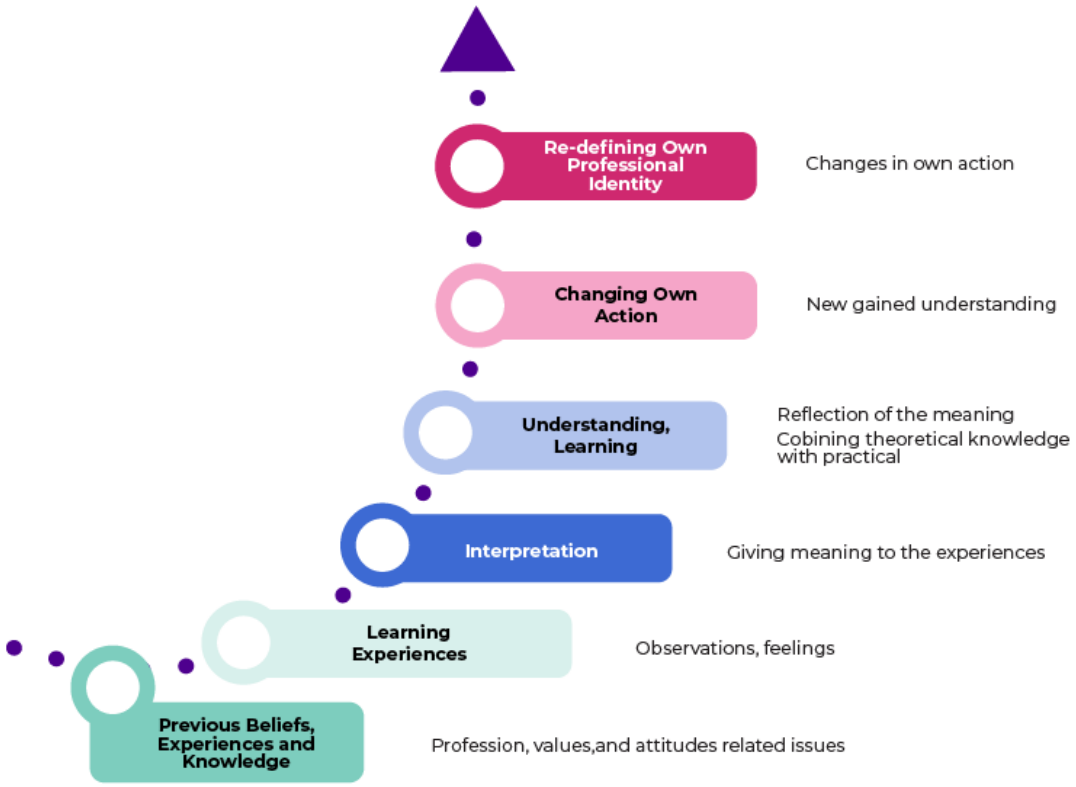

Figure 20. Core process of professional growth, development, and learning (Ora-Hyytiäinen, 2004, modified)

Guiding Nursing Students' Professional Growth: The Vital Role of Teachers

Nursing students enter professional studies with diverse backgrounds, experiences and knowledge, shaping their expectations of nursing. Their professional identity evolves during studies (Allen et al., 2022), with teachers playing a crucial role. Teachers contribute to developing this identity, critical for students advancing in university studies. The development of a professional identity, influenced by media, education, and role models, is a continuous process (Browne, 2018). A robust pre-professional identity is crucial for nursing students, correlating with future job satisfaction and a resilient nursing workforce (Browne, 2018; Allen et al., 2022). Aligning personal and professional identities fosters commitment and professional development (Ora-Hyytiäinen, 2004). To achieve this, teachers must provide a comprehensive understanding of nursing, encompassing diverse personal perspectives.

> ***A robust pre-professional identity is crucial for nursing students, correlating with future job satisfaction and a resilient nursing workforce***

Understanding the early stages of professional identity formation is essential for nursing teachers in facilitating student growth. The professional identity shapes in stages, where five stages of professional growth for nursing students (Figure 21) are identified (Ora-Hyytiäinen, 2004).

In the first year, students see themselves as "I, a helper," expressing a desire to be useful with initial layman impressions of professional action. By the second year, their identity transforms into "we carers," emphasizing group belonging and collaborative work. In the third year, students typically adopt the identity of "I, a nurse," becoming task-oriented with increased responsibility but maintaining a somewhat passive patient relationship. Graduates exhibit one of three

identities: “Effective nurse,” emphasizing task efficiency and growing responsibility; “Reflective nurse,” focusing on patient well-being based on patient needs; and “conflicting transition identity,” marked by mixed feelings toward the profession, possibly experiencing anxiety at graduation (Ora-Hyytiäinen, 2004). As highlighted, professional growth extends beyond graduation into the work life.

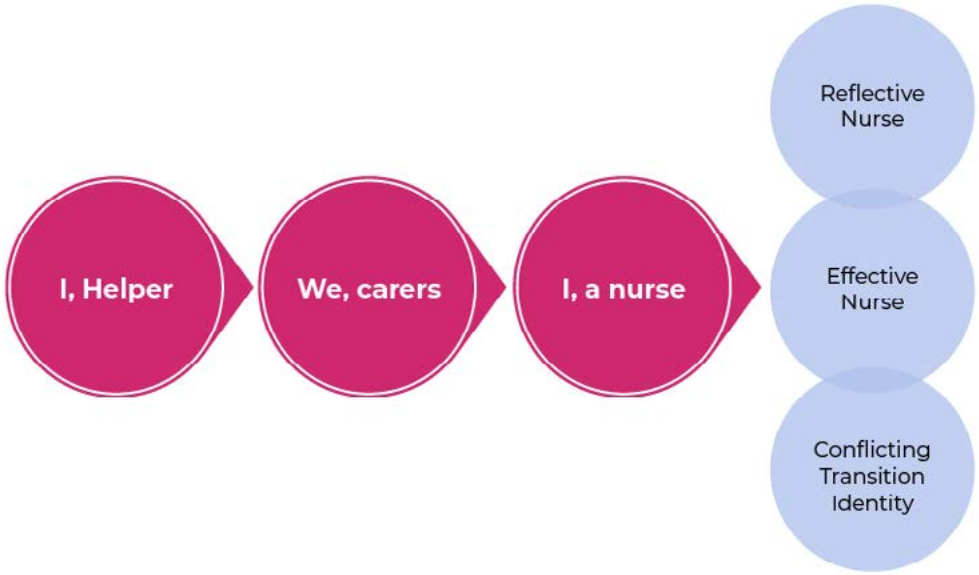

Figure 21. Stages of professional identity of nursing students (Ora-Hyytiäinen, 2004, modified)

Reflection stands as a pivotal element within the core process of professional growth (Figure 20). Simultaneously, receiving social support, whether from peers, clinical staff, or mentors during clinical placements, holds considerable importance in fostering a student’s commitment to developing a professional identity (Clements et al., 2016). Nursing teachers can actively contribute by facilitating reflection and cultivating group support through teaching methods that emphasize group learning and collegiality. They also play a vital role in clinical training, providing support for both students and their mentors. The pedagogical principles of the SmartNurse Methodology place significant emphasis on reflection and collaboration in learning (Read more in Chapter 3.3), while the active learning methods (Read

more in Chapter 3.5) offer tangible tools for teachers to facilitate these processes. This, in turn, contributes to supporting professional growth throughout nursing education."

It is crucial to shape a meaningful and realistic perception of the nursing profession during studies, ensuring graduating students are well-prepared for the demands of the workforce. Unrealistic expectations contribute to high dropout rates among new nurses. Identifying and addressing factors like media, culture, and personal experiences is essential to help nursing students become aware of and adjust their perceptions (Allen et al., 2022).

Professional Growth in Area of Health Education and Self-Care Support

The SmartNurse Methodology focuses on developing competences in health education and self-care support (Read more in Chapter 3.7). The role of nurses in health education varies across countries; for instance, in many Latin American countries, nurses play a crucial role in formal health education as part of the primary and secondary school curriculum. Health education, to a larger or smaller extent, is an integral part of every nurse's role, necessitating the development of relevant skills and understanding.

> ***Nurses play a crucial role in formal health education***

In line with the SmartNurse Methodology, the utilization of active learning methods by nursing students is envisioned to extend their comprehension into patient interactions, fostering active learning for patients. The methodology suggests that achieving proficiency as a health educator in nursing necessitates not just technical prowess and comprehensive theoretical knowledge but also the cultivation of socioemotional and

ethical skills. It emphasizes the importance of having the courage to tackle challenging issues and encourages individuals to find their distinctive approach in integrating personal qualities into professional communication. Competence-based learning and evaluation enable professional growth not only in knowledge and skills but also in attitudes and values (Pettepher et al., 2016).

In the realm of health education, key pedagogical competencies for nursing professionals have been delineated (Table 1), particularly in the context of health promotion in schools (Ayuso Margañón et al., 2019). The findings are adaptable to various nursing environments. These pedagogic competencies are equally applicable to both nursing teachers and their continuous professional development.

Table 1. Key competences of nurses' professional growth in the area of health education in schools (Ayuso Margañón et al., 2018, modified.)

Competence	Content
Basic knowledge for health teaching, and research in health promotion	Specific health didactics knowledge and updating based on innovative pedagogical lines. Theoretical-practical knowledge and constant updating of the taught health content Exploration of strategies and methods, materials, and teaching resources Knowledge of the institution (e.g., functional structure, external resources) and curriculum (e.g., purposes, objectives, and integration of health promotion) Knowledge of the structure of the teaching profession and the teaching community Constant search for effective educational policies and programs for health promotion, exploration of the health status of the population and the conditions and factors that promote well-being, evaluating the impact of health promotion intervention on students and the community Knowledge of students' personal interests and characteristics (e.g., learning capacity)
Interpersonal competence and teamwork	Collaborative attitude in curricular proposal development, planning and implementing health promotion actions Effective social skills, team communicative attitude and respectful attitude among the team and the community Negotiation skills in problem-solving and ability to manage stressful situations Adaptation of personal objectives to those of the team and the school Ability to establish pedagogical dialogue and apply procedures based on the situation
Pedagogical skills and values inherent to the ethical dimension	Select and use suitable teaching and learning strategies, methods, materials and resources Strengthen and constantly update skills in evaluating group techniques, teams, teaching practices, teacher's role, motivation and self-criticism Design realistic educational processes regarding institution, subject, learning needs, individual and group differences, and students' potentials (e.g., knowledge, skills, and attitudes) Develop learning situations based on previous knowledge and make connections to new knowledge and accept student's mistake as a natural part of the learning process, enabling self-regulation Conceptualise, structure and sequence health-related content and activities, develop optimal interventions towards learning objectives, adapting them to students' progress. Evaluate the student's learning process and results continuously, adjusting pedagogical actions as needed, and encouraging students to value their learning
Educational Communication	Effective linguistic, paralinguistic skills, and language understandable for students Maintaining an open and responsive dialogue in and outside of the classroom Using assertive language, avoiding authority and imposition Coherent and motivating discursive action and adaptation of the health message to the students' interests and needs Flexible and tolerant communicative attitude towards student participation; conciliatory and harmonious, based on agreements. language
Competent teaching attitude, educational coordination and leadership	Tolerant and respectful attitude towards differences in education, experiences, and reality of the learners Open attitude to proposals for continuous improvement and experimental ideas in health promotion Ability to influence improvement of health teaching conditions, educational policies, and hence promoting a culture of health promotion in the educational institutions Dialogical and negotiating attitude in the pedagogical relationship Sharing, helping, and learning with students and community and creating group conditions that favor learning and ensure collaboration
Digital competence, pedagogical innovation	Creative health promotion through ICT Effective communication and active participation in health networks using ICT and social networks Mastery of ICT tools in health education, educational processes and in research

Professional growth of nursing students and teacher in the digital age

In addition to health education and self-care support competences, another primary objective of the SmartNurse Methodology is to equip future nursing professionals with digital competences for healthcare (Read more in Chapter 3.6). Like active learning methods (read more in Chapter 3.5), the methodology aims to seamlessly integrate the development of digital competences throughout education in various learning and teaching formats. This approach ensures that the use of digital solutions in both learning and healthcare becomes an inherent aspect of nursing students' professional identity and their role as nurses.

One of the significant challenges facing nursing today is the complete integration of technology into healthcare, teaching, and research activities to enhance the impact on patient care. Adapting to technological advancements extends beyond decisions about the use of platforms or programs; it involves directing the adoption of technology toward areas that require substantial improvement. (Morales, 2016.)

There has been a substantial global increase in telehealth and telemedicine. As future nurses enter the workforce (Read more in Chapter 2.4), they require new skills and knowledge to adapt to these changes. Additionally, nursing teachers must delve into these concepts and various applications in healthcare, instructing students on delivering healthcare at a distance. This includes aspects such as teleportation, telemonitoring, and virtual consultations (Araújo et al., 2023). Teachers play a crucial role in facilitating students to explore and learn about the benefits, challenges, and ethical considerations associated with telehealth (Araújo et al., 2023)."

> ***Use of digital solutions in learning and health care can form a natural part of the nursing students' professional identity and their role as a nurse***

Nursing teachers must adeptly integrate technology into teaching, utilizing digital tools, learning management systems, and simulation software to enhance student engagement and foster interactive learning experiences in virtual classrooms. Employing online and blended learning methodologies allows both students and teachers to gain valuable experience. This involves creating engaging online content, facilitating virtual discussions, and utilizing multimedia resources for effective learning support. Teachers should bravely explore strategies for assessment and feedback in the digital learning environment, staying updated on necessary devices and software for class development (Araújo et al., 2023).

Digitization has created new global and regional professional networks for nursing students and teachers. Online forums, social media groups, and virtual conferences related to nursing and education offer collaboration opportunities, resource sharing, and staying updated on industry trends.

> ***Engagement in virtual professional learning networks was shown to support the professional growth***

As mentioned earlier, social support and a sense of belonging are crucial for professional growth. Nursing teachers should motivate students to build professional networks during their training. Engagement in virtual professional learning networks enhances learning and professional growth by acquiring new knowledge and skills, shaping professional identities, and influencing conceptions about the profession (Ucan, 2023).

Life-Long Professional Growth

Professional growth is an ongoing, lifelong process, emphasized in today's dynamic work environment and society. In the swiftly evolving fields of nursing and teaching, keeping professional competences updated is vital. A systematic review identified eight themes for lifelong learning in nursing education, including intellectual and practical independence, collaborative learning, researcher thinking, persistence in learning, need-based learning, learning management, suitable learning environment, and inclusive growth (Qalehsari et al., 2017).

> ***In the swiftly evolving fields of nursing and teaching, keeping professional competences updated is vital.***

Life-long professional development involves both formal education in various training programs and the ongoing enhancement of competences within the workplace. This includes gaining experience through work and actively seeking and learning new evidence-based information relevant to the profession. Formal continuous education methods encompass participation in programs, workshops, conferences, seminars, or pursuing higher education degrees. Higher education can serve as a career path leading to leadership positions in healthcare. Continuous training for nursing professionals is crucial for personal improvement and optimal work performance (Garcia-Salas, 2019).

Lifelong learning and adaptability in the changing landscape of work-life necessitate embracing a mindset that accommodates the rapid evolution of digital technologies. A lifelong learner exhibits persistence, reflection, self-efficacy, and collaboration. These qualities can be cultivated and developed during undergraduate studies.

Individuals with a lifelong learning mindset consistently seek professional development opportunities, such as attending webinars and engaging in self-directed learning (Pearse and Dunwoody, 2013).

Nursing teachers also continuously enhance their professional expertise by crafting course plans, contributing to nursing curricula, and incorporating evidence-based practices. Active participation in curriculum design is pivotal for improving academic program relevance and quality (Tovar, 2011). Like nurses, lifelong professional growth for teachers is facilitated through collaborative networks within institutions and the broader field of nursing education and practice. Engagement in professional associations, interprofessional collaboration, research, publishing, and conference presentations are avenues for ongoing learning. The establishment of organizational structures promoting a collaborative culture for shared learning is of paramount importance (De Arco-Canoles & Suarez-Calle, 2018).

Read more

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3.5 Active Learning Methods in Nursing Education

Maria Leticia Venegas Cepeda, Leticia Villarruel Hernández, Edgardo García Rosas, Claudia González Acevedo, Aracely Díaz Oviedo and Erika Torres Hernández

The SmartNurse Methodology incorporates, as a fundamental element, the use of active learning methods in nursing education. Active learning methods can enhance student learning, foster critical thinking, and boost motivation to learn. In this chapter, we provide a concise description of the active learning methods used in the project and introduce additional methods that can be seamlessly integrated into our methodology. For each active learning method, we offer a brief overview, ensuring a compact and informative presentation. Additionally, we provide some tips for further reading.

The SmartNurse Methodology is grounded in the conceptualization of learning as an intentional act, considering the student as the protagonist of the educational experience and recognizing the process of reality as essential for content creation (Read more in Chapter 3.3). The methodology aims to incorporate active learning methods into nursing education. These methods encourage students to exercise clinical judgment in decision-making and develop competences in interaction, creative and critical thinking, as well as digital skills (Alé-Ruiz del Moral Marcos, 2022; Bermúdez Mendieta, 2021; Høegh-Larsen et al., 2023; Kim & Castelli, 2021).

Active learning is a student-centered strategy motivating knowledge and skill development through questioning, analysis, problem-solving, and synthesis of information. It emphasizes collaboration and continuous reflection (Lozano et al., 2020). In contrast to traditional lectures, where students passively receive information, active learning encourages behavioral changes by promoting reflection and meaningful learning (Lozano et al., 2020). Engagement enhances memory retention and

the application of knowledge in various contexts (Lozano et al., 2020). This approach allows students to apply knowledge actively, fostering creativity, curiosity, and intelligence utilization (Ghezzi et al., 2021; Singh et al., 2019).

> ***Students' engagement enhances memory retention and the application of knowledge in various contexts.***

To facilitate students' active learning, teachers should employ strategies that enhance their cognitive abilities when interacting with presented content or materials. These strategies are structured in a progression from simple to complex, fostering skill development at various levels (Figure 22).

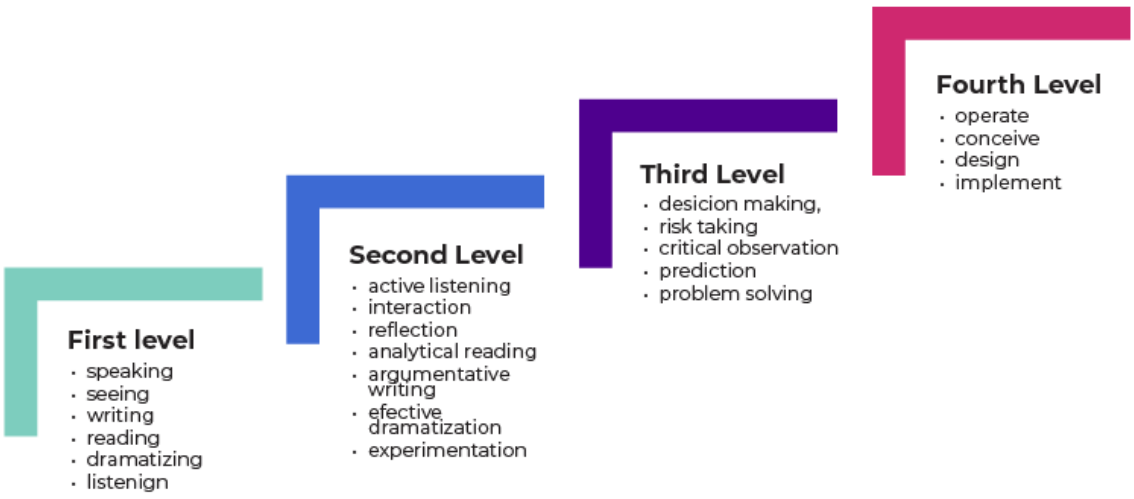

Figure 22. Levels of the active learning model (Castillo Rosas & Cabral Rosetti, 2022, modified)

The student's evolution in information acquisition and processing is categorized into four complexity levels. The first level encompasses fundamental communication components: speaking, listening, observing, dramatizing, reading, and writing. The second level illustrates skills emerging through strategic training of the components from

the previous level, whether individually, collectively, or in combination: active listening, analytical reading, experimentation, reflection, interaction with objects and situations, and argumentative writing.

The third level involves more complex activities like attitudes, behaviors, critical observation, prediction, risk-taking, and decision-making—essentially, problem-solving contributing to a significant construction of the theory-practice relationship in any knowledge area. Reminiscent of Tulving's levels of consciousness (1985), students continuously navigate these levels, reshaping information. Errors in this process become fundamental experiences for learning, making students aware of what is incorrect and reinforcing correct information through positive reconstruction. In the fourth level, cognitive and metacognitive skills developed in earlier levels prepare students to approach phenomena, problems, or projects from a more complex systemic perspective (Castillo Rosas & Cabral Rosetti, 2022).

In active learning, unlike traditional methodologies, the teacher's role shifts from being a content provider and activity director to a designer and presenter of activities and materials for student interaction. The teacher becomes a guide in the educational journey, fostering reflection, decision-making, idea generation, and new knowledge. Implementing an active learning strategy demands that the teacher possesses skills in managing interpersonal relationships and considers the learning styles of the students in their didactic planning (Enriquez Chasin, 2021; Lozano et al., 2020).

Read more about active learning

Ghezzi, J. F. S. A., Higa, E. F. R., Lemes, M. A., & Marin, M. J. S. (2021). Strategies of active learning methodologies in nursing education: an integrative literature review. *Revista brasileira de enfermagem*, *74*(1). https://doi.org/10.1590/0034-7167-2020-0130

Benegas, J., Alarcón, H. & Zavala, G. (2013). Formación del profesorado en metodologías de aprendizaje activo de la física. In J. Benegas, M.C. Pérez de Landazabal & J. Otero (Eds.) *El aprendizaje activo de la física básica universitaria*. pp. 193-203. Andavira Editora, S.L. Argentina. Retrieved 12.10.2023, from https://www.researchgate.net/publication/264768097_Formacion_de_Profesorado_en_Metodologias_de_Aprendizaje_Activo_de_la_Fisica

Enriquez Chasin, R. I. (2021). La Efectividad del Aprendizaje Activo en la Práctica Docente. *EduSol*, *21*(74), 102-111. Retrieved 12.10.2023, from http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1729-80912021000100102&lng=es&nrm=iso

Hyppönen, O. & Linden, S. 2009. Handbook for teachers – course structures, teaching methods and assessment. Publications of the Teaching and Learning Development Unit of the Helsinki University of Technology 5/2009. Retrieved 12.10.2023, from https://aaltodoc.aalto.fi/bitstream/handle/123456789/4755/isbn9789526030357.pdf?sequence=1&isAllowed=y

TeamWe – project (n.d.) Teaching Welfare Technology Together. A handbook for teachers. Retrieved 12.11.2023, from https://sites.google.com/view/teamwe-handbook/front-page

Yanagita, T., Kanaoka, M., Kinoshita, Y., & Takeya, R. (2022). Nursing pharmacology education and active-learning. *Nihon yakurigaku zasshi*, *157*(2), 104–109. https://doi.org/10.1254/fpj.21100

Active Teaching Methods

A variety of instructional methods can be employed for active learning, aligning with formative interests and the specified level of training. It's crucial to view these methods as a system rather than in isolation, considering them as an organized set of interactions. Purposefully combining the theoretical foundations of science with practical experience in a social context facilitates processes of assimilation and conceptual construction (Castillo Rosas & Cabral Rosetti, 2022). The active learning methods applied in the SmartNurse project piloting (Read more in Chapter 4) are briefly introduced here.

Flipped classroom

The flipped classroom model reverses the traditional teaching approach by introducing new concepts before class, enabling teachers to use class time for guiding students through active, practical, and innovative application of key subject concepts. When correctly designed and implemented, this methodology proves more effective than traditional expository methods. (Prieto Martín, et al., 2019.) In the traditional approach, teachers cover basics in class and assign homework for students to delve deeper into the topic afterward. In the flipped classroom, teachers provide materials for students to learn basics independently before class, utilizing in-person time for deeper understanding, clarification, and practical applications of new knowledge.

> ***By introducing new concepts before class, teachers are able to use class time for guiding students through active, practical, and innovative application of key subject concepts***

The flipped classroom method offers various benefits, including fostering emotional commitment from students (Ng, 2023). This approach has shown positive effects on developing students' foundational skills and understanding nursing degree content (Ke et al., 2023). The four pillars of the flipped classroom method are illustrated in Figure 23.

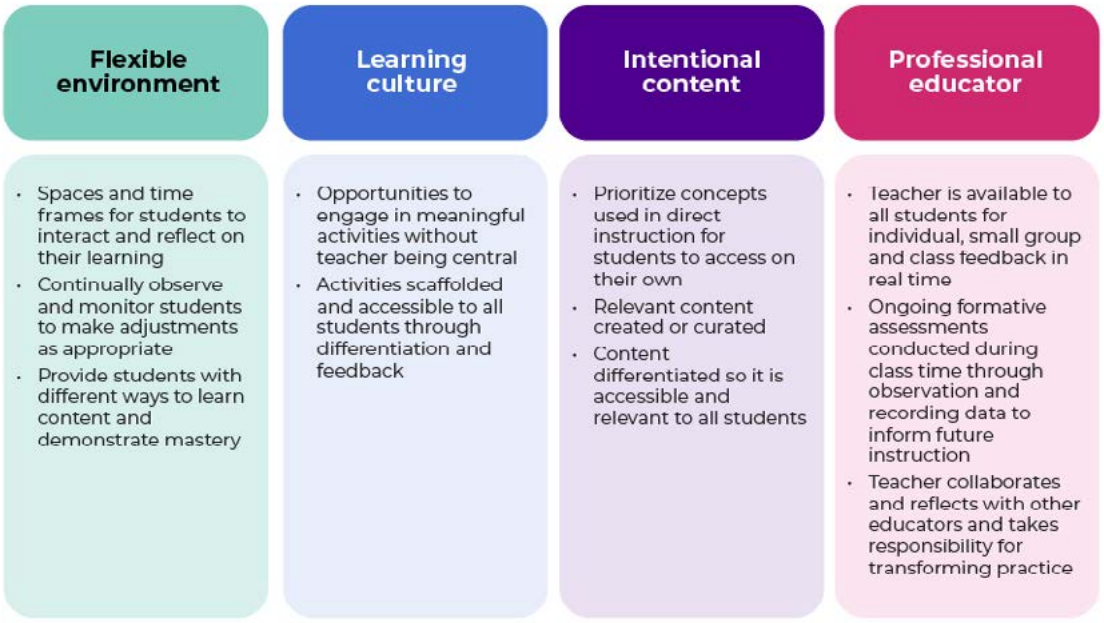

Figure 23. Four pillars of the Flipped classroom method. (Earley, 2016, modified)

The flipped classroom method can effectively teach fundamental nursing skills (Wilson & Hobbs, 2023) and is applicable to learning procedural clinical skills. It can be employed for conceptual content, clinical scenarios, and ethical cases. Clear evaluation processes are recommended for teachers utilizing the flipped classroom method (Barranquero-Herbosa, 2022). Ensuring students' resources are considered helps reduce disparities in opportunities when applying this method (Mikek, 2023). Activities should align with students' experiences and the training program's content.

Read more about Flipped Classroom

Hew, K. F., & Lo, C. K. (2018). Flipped classroom improves student learning in health professions education: A meta-analysis. *BMC Medical Education*, *18*(1), 38–38. https://doi.org/10.1186/s12909-018-1144-z

Ruzafa-Martinez, M., Molina-Rodriguez, A., Perez-Munoz, V., Costa, C. L., & Ramos-Morcillo, A. J. (2023). Effectiveness of the flipped classroom methodology on the learning of evidence-based practice of nursing students: Quasi-experimental design. *Nurse Education Today*, *128*, 105878–105878. https://doi.org/10.1016/j.nedt.2023.105878

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Wilson, K. E., & Hobbs, J. R. (2023). Innovative use of a flipped-classroom approach to teach fundamental nursing skills. *Teaching and Learning in Nursing*, *18*(1), 144–147. https://doi.org/10.1016/j.teln.2022.08.002

Islam Pia N, Huuskonen A, Kunnas K, Rahman R, Manzoor F, Ylistalo E and Smolander N. (2023). Flipped Learning. In N. Smolander, A. Huuskonen, K. Kunnas & E. Ylistalo (Eds.), *DigiCare Model : Digitalized Healthcare and Coaching of Patients in an Asian Context.* (pp. 140-146) Tampereen ammattikorkeakoulu. https://urn.fi/URN:ISBN:978-952-7266-85-4

Flipped Learning Network (n.d.). Retrieved 22.11.2023, from https://flippedlearning.org/

Problem-Based Learning (PBL)

The problem-based learning (PBL) method emphasizes individual and collective learning through the discovery of new knowledge tailored to one's learning needs, enhancing professional competence. This method encourages students to construct knowledge by solving real-life or professional problems, promoting cognitive skills like critical observation, prediction, risk-taking, decision-making, and problem-solving in various contexts (Castillo Rosas & Cabral Rosetti, 2022). PBL has been shown to significantly improve critical thinking skills (Bermúdez, 2021). Literature reviews demonstrate higher satisfaction levels with PBL compared to lecture-based methods, as it enhances problem-solving skills, self-management of knowledge, and communication abilities (Trullàs et al., 2022). Utilized globally in nursing education, PBL fosters critical thinking, motivates active information seeking, and encourages autonomy (Santos et al., 2019).

> ***Problem-based learning method emphasizes on individual and collective learning through the discovery of new knowledge tailored to one's learning needs.***

In PBL sessions, small groups rotate between group sessions and individual investigation time (Figure 25). In the initial session, the teacher provides a teaser to help the group identify the knowledge need and formulate a problem or study question. During the discussion in the first session, the group also identifies existing knowledge about the problem. Subsequently, each member individually investigates the topic to find answers to the identified problem. In the following session, held within days or weeks, the group shares their findings and consolidates solutions to the problem. (Laakso, 2015.)

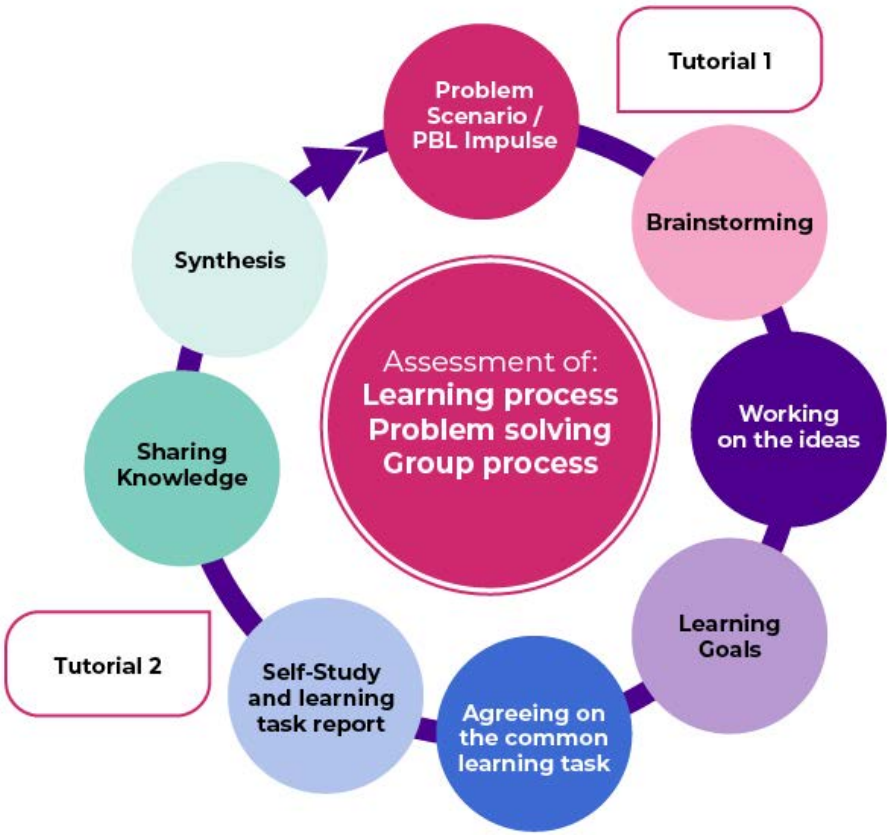

Figure 24. The Principles and the Cycle of Problem-based Learning (Laakso, 2015, modified)

Students also engage in self-assessment of their learning (Moust et al., 2005). Each student is responsible for reviewing literature related to the problem. Evaluation is based on teamwork skills, the scientific contribution of each student, and their involvement in the discussion and reflection on the most accurate solution to the problem (Bermúdez, 2021).

> ***Evaluation is based on teamwork skills, the scientific contribution of each student, and their involvement in the discussion***

It is recommended that the teacher identify university and student resources for information search, foster a respectful environment between the teacher and students, and among students. Additionally, it is crucial to assess the students' digital skills to conduct searches in reliable sources and apply necessary corrective interventions.

The PBL method can be employed to teach various subjects such as anatomy, physiology, pathophysiology, and the development of nursing interventions (Bains et al., 2022). In the field of nursing management, issues can be addressed through experiences found in literature, enabling students to integrate knowledge related to the tools of each stage of the administrative process. Additionally, moral sensitivity can be developed using this method, as nursing professionals often encounter ethical dilemmas and situations in their daily practice (Zia et al., 2023).

Read more about PBL

Wosinski, J., Belcher, A. E., Dürrenberger, Y., Allin, A.-C., Stormacq, C., & Gerson, L. (2018). Facilitating problem-based learning among undergraduate nursing students: A qualitative systematic review. Nurse Education Today, 60, 67–74. https://doi.org/10.1016/j.nedt.2017.08.015

Santos, M. Z. D., Otani, M. A. P., Tonhom, S. F. D. R., & Marin, M. J. S. (2019). Degree in Nursing: education through problem-based learning. Revista brasileira de enfermagem, 72(4), 1071–1077. https://doi.org/10.1590/0034-7167-2018-0298

Compton, R. M., Owilli, A. O., Norlin, E. E., & Hubbard Murdoch, N. L. (2020). Does problem-based learning in Nursing Education Empower Learning? Nurse Education in Practice, 44, 102752–102752. https://doi.org/10.1016/j.nepr.2020.102752

Case-Based Collaborative Learning (CBCL)

The objective of Case-Based Collaborative Learning (CBCL) is to prepare students in the health field by using real clinical cases that link theory with practice and apply theoretical knowledge to real-life cases. Applying this method in the training of health professionals has demonstrated improved capacity to transfer theoretical knowledge to clinical problems, preparing students for collaborative work in multidisciplinary teams. CBCL is a participatory method that motivates students and fosters critical thinking (Sartania et al., 2022).

> ***Using real clinical cases links theory with practice***

This method has the advantage of allowing students to identify their learning needs and competencies related to the topic, thereby enhancing motivation in the training process. The teacher plays a crucial role in guiding student learning and creating environments of trust and respect, fostering collaboration rather than competition among students (Yan et al., 2023).

To apply the CBCL method, the teacher first presents a clinical case to the students, challenging their reasoning with relevant questions. Following this, students engage in subgroup discussions, where each member identifies the necessary information to address the clinical scenario and conducts individual data search. Subsequently, the subgroups discuss their approaches to addressing the clinical case. In a collective session, the teacher facilitates a broader discussion on potential solutions, with each subgroup contributing and providing feedback (Besche et al., 2022; Sartania et al., 2022).

It is possible to apply the CBCL method to clinical cases, where each student conducts a literature review and subsequently identifies nursing participation in multidisciplinary care. The case can also be related to ethical aspects or situations of pharmacological care. Another application is in anatomy teaching (Bassey et al., 2023). This method allows students to develop a perspective on integrating knowledge from specific points and appreciate the effectiveness of collaborative problem-solving in clinical scenarios (James et al., 2022).

It is advisable for the teacher to guide students in information retrieval, make them responsible for their knowledge development, establish rules from the beginning to prevent incomplete tasks or conflicts among students. The teacher can allocate time for students to reflect on how they can enhance collaborative learning. The evaluation process should be transparent, reducing the risk of conflict and dissatisfaction (Kochis et al., 2021).

Read more about CBCL

Besche, H. C., Schwartzstein, R. M., King, R. W., Hoenig, M. P., & Cockrill, B. A. (2022). *A Step-By-Step Guide to Case-Based Collaborative Learning (CBCL)* (1st ed.). Springer International Publishing AG. https://doi.org/10.1007/978-3-031-14440-0

Instructional Moves. Case-Based Collaborative Learning. (n.d.) Harward Graduate school of Education. Retrieved 22.11.2023, from https://instructionalmoves.gse.harvard.edu/cbcl

Simulation

Simulation is a method involving learning through replicating or simulating real-life experiences under the guidance of a teacher or tutor. Simulation scenarios faithfully imitate reality in a safe, interactive learning environment. The specific scenario aims for students to experience dimensions of future professional roles, facilitating their integration into the world of work (Koukourikos et al., 2021). Simulation comprises three crucial phases: pre-briefing for prior information and orientation, exposure to the simulation experience, and debriefing for feedback and reflection – a phase highly valued by students (Fregan, 2023).

> ***Simulation scenarios faithfully imitate reality in a safe, interactive learning environment.***

Simulation serves as a bridge between classroom-acquired knowledge and reality (Moabi & Mtshali, 2022). This method enables students to recognize the significance of teamwork, interdisciplinary collaboration, and communication skills. It also encourages students to better prepare and gain greater confidence in managing stress and other emotions (Skedsmo et al., 2023).

This method can be applied in specific clinical situations such as cardiorespiratory arrest, supraventricular tachycardia, diabetic ketoacidosis, where students can select the nursing treatments to be applied. Additionally, it can be employed for executing nursing procedures in the context of a specific case, such as the placement of a nasogastric tube, aspiration of secretions, insertion of a short catheter, or placement of a urinary catheter.

It is essential for the teacher to create an atmosphere of trust among students and teachers, clearly define the objectives and evaluation

criteria for the activity (Høegh-Larsen et al., 2023), explain the dynamics of the simulation, and familiarize students with the available materials for the cases. After each simulation scenario, instant debriefing and feedback are provided based on the performed activity. In this context, feedback from peers should be utilized to engage the observers of the case (Fegran et al., 2023).

Implementing this active learning method requires institutions to have adequate resources, including simulation laboratories, mannequins, and ample materials for each simulation.

Read more about Simulation

Fegran, L., Ten Ham-Baloyi, W., Fossum, M., Hovland, O. J., Naidoo, J. R., van Rooyen, D. R. M., Sejersted, E., & Robstad, N. (2023). Simulation debriefing as part of simulation for clinical teaching and learning in nursing education: A scoping review. *Nursing open*, *10*(3), 1217–1233. https://doi.org/10.1002/nop2.1426

Islam Pia N, Huuskonen A, Kunnas K, Rahman R, Manzoor F, Ylistalo E and Smolander N. (2023). Low-Fidelity Simulation. In N. Smolander, A. Huuskonen, K. Kunnas & E. Ylistalo (Eds.), *DigiCare Model : Digitalized Healthcare and Coaching of Patients in an Asian Context* (pp. 151-158). Tampereen ammattikorkeakoulu. https://urn.fi/URN:ISBN:978-952-7266-85-4

SSH. (n.d.). Society for Simulation in Healthcare. About Simulation. Retrieved 22.11.2023, from https://www.ssih.org/About-SSH/About-Simulation

World Café

The World Café method is a structured conversation process designed to facilitate open and private discussions, creating connections of ideas that emerge as “collective intelligence” from all participants. The facilitator constructs a series of questions on a specific topic, establishes a welcoming environment, and organizes participants into subgroups seated at tables (resembling a cafeteria), each with a different question. A conversation takes place around the questions at each table, lasting 20 to 30 minutes while one person takes notes. Participants then rotate

from one table to another, with one person staying to welcome the next group and share key points from the previous conversation. The new group adds their perspectives and information to the existing ones. Once all groups have visited all tables and the allotted time has passed, participants share the gathered information, fostering collective knowledge (Ghafili et al., 2023).

The World Café method operates on the assumptions that individuals possess wisdom and creativity as tools to address challenges, that the necessary answers are accessible, and that collective wisdom can be attained. This method centers on conversations about a central topic, treating each conversation as a table within a broader network where knowledge is shared. The implementation of this method involves the teacher setting a context, exploring meaningful questions with students, fostering collective participation, connecting diverse perspectives, actively listening to patterns and perceptions, and sharing the collective discoveries (Brown & Isaacs, 2005).

The World Café operates on the assumptions that individuals possess wisdom and creativity as tools to address challenges, and that collective wisdom can be attained.

The principles of the World Café method can be summarized as follows (Brown & Isaacs, 2005):

1. Foster a welcoming space: Create an environment of trust that allows individuals to freely express themselves.

2. Set the context, welcome, and instruct: Define the topic, establish rules, and provide guidance for the activity.

3. Ask questions that matter: Clearly define the topic for discussion, ensuring that each table focuses on specific and limited issues.

4. Encourage everyone's participation: Cultivate a dialogue environment, promoting active listening and giving everyone opportunities to speak.

5. Cross-pollination of ideas and connect different perspectives: After discussions, teams move to the next table, leaving a representative to share thoughts with the next group, continuing the conversation on that topic.

6. Identify patterns, gain insights, and explore deeper questions: Through ongoing discussions, shared knowledge and insights deepen.

7. Make collective knowledge visible: Capture emerging knowledge at each table on notes or shared big paper. Representatives share this information with the entire group at the end of the conversation, providing a comprehensive view of the themes discussed.

This method can be applied, for example, to construct care plans based on the knowledge and clinical experience of nursing students, solve clinical cases drawing from students' experiences to identify knowledge gaps, discuss the recovery of injuries, explore the clinical experiences of human resources in training to design interventions that improve nursing practice. Other applications include ethical cases or the discussion of adverse events in clinical practice. It is not recommended for use with purely conceptual topics. Additionally, questions should be open-ended and able to be discussed in any order; there is no common starting point for all groups.

The teacher must provide clear instructions for the activity and create an environment of respect among students, emphasizing that errors can be corrected without generating ridicule. Should the teacher not pay attention to the discussions, there is a risk that students might deviate from the intended objective of the activity.

Read more about World Café

van Wyngaarden, A., Coetzee, I. M., & Leech, R. (2018). Assessing the value of action research : using a world café to explore the professional journey of nurse educators. South African Journal of Higher Education, 32(6), 519–531. https://doi.org/10.20853/32-6-2974

The World Café TM. (n.d). Shaping Our Futures Through Conversations That Matter. Retrieved 22.11.2023, from https://theworldcafe.com/

The World Café. (n.d.). Significance of virtual World Cafés. Retrieved 22.11.2023, from https://www.worldcafe.eu/en/virtual-world-cafe/

Drama Pedagogy

The pedagogical drama is centered around the creation of a cooperative and artistic learning environment, blending dialogue and the elicitation of emotions through role-play. This method is designed to stimulate the intellectual and ethical skills of both students and teachers (Hadjipanteli, 2020). The method has been associated with fostering creativity and is particularly valuable for gaining insight into the experiences of patients with serious illnesses. It enables students to comprehend patients' perspectives and contemplate their future roles as nurses (Suh et al., 2021).

This method is applicable in scenarios like simulating clinical cases, aiming to enhance students' abilities in conducting holistic nursing assessments. It focuses on identifying critical information that the patient might not have mentioned but is observable through careful observation of body language. Subsequently, the teacher engages students in a discussion about the enacted scenario, prompting reflection on what transpired and what should ideally occur. This encourages students to contemplate the knowledge they need for further reinforcement or improvement.

The drama pedagogy method demands meticulous planning, introducing an element of playfulness that may diminish reflective aspects while addressing specific facets of social reality. This method is not advisable for conceptual topics with limited practical application or when time constraints hinder thorough exploration (Flores et al., 2017).

Some recommendations for the teacher in implementing the drama pedagogy include:

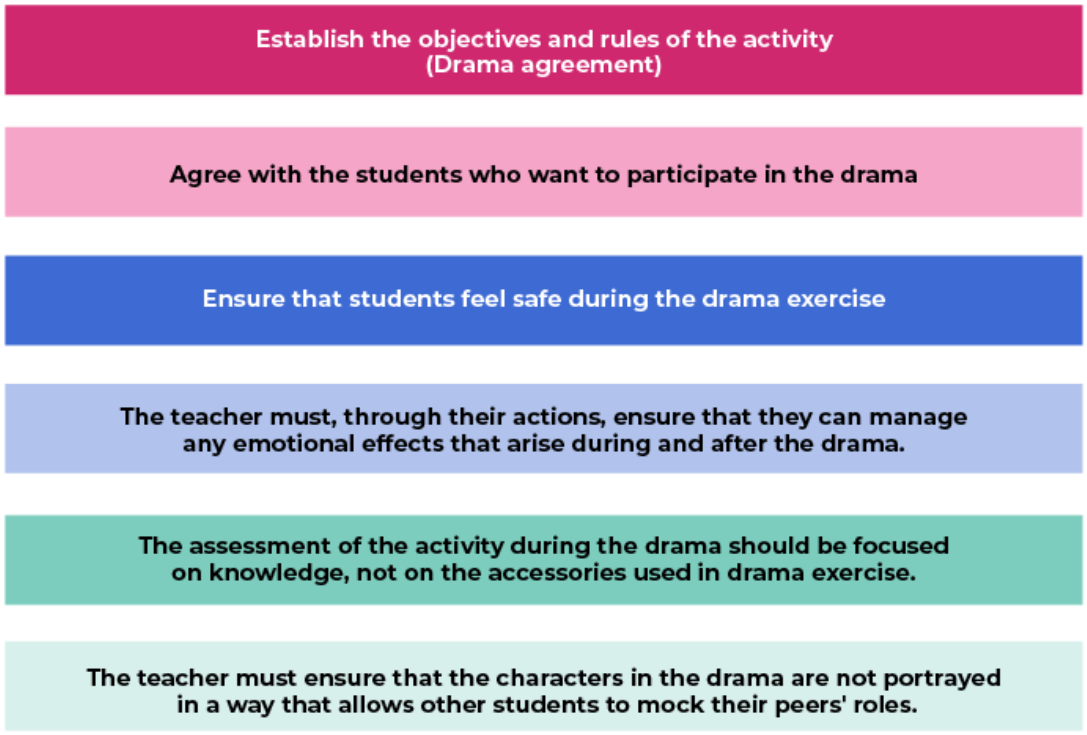

Figure 25. Recommendations for the teacher in the implementation of drama pedagogy (Lehtonen et al., 2016, modified)

Read more about Drama Pedagogy

Arveklev, S. H., Wigert, H., Berg, L., Burton, B., & Lepp, M. (2015). The use and application of drama in nursing education — An integrative review of the literature. Nurse Education Today, 35(7), e12–e17. https://doi.org/10.1016/j.nedt.2015.02.025

Celume, M.-P., Besançon, M., & Zenasni, F. (2019). Fostering children and adolescents' creative thinking in education. Theoretical model of drama pedagogy training. Frontiers in Psychology, 9, 2611–2611. https://doi.org/10.3389/fpsyg.2018.02611

Ljunggren, C., Carlson, E., & Isma, G. E. (2021). Drama with a focus on professional communication – A phenomenographic study. Nurse Education in Practice, 52, 103022–103022. https://doi.org/10.1016/j.nepr.2021.103022

Ranzau, S. D., & Horowitz, R. (2017). Drama-Based Pedagogy: New Ways of Incorporating Drama into the Secondary Classroom. Texas Association for Literacy Education Yearbook, 4, 99-. Retrieved 12.11.2023, from https://files.eric.ed.gov/fulltext/EJ1305026.pdf

Wells, T., Sandretto, S., & Tilson, J. (2023). Bridging the theory-practice divide in teacher education through process drama pedagogy: "You fully experience what you're learning." Teaching and Teacher Education, 124, 103993-. https://doi.org/10.1016/j.tate.2022.103993

Gamification

Although games are entertaining, gamification method refers to the use of game elements in training processes with the primary goal of education rather than creating a game. The use of games motivates action and effort, promoting learning and problem-solving. When incorporating teaching activities based on games, students take on a more active role in their learning. Evidence suggests that gamification enhances motivation, fosters active learning, and facilitates the establishment and internalization of the concepts taught (Serna et al., 2016).

Games encompass attributes such as action language, evaluation, challenge, control, environment, game fiction, human interaction, immersion, and activity rules. The application of these elements necessitates a consideration of pedagogical theory (van Gaalen et al., 2020). Gamification emerges as a potential catalyst for inducing changes in

student behaviors and enhancing learning outcomes (Kim & Castelli, 2021). Moreover, this method proves effective in delivering health education to patients with various pathologies, involving their families in the process (Blok et al., 2021). For instance, gamification strategies were employed among older adults to develop preventive measures against Covid-19 (White et al., 2023).

> ***Gamification favors motivation and active learning and promotes internalization of the concepts.***

Various online tools, such as Kahoot, Quizizz, Word Wall, Padlet, and Plickers, among others (Zambrano et al., 2020), offer options for implementing gamification. Additionally, classic games like bingo or Alias can be integrated into teaching practices. When utilizing online games, teachers need adequate digital skills and should establish clear academic activity rules. It is crucial to communicate the activity's objectives to students to prevent negative attitudes toward the results. To foster a positive learning environment, teachers should encourage mutual respect among all participants. Additionally, teachers should carefully evaluate the outcomes of gamified activities, pinpoint students' weaknesses, and provide guidance on tools for improvement.

Read more about Gamification and find tools

Garrison, E., Colin, S., Lemberger, O., & Lugod, M. (2021). Interactive learning for nurses through gamification. *The Journal of Nursing Administration*, *51*(2), 95–100. https://doi.org/10.1097/NNA.0000000000000976

Seymour, A., Borggren, M., & Baker, R. (2023). Escape the Monotony: Gamification Enhances Nursing Education. *Journal of Emergency Nursing*, *49*(6), 805–810. https://doi.org/10.1016/j.jen.2023.06.004

Kahoot. https://kahoot.com/

Quizizz. https://quizizz.com/

Wordwall. https://wordwall.net/

Padlet. https://fi.padlet.com/

Plickers. https://get.plickers.com/

Genially. https://genial.ly/

Canva. https://www.canva.com/

Educaplay. https://www.educaplay.com/

Flinga. https://flinga.fi/

Alternative Active Learning Methods

Smart learning, or learning in virtual environments, utilizes digital tools to enhance student engagement, and focus. It encourages personalized, adaptive, interactive, or collaborative learning, depending on teaching contexts (Alé-Ruiz & del Moral Marcos, 2021).

In the current era of technological evolution, developing digital teaching competence is crucial for educators. Technological tools reshape education in terms of time and space, offering synchronous, asynchronous, face-to-face, hybrid, virtual, online, or remote learning. To avoid techno-centrism, a pedagogical vision is essential in integrating these tools meaningfully (Barbosa, 2021).

Virtual learning spaces may impact social interactions, causing psychological insecurity in students (Hovlid et al., 2022). There's a risk of losing the teacher-student relationship in digital environments. Teachers must take precautions to prevent students from feeling abandoned in the learning process (Solé-Beteta et al., 2022).

Read morebout Smart Learning or learning in virtual environments

Liaw, S. Y., Ooi, S. W., Rusli, K. D. B., Lau, T. C., Tam, W. W. S., & Chua, W. L. (2020). Nurse-Physician Communication Team Training in Virtual Reality Versus Live Simulations: Randomized Controlled Trial on Team Communication and Teamwork Attitudes. Journal of Medical Internet Research, 22(4), e17279–e17279. https://doi.org/10.2196/17279

King, D., Tee, S., Falconer, L., Angell, C., Holley, D., & Mills, A. (2018). Virtual health education: Scaling practice to transform student learning: Using virtual reality learning environments in healthcare education to bridge the theory/practice gap and improve patient safety. Nurse Education Today, 71, 7–9. https://doi.org/10.1016/j.nedt.2018.08.002

Steehler, A. J., Pettitt-Schieber, B., & Alexander, P. A. (2022). The Smart Use of Smart Technologies in Teaching and Learning: Where we are and Where we Need to be. Ear, Nose, & Throat Journal, 101(9_suppl), 29S-36S. https://doi.org/10.1177/01455613231154037

Question-based learning is a straightforward method involving the teacher or student posing questions before, during, or at the end of class. This shifts the classroom dynamic away from teacher-centric exposure, transforming it into a student-centered environment. Students are prompted to engage through activities like seeking additional information, watching videos, analyzing cases, or actively listening to the teacher's presentation (Goodman et al., 2018).

Read more about Question-based learning

SMILE: Stanford Mobile Inquiry-based Learning Environment. Stanford Graduate School of Education. Office of Innovation & Technology. Retrieved 12.11.2023, from https://gse-it.stanford.edu/smile

Case study method involves students solving a given situation through information search, analysis, exchanging opinions, and decision-making. This process develops cognitive skills, including interaction, reflection, analytical reading, argumentative listening, active listening, and effective dramatization (Castillo Rosas & Cabral Rosetti, 2022).

Read more about Case Study

Ardila Roa, I. D. (2020). Estudio de caso: una estrategia de aprendizaje significativo en farmacología en estudiantes de enfermería. *Paradigmas Socio-Humanísticos*, *2*(1), 17–25. https://doi.org/10.26752/revistaparadigmassh.v2i1.473

TeamWe – project (n.d.) Teaching Welfare Technology Together. A handbook for teachers. Retrieved 12.10.2023, from https://sites.google.com/view/teamwe-handbook/front-page

Project-based learning involves constructing a product to address a simulated or real-life situation. This approach fosters research skills, encouraging problematization through causal analysis. The process of conceiving, designing, and implementing projects contributes to the development of heightened awareness and professional judgment (Castillo Rosas & Cabral Rosetti, 2022).

Read more about Project-based learning

Laverick, E. K. (2018). *Project-based learning*. TESOL International Association. *ProQuest Ebook Central*. Retrieved 22.11.2023, from https://ebookcentral.proquest.com/lib/tampere/detail.action?docID=6447707.

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Pascon, D. M., Vaz, D. R., Peres, H. H. C., & Leonello, V. M. (2022). Project-based learning in remote teaching for undergraduate nursing students. *Revista Da Escola de Enfermagem Da U S P*, *56*, e20220058–e20220058. https://doi.org/10.1590/1980-220X-REEUSP-2022-0058en

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A social hackathon aims for students to address challenges by generating innovative ideas and creating prototypes. This method facilitates collaborative and situated learning, allowing students to tackle complex problems with interdisciplinary approaches. It promotes shared reflection, deliberation, and consensus-building to solve problems, fostering the development of social innovation and the formation of learning communities (Sánchez, et al., 2022).

Read more about Social hackathon

Sánchez G. I., Concha G. M. & Rojas C. A. (2022). Hackathon social como metodología activo-participativa para el aprendizaje colaborativo e innovador en la formación universitaria. *Información tecnológica 33*(4), 161-170. https://doi.org/10.4067/s0718-07642022000400161

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3.6 Digital Competencies in Nursing Education

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The SmartNurse Methodology encompasses multiple crucial components, with digital learning and its accompanying skill set standing out prominently. Leveraging an array of digital tools, applications, and communication capabilities, nursing education has transcended geographical constraints and language impediments. Consequently, integrating digital competences into the repertoire of nursing educators and students emerges as a pivotal factor in enhancing the landscape of nursing education across Latin America. In this chapter we discuss digital competences and their impact on the digital learning in nursing education.

The concept of digital competence has gained significant relevance due to the increasing number and diversity of educational computer tools available to teachers. These tools encompass a wide range of technologies, including artificial intelligence, gamification, simulation, interactive multimedia content, data analytics, and personalized instructional design, among others. Moreover, the recent and ongoing impact of the COVID-19 pandemic has expedited the integration of digital technology in nursing education at all levels and educational institutions worldwide, particularly in the realm of distance learning.

Finding a universally accepted definition of the concept of digital competence is a complex task. In some instances, it has been suggested that the term might carry a somewhat political undertone (Ilomäki et al., 2011), as it often embodies beliefs and aspirations regarding future requirements. Moreover, it is rooted in the context of economic competition, where emerging technologies are perceived as both opportunities and solutions. Additionally, there are several terms frequently used interchangeably with digital competence, such as “digital literacy,” “computer skills,” or “digital skills.”

In the context of designing social policies, the concept of "competence" has gained prominence over "knowledge" and "skill," emphasizing its broader nature. For instance, within the framework of the Program for International Student Assessment program (PISA), the OECD has proposed identifying key competencies to inform the development of educational social policies and the monitoring of national and international progress in this field. The OECD's definition of competency serves as a foundational concept: "A competency is more than just knowledge and skills. It signifies the ability to address intricate demands by drawing upon and mobilizing psychosocial resources, including skills and attitudes, within a specific context" (OECD, 2005, p. 4). Compared to digital literacy, digital competence places greater emphasis on ethical, safety, and social dimensions (Falloon, 2020; Foulger et al., 2017; Lund et al., 2014 in Mehrvarz et al., 2021) and recognizes a broader spectrum of knowledge, skills, and individuals' aspirations (Mehrvarz et al., 2021).

The European Commission (Punie, 2007) defines digital competence as the secure and discerning use of technology in the Information Society, encompassing activities in the realms of work, leisure, and communication. Digital competence, therefore, builds upon fundamental ICT skills, enabling individuals to retrieve, evaluate, store, generate, exchange information, engage in communication, and participate in collaborative networks via the Internet while adhering to safety measures.

Following the elucidation of the concept of digital competence, the next step is to delineate its principal components for measurement. In one of the most prominent studies on this subject (Janssen et al., 2013), European experts achieved consensus using the Delphi technique, identifying twelve relevant areas associated with digital competencies (Table 2).

Table 2. Twelve areas of digital competence (Janssen et al., 2013, modified)

Digital competence area	Description
General knowledge and functional skills	The digitally competent person knows the basic concepts (terminology, navigation, functionality) of digital devices and can use them for elementary purposes.
Use in everyday life	The digitally competent person can integrate technologies into the activities of daily life.
Specialized and advanced competence for creative work and expression	The digitally competent person can use ICT to express their creativity and improve their professional performance.
Communication and collaboration mediated by technology	The digitally competent person can connect, share, communicate and collaborate with others effectively in digital environments.
Treatment and management of information	The digitally competent person uses technology to improve their ability to collect, organize, analyze, and judge the relevance and purpose of digital information.
Privacy & Security	The digitally competent person has the ability to protect personal data and take appropriate security measures.
Legal and ethical aspects	The digitally competent person behaves appropriately and socially responsible in digital environments, demonstrating awareness and knowledge of the legal and ethical aspects of the use of ICT and digital content.
Balanced attitude towards technology	The digitally competent person demonstrates an informed, open and balanced attitude towards the Information Society and the use of digital technology. The digitally competent person is curious, aware of opportunities and new developments, and comfortable exploring and exploiting them.
Understanding and awareness of the role of ICT in society	The digitally competent person understands the broader context of use and development of information and communication technologies.
Learning about and with digital technologies	The digitally competent person actively and constantly explores emerging technologies, integrates them into their environment, and uses them for lifelong learning.
Informed decisions about appropriate digital technologies	The digitally competent person knows the most relevant or common technologies and can decide on the most appropriate technology according to the purpose or need in question.
Continuous use demonstrating self-efficacy	The digitally competent person confidently and creatively applies digital technologies to increase personal and professional effectiveness and efficiency.

In addition to self-evident skills, such as proficiency in using digital devices and software applications, experts have identified and highlighted other noteworthy aspects (Janssen et al.). These encompass considerations related to privacy, data security, learning aptitude, as well as attitudinal elements like self-efficacy in making informed decisions regarding information technologies and an awareness of their societal impact.

These domains hold particular significance for nursing teachers and students. This is because, in addition to addressing critical subjects such as legal and ethical concerns, nursing professionals must also cultivate an understanding of the broader role of ICTs in society. This encompasses areas like the privacy and security of personal data and the capacity to assist patients in making informed decisions regarding self-care.

Digital Competences in Nursing

In the modern nursing field, there exists a challenge associated with transitioning from traditional, in-person, face-to-face patient care to the rapidly evolving realm of digital technology applications. These applications and digital tools span numerous facets of the discipline, including the management of electronic health records (EHR), operation of telehealth platforms, utilization of Mobile Health (mHealth) applications, facilitation of barcode medication administration (BCMA) for patients, engagement in remote monitoring, consultation of clinical decision support systems (CDSS), and even the integration of simulation and training technologies into nursing education (Ali et al., 2023; Wynn et al., 2023).

Within this context, nurses involved in education face the imperative of integrating these digital tools into nursing curricula and clinical training programs. This integration necessitates the utilization of established and effective pedagogic strategies, such as active learning methods (Refer to chapter 3.5). A logical starting point for addressing this challenge lies in the assessment of the digital competencies possessed by teaching professionals and students.

In the context of this transition, a study aiming to enhance our understanding of graduate students' digital preferences and perceptions within a modern, digitally enabled healthcare sector surveyed 361 students and revealed significant findings (Cham et al., 2022). While

students exhibited confidence in utilizing day-to-day information technologies, only 11% indicated that they had access to sufficient university support and services for the development of their digital skills and competencies. Additionally, merely 39% of the students believed they possessed the requisite skills to enter the workforce confidently. As an intervention, a workshop was implemented to enhance students' comprehension of the practical applications of digital technologies in the healthcare domain. The workshop succeeded in improving their awareness of their own digital capabilities. However, it was recommended that university teaching professionals should also possess an awareness of digital health subjects to enhance the content of professional curricula.

> ***A logical starting point for addressing the challenge lies in the assessment of the digital competencies of teaching professionals and students***

While examining the transfer of digital competencies acquired through healthcare training courses to participants' professional practice, it was found that nearly 60% of the participants, primarily nurses, applied their acquired knowledge in their professional roles. However, only 16% reported daily use of these skills, and merely 22% were involved in developing patient resources following the course. (Navarro Martínez et al., 2022.) This highlights the necessity for enhancing e-learning methods and the quality of training to facilitate the effective transfer of digital competencies within the healthcare sector.

In the realm of education, the significant role of nurse educators in facilitating and promoting the acquisition of digital competencies is underscored and therefore they need to be digitally competent themselves. A German study researched 169 nursing educators employing a standardized self-reported questionnaire tailored for the study. The

findings revealed that nearly all respondents (98%) recognized the necessity of continuous education and training to acquire and enhance digital competencies. The study also observed age-related distinctions, with older participants often exhibiting an inverse relationship with digital competence. Furthermore, the research unveiled a high level of motivation and an overall positive attitude toward digital technology, particularly in pedagogical and didactic contexts. (Jobst et al., 2022.)

An emerging theme from the previously summarized studies is the implementation of courses and workshops focused on digital technology usage. These serve as remedial measures, especially when initial assessments indicate insufficient digital competencies. This underscores the necessity for greater emphasis on enhancing digital competencies at the university level, bridging the gap between classroom learning and professional practice.

Digital Competencies and Ethical Issues

One crucial aspect of digital competencies is the ability to make informed decisions about suitable digital technologies (Janssen et al., 2013). In the context of nursing education and clinical practice, ethical considerations become particularly significant when self-care and eHealth converge (Read more in Chapter 3.6). In such situations, nursing students and practitioners are tasked with educating patients about the capabilities and limitations of these tools. Context plays a pivotal role, and several examples of these issues, among others, are outlined in the following scenarios.

Digital literacy of elderly persons: Nurses may need to educate elderly patients on using smartphone apps for medication reminders. These patients could have limited digital literacy and no access to a smartphone. The nurse faces the ethical dilemma of ensuring equitable access to digital tools and tailoring education to the patient's abilities (Göransson et al., 2020).

Cultural sensitivity: Nurses must train patients from culturally diverse backgrounds to use digital tools for self-care. The ethical challenge involves respecting cultural beliefs and practices while integrating technology and ensuring the effectiveness of the patient's self-care plan (Ackley et al., 2023).

Accuracy and reliability: Nurses also need to instruct patients to correctly interpret health data from home monitoring devices. Special attention and awareness must be taken if the device provides inconsistent or inaccurate readings, potentially leading to the mismanagement of the patient's health condition (Leese et al., 2022).

Informed decision-making: A nurse could guide a patient to research health information online. The ethical concern involves helping the patient critically evaluate the credibility and reliability of online sources to make informed decisions about their care (Gloeckler et al., 2022).

Digital dependency: Teaching a patient to rely on a health-tracking app and wearable device is a likely scenario. The nurse must ensure that the patient understands the limitations of technology and doesn't neglect traditional medical advice or regular check-ups with traditional instruments.

Inclusion and accessibility: Nurses could assist patients with disabilities who, in turn, must use assistive technologies for self-care. Considerations revolve around searching and ensuring that digital tools are customizable to meet the patient's specific needs (Oudshoorn et al., 2021).

The scenarios described align with recent studies (Kaihlaniemi et al., 2023; Veikkolainen et al., 2023) that measured the counseling and attitudinal competencies of nursing students regarding eHealth and healthcare digitalization. These studies reveal a notably positive attitude among the student population. As a result, they offer valuable reference points and justifications for curriculum updates that incorporate the eHealth and digitalization trends.

Developing Digital Competences in Nursing Education

The internet and social media have become integral parts of modern life, influencing how we work, communicate, and share information. In healthcare education, the growing use of social media and the internet supplements traditional educational resources. To actively engage students and align curriculum-based learning activities within nursing curricula, teachers are increasingly utilizing social media and technology-based platforms (O'Connor et al., 2017, as cited in Ross & Cross, 2019)

As learning through digital content can engage specific cognitive processes, we can reasonably infer that digital literacy enhances the ability to use computers in an educationally productive manner (Pagani et al., 2016). Access to digital tools and equipment is essential for developing essential digital skills (Huda, 2023). In higher education, access to and utilization of digital resources enables nursing students to gain proficiency in navigating technology, ensuring their readiness for an increasingly technology-driven healthcare landscape as future healthcare professionals. Conversely, students who lack access to necessary digital tools may face disadvantages in both their academic journey and future professional pursuits (Michel et al., 2021; Gause et al., 2022)

Differences in digital literacy contribute to educational inequality and, consequently, labour market disparities (Pagani et al., 2016). Therefore, it should be a global objective for educators and institutions to prioritize students' digital literacy.

Educating nursing students in informatics and digital health is crucial for their ability to safely use digital tools in patient care. This knowledge enables nurses to actively engage with current and emerging digital technologies, understanding their impact on patient safety and their professional responsibilities (NHS Health Education England, 2019, as cited in Kleib et al., 2022).

Measuring Digital Skills

Efforts to enhance higher education nursing curricula require tools and instruments to pinpoint areas where teachers and students may benefit from additional training or resources. By identifying digital competency gaps, institutions and their management can develop targeted support and strategies to improve technological skills and knowledge.

Within this context, several recently developed measurement instruments, such as the Teacher Digital Competence Framework (TDC) (Falloon, 2020) and DIGIGLO (Alarcón et al., 2020), are available. However, the most referenced frameworks for assessing digital skills in the literature on digital competence include three specific frameworks (Figure 26).

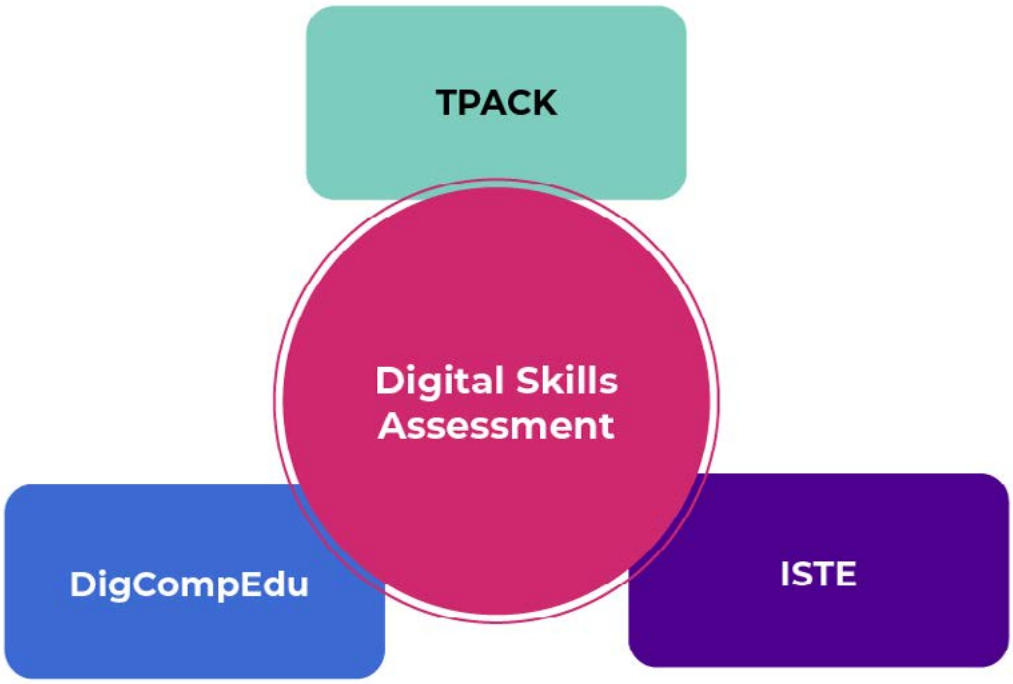

Figure 26. Frameworks for assessing digital skills

TPACK. **T**echnological **P**edagogical **C**ontent **K**nowledge is a framework that delineates the knowledge and skills required by educators to proficiently incorporate technology into their teaching practices. TPACK emphasizes the intricate interplay among three distinct knowledge

domains: technological, pedagogical, and content knowledge. The synergy of these domains yields the adaptable expertise essential for the effective integration of technology in education. (Koehler et al., 2009.)

ISTE Standards for Students. The **I**nternational **S**ociety for **T**echnology in **E**ducation has developed a set of standards for students that describe the digital skills and competencies students need to succeed in a digital world. The standards cover a variety of topics, including digital citizenship, creative and innovative thinking, communication and collaboration, and research and information fluency, among others. (Crompton, 2017.)

DigCompEdu. The **Dig**ital **Comp**etency Framework for **Edu**cators, developed by the European Commission, serves as a comprehensive guide to the digital skills essential for educators. It offers a standardized language for describing these digital skills, ensuring uniformity in terminology across Europe. The primary objective of this framework is to empower educators to seamlessly integrate digital technologies into their teaching practices, fostering a more digitally adept and connected educational landscape. (Redecker, 2017.)

The DigCompEdu Framework

Given its widespread adoption in Europe and Latin America (Araújo et al., 2022; Barrientos et al., 2022; Lamschtein, 2022; Lorelí Padilla Hernández, 2020), we have chosen to use the DigCompEdu instrument (Redecker, 2017) within the SmartNurse Methodology. This instrument provides a robust international benchmark, without diminishing the validity and contributions of other measurement tools discussed in this chapter.

The DigCompEdu framework encompasses six areas (Figure 27) that assess the digital skills of teachers and students, classifying a total of 22 skills (Redecker, 2017).

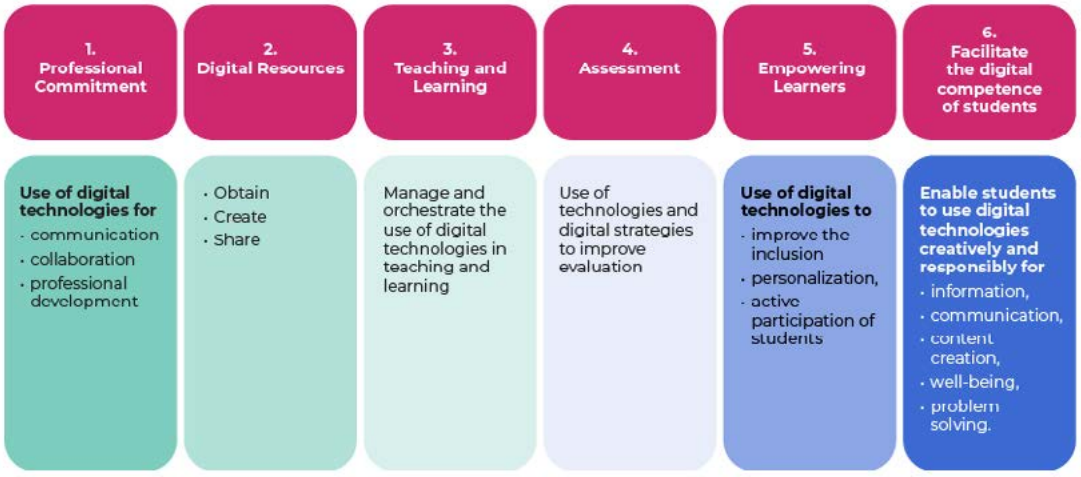

Figure 27. Six areas of the DigCompEdu framework (Redecker, 2017, modified)

And so, the framework provides a comprehensive view of relevant areas for diagnostic and possible improvement, but also shows the interrelated nature of these competences, as well as the influence they have on the learning process of the students.

Conclusions

The concept of digital competence contains elements about the attitudinal aspect of decision-making regarding the use of digital tools and their impact on society. Ethical and attitudinal issues are a central skill of digital competence for nurses, especially when there is a convergence of the areas of self-care, eHealth, and training given that there should be a clear awareness of the consequences of bad decision making from the patient. Also, context elements such as culture, economics, age differences, and inclusion are important variables to be considered.

Nursing teachers in theory, laboratory, and clinical settings are encouraged to engage their students in learning about and discussing digital health and nursing informatics concepts. Nursing students need to know about digital health as a model of care, but learning about dig-

ital health should not only be determined by the type of technologies available, as these are rapidly changing and evolving. However, students need to know that digital health technologies are only tools that complement what nurses do and think and do not determine what nurses can achieve with digital health (Kleib et al., 2022). Although digital technology is strongly present already and continue coming to the fore, there is a need to ensure that evidence-based practice and patient-centered care need to remain at the forefront of nursing education and care delivery (Ross & Cross, 2019).

> ***Ethical and attitudinal issues are a central skill of digital competence for nurses***

Measuring digital competencies could be a starting point for all institutions. There is a wide variety of instruments, which allow universities and hospitals to carry out processes of continuous improvement for the application of strategies and channeling scarce resources towards their educational communities. Nursing educational curricula in Latin America are not exempt from this global dynamic and can use these measurement instruments to apply their own improvement processes, in addition to being able to identify specific areas of opportunity for health promotion and self-care.

The SmartNurse Methodology aims to address the prevailing concerns in recent literature regarding the inadequacy of digital competency training for healthcare professionals, educators, and students. It achieves this by offering a comprehensive framework that incorporates elements of active learning methods, self-care, and digital technologies to enhance curriculum quality and effectiveness.

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3.7 Self-Care Support in the Digital Era

Jenny Díaz Artiga, Maximiliano Campos Hernández, Melissa Calderón Cruz, Roxana Zúniga Pined and Karen Sánchez Núñez and Annukka Huuskonen

The SmartNurse Methodology aims to prepare future nursing professionals to enhance self-care support. The methodology is grounded in the belief that nursing students learn effectively through active methods and digital solutions, enabling them to apply these innovative approaches in supporting their patients' self-care. This chapter explores self-care support, particularly in the digital era, and includes additional reading on various tools related to self-care at the end of the chapter.

Globally, there is an increasing emphasis on self-care, its support, and various self-care interventions due to their affordability for both individuals and the healthcare system. Self-care support not only empowers individuals but also promotes self-determination and self-efficacy. (World Health Organization, 2022.) A variety of self-care practices can be powerful in preventing diseases or their complications and in promoting and sustaining the mental, physical, and emotional health of individuals, families, and communities. Traditionally, in Latin-American countries, self-care and its support have not been emphasized in nursing education. The SmartNurse Methodology aims to equip future nurses with strong competences in self-care support.

Elements of Self-Care

Self-care is a widely used term in the field of healthcare and health sciences, yet there is no clear consensus on the definition and its relation to closely related terms like self-management (Matarese et al., 2018). The World Health Organization (WHO) has defined self-care as "the ability of individuals, families, and communities to promote

health, prevent disease, maintain health, and care for oneself with illness and disability with or without the support of a health professional" (WHO, 2022). Self-care is considered here as a broad umbrella concept (Figure 28), linking, and overlapping with the healthcare system and, on the other hand, with the everyday life of an individual, family, or community. It consists of self-management, self-awareness, and self-testing (WHO, 2022).

> ***Self-care is considered here as a broad umbrella concept, linking, and overlapping with the healthcare system and, on the other hand, with the everyday life of an individual, family, or community.***

Self-management is an indispensable element in self-care, which aims to prevent further diseases and complications through a healthy lifestyle and self-evaluating changes, as well as following a therapeutic regimen. Self-management is enabled and supported through education and monitoring (Matarese et al., 2018). Self-management consists of self-medication, including self-injection, and self-use of medical products and interventions, as well as self-treatment and self-examination (WHO, 2022). Well-implemented self-management is crucial in the care of chronic diseases, as patients can lead a well-balanced life with the disease for years or decades.

In the WHO model (Figure 28), self-testing is delineated as an autonomous component separate from self-management, encompassing various ways in which individuals assess, screen, and monitor their health. Similarly, self-awareness is a distinct aspect of self-care, incorporating attributes such as self-regulation and self-determination that are pivotal for the successful self-care of a chronic disease.

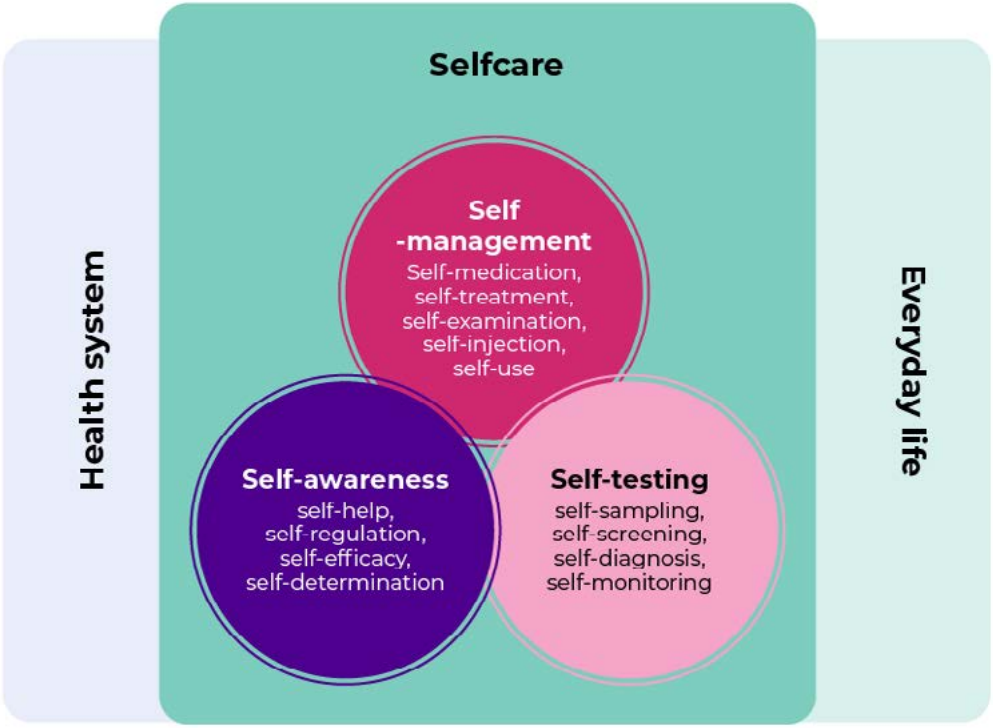

Figure 28. Self-Care In the Context of Interventions Linked to Health Systems Interventions (WHO, 2022, modified)

The broad scope of self-care includes health promotion, disease prevention and control, self-medication, care for dependent persons, seeking primary health care, specialized or hospital care when necessary, and rehabilitation, even palliative care (WHO, 2022).

There are various ways to describe what is included in self-care. The International Self-Care Foundation (ISF, n.d.) identifies seven pillars of self-care: Knowledge and Health Literacy, Mental Well-being, Self-awareness and Agency, Physical Activity, Healthy Eating, Avoiding Health Risks, Maintaining Good Hygiene, and finally, Rational and Responsible Use of products such as medicines and services. This breakdown and similar ones of essential elements for self-care help individuals and the nurses supporting them assess their self-care needs and assets comprehensively. Other examples of practical tools for self-assessment and the promotion of self-care include a discussion tool of positive health (Institute for Positive Health, 2019), which covers

elements of body functions, mental well-being, meaningfulness, quality of life, participation, and daily functions. There is also a guide with practical exercises for emotional self-care published by the Salvadoran educational foundation Funpres (Fundación Pro Educacional de El Salvador, 2023). Based on the self-analysis or assessment done together with the nurse, one can set individually realistic and meaningful goals suitable to their personality, age, and physical and social conditions (Fundación Pro Educacional de El Salvador, 2023).

Healthcare Professionals' Interventions for Supporting Self-Care

Different nursing theories serve as the foundation for structured self-care support in healthcare systems and are integrated into governmental health policies in Latin America. This enhances the quality and competitiveness in which nursing professionals play a direct role in providing safe care (Álvarez, 2015). One well known example is evidence-based nursing, or the self-care theory developed by Dorothea Orem. Orem's theories on self-care and self-care deficit define self-care as intentional actions that contribute to one's health, involving obtaining or seeking information and making decisions. The nurse's role is to provide information and support decision-making, thereby strengthening an individual's "power" or "self-care agency," as described by Orem (Hartweg, 1991).

> ***Self-care is intentional actions that contribute to one's health, involving obtaining or seeking information and making decisions.***

Health promotion encompasses a range of social and environmental interventions aimed at enhancing and safeguarding the health and quality of life by addressing the root causes of disease (WHO, 2022). Health education is considered a form of health promotion and a means

of self-care support. Health professionals, at various levels of healthcare, play a crucial role in educating patients and promoting self-care.

When supporting patients with chronic diseases, a collaborative self-care plan and supportive tools should be developed, considering the patient's needs and motivation for implementation (McMurray, 2022). The action plan should be regularly evaluated and adapted to the patient's mental and physical capabilities, as well as their social, cultural, and economic context. Self-care support can take various forms, tailored to individual needs, and based on evidence of effectiveness (Heggdal et al., 2021). For instance, online and group-based interventions in community settings have proven effective in supporting self-care for children and youth with chronic diseases, while interventions limited to parents or hospital settings had limited impact (Kirk et al., 2012).

> ***Self-care support can take various forms, tailored to individual needs, and based on evidence of effectiveness***

The WHO guidelines on self-care interventions emphasize that self-care should not imply leaving the patient alone to manage on their own. All self-care interventions must provide accurate, understandable information about the intervention and its connection to health services. It should also offer the opportunity to interact with nurse or other trained healthcare personnel to support decisions about the intervention and its usage (WHO, 2022).

Digital Assets and Interventions in Self-Care and Its Support

Nurses can encourage the use of digital tools and telehealth to enhance well-being and prevent non-communicable diseases and their complications. Both health professionals and users can utilize software and digital devices for medical guidance, lifestyle improvement, and cultural considerations, empowering users to play a more active role in their health maintenance (Vassilev et al., 2015).

Various digital devices, such as cell phones, smartwatches, thermometers, blood pressure monitors, and glucometers, support self-care globally, enabling effective self-monitoring. Devices and apps now allow users to monitor vital signs, activity, stress levels, and water consumption without direct professional intervention in hospital or community clinic settings (Fortmann et al., 2017; Steinert et al., 2020). Digitalization has also granted access to extensive health information, including self-testing questionnaires that offer automatic feedback and advice.

> ***Health professionals can utilize digital tools, empowering users to actively manage their health.***

Nurses play a creative role, offering practical tips and using questions to guide patients in finding personalized solutions (Heggdal et al., 2021). For instance, leveraging smartphone calendars and alarms can serve as reminders for medications, while apps tracking distance, heart rate, and calories can boost physical activity motivation. Nurses must also emphasize critical thinking, assessing data privacy, and confidentiality when recommending apps or programs collecting personal information.

Although digital tools and apps can assist many patients in their self-care, nurses must be mindful of potential barriers (Heggdal et al., 2021). Barriers include physical limitations such as impaired sight or fine motor control, inadequate technological skills or interest, and contextual factors like poor usability or accessibility issues with technology. Healthcare professionals can help overcome these barriers by selecting tailored tools and providing necessary support. (Huuskonen et al., 2023.)

> ***Nurses need to be aware and promote critical thinking and assessment trustworthiness of the information as well as data privacy and confidentiality.***

Digital solutions offer cost-effective follow-up and self-care support services. Users facing mobility constraints or inconvenience to reach healthcare centers, whether due to distance or economic factors, can benefit. Technology allows the multidisciplinary team to conduct calls or video calls to verify the user's health status, providing opportunities for peer support (Heggdal et al., 2021). Telehealth utilization can also optimize time and resources, prioritizing on-site contact for those in need of direct healthcare provider interaction.

Learning Self-Care Support in Nursing Education

Nursing students must realize the significance and essentiality of self-care across various nursing domains and patient groups. Their comprehension and skills in self-care support should continually expand during their training (Graves, 2016). Acquiring these competencies involves a dynamic interplay of theory and practice, transitioning between roles such as reflecting on personal self-care, health habits, and motivational factors, being an active learner, and facilitating patients' learning and motivation for self-care.

In clinical practice, students apply the knowledge and skills gained in theoretical classes using various active learning methods and digital tools. The teacher serves as a companion in the educational process, facilitating holistic learner development.

> ***Students must engage in learning through active methods and the utilization of digital solutions. This approach enables them to apply these methods innovatively in providing self-care support.***

Students continuously enhance their competencies through theoretical learning and practical application, promoting self-care by educating and guiding patients at various care levels in different social contexts. These activities encompass verbal guidance, patient coaching, and demonstrations to empower users in managing their health effectively. Additionally, it is crucial for students to learn how to assess the evidence base of the interventions they employ (Kirk et al., 2012). Nursing education must equip students with the skills to educate patients in self-care actions, including the use of digital tools.

Role of Nursing Professionals in Self-Care Support in Latin America

In Latin America, each country has a self-care program, emphasizing the primary level of care. Nursing professionals play a crucial role in frontline care, educating users about health and self-care to prevent chronic non-communicable diseases or enhance individuals' quality of life based on their situation and health conditions (Álvarez Yañez, 2015). The nursing profession has adeptly adapted to diverse social, economic, cultural, and political changes, enabling professionals to address evolving user needs as health systems develop and become more complex (Centro de Capacitación e Investigación en Enfermería, 2000;

Manfredi, 1993). This adaptation to the current world is partly facilitated by the integration of technologies that facilitate the dissemination of knowledge (Álvarez, 2015).

> ***Nursing professionals play a crucial role in frontline care, educating users about health and self-care***

The Mexican Social Security Institute (IMSS) emphasizes self-care as the primary approach to disease prevention and health promotion. IMSS advocates for self-care beginning even before conception, with actions taken before and during pregnancy. Recognizing the importance of strategic plans, IMSS aims to enhance lifestyles, including physical, emotional, and mental health, for diverse population groups. This approach involves collaboration among various stakeholders, such as patients, health professionals, health authorities, and the media, for effective dissemination (IMSS, 2020).

In El Salvador, a National Health Promotion Policy is in place, aligned with legislation from the Health Code and the Law of the National Integrated Health System (SNIS). This policy strengthens “educational and health communication actions for the prevention of diseases with individual, family, and small group approaches.” These actions are implemented at both home and institutional levels in health facilities and communities (MINSAL, 2022). Following WHO guidelines, the policy focuses on developing strategies to promote healthy habits and prevent chronic diseases from pre-conception, establishing rights and duties for all users.

Read more

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4

Implementation Experiences

The SmartNurse project aimed to modernize nursing education within partner Higher Education Institutions (HEIs) in El Salvador and Mexico by integrating digital educational tools and active learning methods. This initiative sought to equip both teachers and students with essential competencies for the digital era.

A pivotal outcome of the SmartNurse project is the development of the SmartNurse Methodology, a pedagogical framework crafted through collaborative efforts with the project consortium (Read more in Chapter 3). To enhance its utilization, Teacher Training sessions were conducted to empower teachers with digital tools and active learning methods.

This chapter discusses the methodology's implementation process (4.1), the content, structure, and feedback of Teacher Trainings (4.2), its practical application in partner HEIs (4.3-4.7), and pilot results (4.8.1-4.8.3).

Following the piloting of the SmartNurse Methodology, the importance of active learning methods and digital competencies became evident, affirmed by insights from nursing teachers and students, highlighting the project's transformative impact on nursing education in the digital era.

4.1. Description of the Smart-Nurse Implementation Process

Maximiliano Campos Hernández, Jenny Díaz Artiga, Nina Smolander and Katariina Kunnas

The main output of the SmartNurse project was the development of the SmartNurse Methodology in close collaboration with the entire consortium. An essential part of the methodology development involved conducting literature reviews (Read more in Chapter 2) and pilot testing of the methodology. The SmartNurse Methodology was tested in three different phases, and feedback was collected from participants after each phase. This chapter provides a concise overview of the implementation process undertaken in the project and describes the content of the three pilot phases.

The SmartNurse Methodology was developed through literature reviews conducted by partner universities, forming a theoretical foundation for the methodology (Read more in Chapter 2). Additionally, the empirical knowledge of Latin American and European expertise among project members played a fundamental role in both the creation (Read more in Chapter 3) and implementation of the methodology. Throughout the project implementation, the SmartNurse Methodology underwent further development and refinement based on experiences (Read more in Chapters 4.3-4.7) and feedback from pilot participants (Read more in Chapter 4.8) across three pilot phases.

According to project management literature and the Consolidated Framework for Implementation Research (CFIR), it is recommended to conduct pilot phases before implementing new interventions or approaches, particularly when the proposed approach differs significantly from the current one (Damschroder et al., 2022; Project Management Institute 2014). In the SmartNurse project, the pilots aimed to enhance digital competencies among nursing teachers and students, as well as integrate active learning methods into nursing curricula at partner institutions in El Salvador and Mexico. Furthermore, the

project provided partner universities with the opportunity to acquire digital teaching and learning equipment, along with digital medical equipment, to be utilized during the pilot phases.

The implementation process of the SmartNurse Methodology (Figure 29) involved Teacher Training sessions (Read more in Chapter 4.2) and a total of three pilot cycles planned collaboratively and conducted by each partner university. Between the second and third pilots, a thorough curriculum integration was undertaken, and the process was concluded with recommendations for integrating the SmartNurse Methodology (Read more in Chapter 5.3).

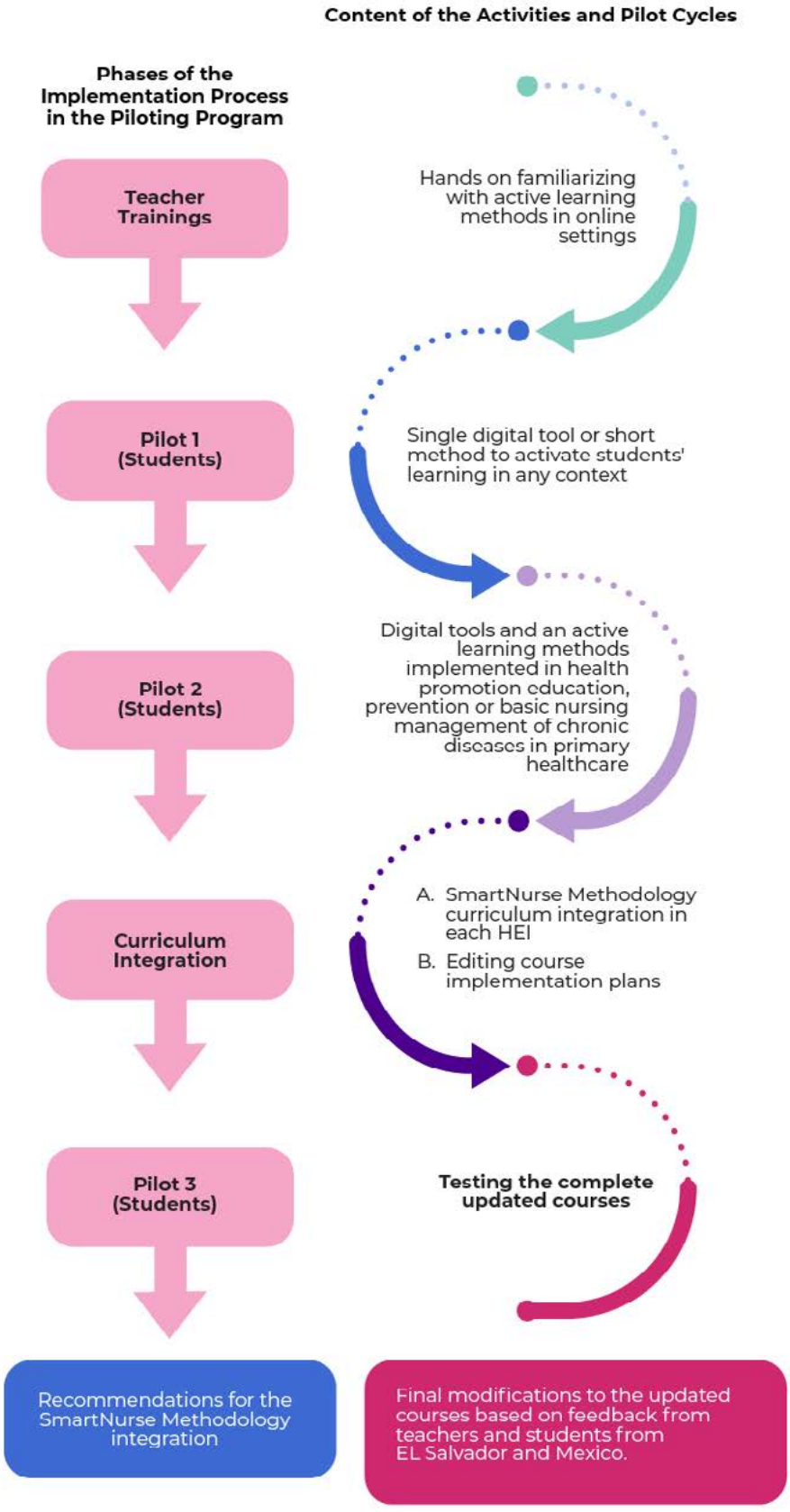

Figure 29. Implementation Process Through Pilots

The First Pilot

The first pilot was preceded by online Teacher Training sessions focusing on active learning methods, led by specialists from Tampere University of Applied Sciences. During these sessions, a variety of digital methods, tools, and applications were presented as examples for the participating teachers, including those from project members and other educators from Latin American partner HEIs..

> ***The pilots were designed to cultivate digital competencies among nursing teachers and students, while also integrating active learning methods.***

In the first pilot, the objective was to empower participating teachers by providing them with a selection of new digital tools or activities to trial in their classrooms, aiming to engage and motivate their students. A joint framework for the first pilot's implementation was planned. This inaugural pilot phase served as a flexible and accessible experiment for teachers to explore and integrate digital tools or applications, such as Kahoot, Padlet, and others, or to incorporate brief active learning exercises into any topic covered in their lessons.

The Second Pilot

To facilitate the second pilot, further Teacher Trainings on eight different active learning methods were conducted. Literature reviews were conducted alongside these training sessions to establish the theoretical basis for the SmartNurse Methodology (Read more in Chapter 2).

In the second pilot, teachers developed more comprehensive lesson plans and components for their classes using various active learning

methods and digital tools based on the jointly designed pilot framework. They selected active learning methods and digital tools suitable for subjects related to health promotion, disease prevention, or basic nursing management of non-communicable diseases in primary healthcare settings. Teachers collaborated and exchanged ideas to create pilot lesson plans, describing their chosen active learning methods and digital tools, and what they wanted to achieve by using the chosen method in their classes. Additionally, some Latin American partner HEIs organized internal training sessions on using specific digital tools for their colleagues. Pilots 1 and 2 provided students with access to the SmartNurse Methodology and enhanced the digital skills of both teachers and students.

The Third Pilot

The integration of the SmartNurse Methodology into the curricula and courses of selected subjects in each Latin American partner HEI occurred after the second pilot phase. In the third pilot phase, each participating institution selected at least two courses covering self-care for non-communicable diseases in primary healthcare settings. The aim of the third pilot was to test fully improved SmartNurse Methodology courses and integration. These curricula and courses incorporated various active learning methods, including Learning Café, Problem-Based Learning, Case-Based Collaborative Learning, Simulation, Drama Pedagogy, and Flipped Learning. Digital tools chosen to engage students in lectures included e.g. Pickers and Kahoot. Additionally, emphasis was placed on collaborative learning among nursing students, leading to the utilization of platforms such as Canva, Padlet, and other joint virtual learning platforms for gathering and sharing information during lessons. In these new teaching methods, video was used both for knowledge sharing in the form of recorded video lectures and to assess learning through various video learning platforms. Some universities also incorporated digital methods such as quizzes as part of their assessment.

After each pilot phase, participating teachers and students were asked to complete a feedback questionnaire to reflect on their experiences with the active didactic approaches and the integration of digital tools. On the basis of feedback, the curricula were fine-tuned and finalized.

Read more about the pilot experiences

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4.2 Structure and Experiences of Teacher Trainings

Tina Gogova, Marija Milavec Kapun, Hanne Mäki-Hakola, Jožica Čehovin Zajc and Nina Smolander

An important component of the SmartNurse project activities consisted of Teacher Trainings focusing on the use of digital tools in education, with an emphasis on active learning, conducted in partner Higher Education Institutions (HEIs) in El Salvador and Mexico. The objective of these Teacher Trainings was to empower participants to acquire comprehensive pedagogical and digital competencies through the utilization of various digital tools, applications, and contemporary pedagogical methods. Furthermore, as part of the SmartNurse project, the experiences of the Teacher Training participants were evaluated, allowing for the identification of their needs for further professional development. Both qualitative and quantitative data were collected from participants after each Teacher Training session. In this chapter, we explore the structure and content of the Teacher Trainings, as well as the feedback provided by participants.

The Teacher Trainings in the SmartNurse project were a fundamental part of the project's efforts to achieve the goal of enhancing the competence of Latin American nursing teachers in the use of active learning methods, emphasized through the utilization of various digital educational tools. These training sessions were open to consortium members and other teachers from partner universities. The training sessions were conducted both online and in-person, facilitated by experts from Tampere University of Applied Sciences (TAMK) between March 2021 and September 2022. The content for the Teacher Trainings was customized to address the specific needs and requests of consortium members from partner HEIs in El Salvador and Mexico. The structure of the training sessions mirrored the active learning methods being taught to provide participants with a personal experience of the method. The evaluation of the Teacher Trainings was conducted by the experts from University of Ljubljana (UL).

The topic selection for the Teacher Trainings (Figure 30) was carefully aligned with the project's objectives. These chosen topics, which also matched the participants' expressed needs, were crafted to provide a comprehensive understanding of innovative active learning methods.

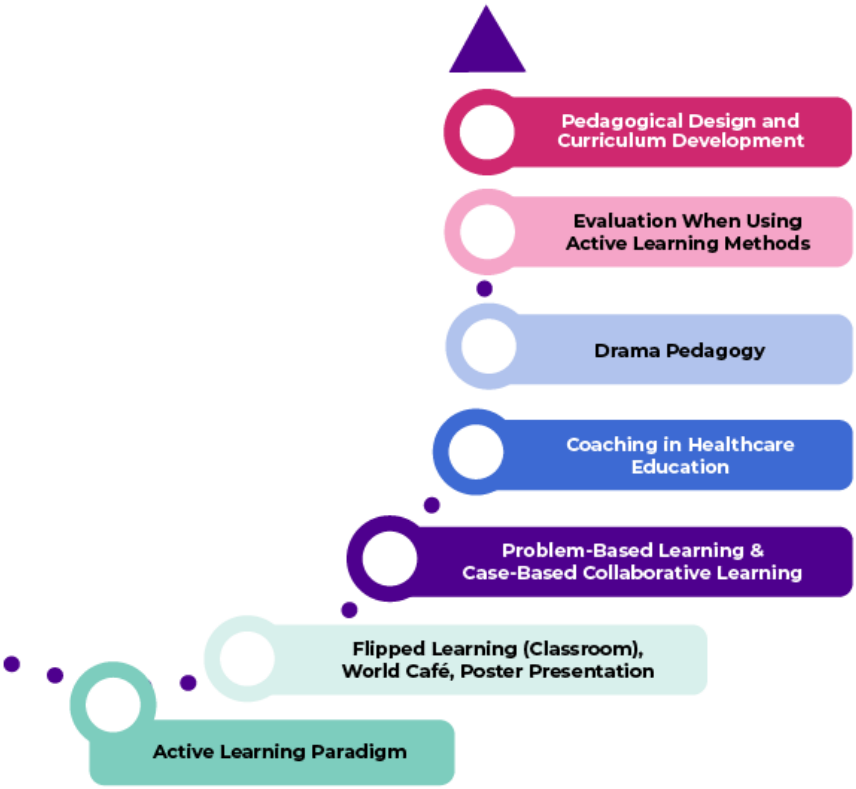


Figure 30. Topics of the Teacher Trainings

The Teacher Trainings, being a core educational activity for the teachers within the consortium and relevant local and regional stakeholders, received specific attention in terms of advertising (Picture 6). Prior to each training session, an advertisement was sent out to be distributed to all interested parties in the Latin American partner HEIs and beyond. This helped to increase visibility for the SmartNurse project and raise awareness of both the project activities and the Teacher Trainings.

Picture 6. Advertisement images for the Teacher Trainings
(Picture by Nina Smolander, 2022.)

A total of 11 online training sessions, 1 hybrid training session, and three face-to-face training sessions were conducted. The hybrid and in-person sessions were held during transnational meetings in Mexico and Finland. Online and hybrid sessions allowed for participation from a larger audience and aligned the project activities with the principles of the EU Green Deal (Erasmus+, n.d.a).

The Pedagogical Process in Teacher Trainings

The pedagogical process of the SmartNurse Teacher Trainings can be depicted and conceptualized as an umbrella (Figure 31). The initial step of the entire process was to explore the contemporary theories of learning and to understand what it entails to utilize active learning methods. Given that all the methods and practices utilized by teachers are based on their individual conceptions of learning, the objective was to offer each participant an opportunity to reflect on their understanding in light of researched theories and adjust their personal theory-in-use (Stewart, 2012, p. 3).

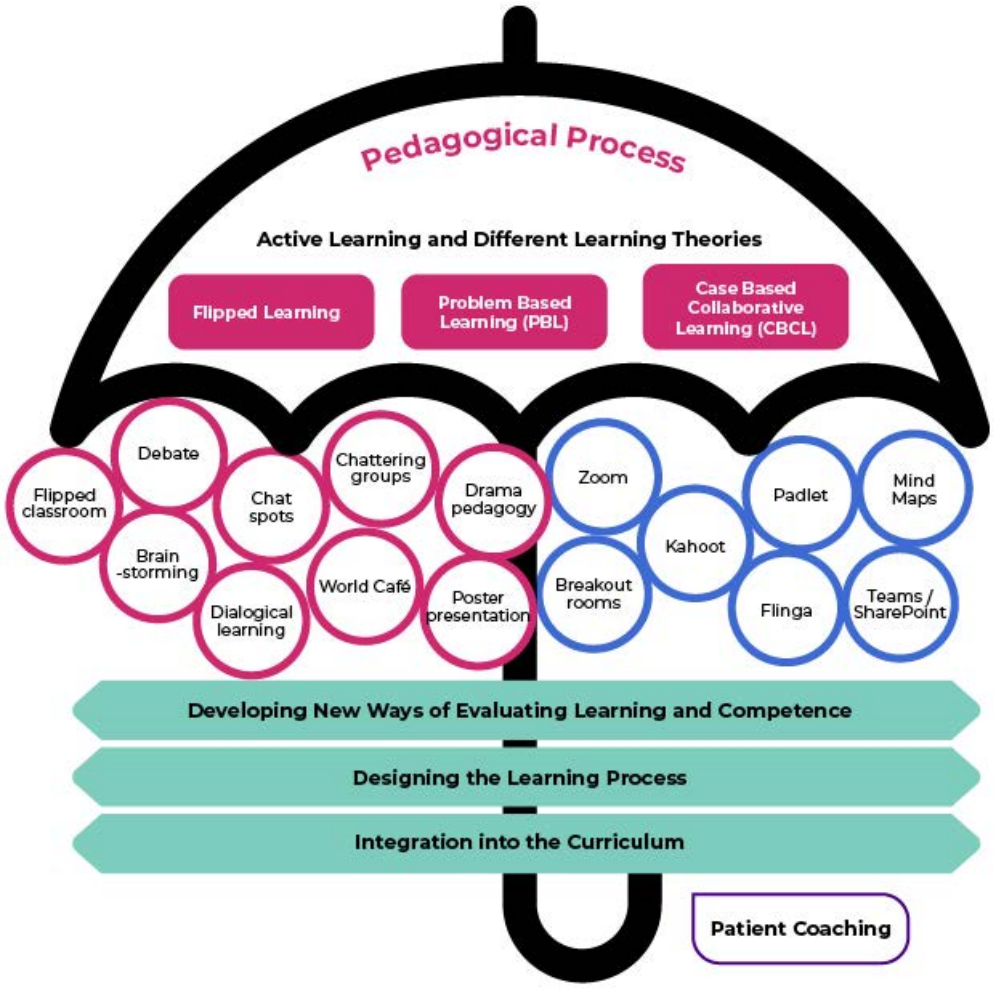
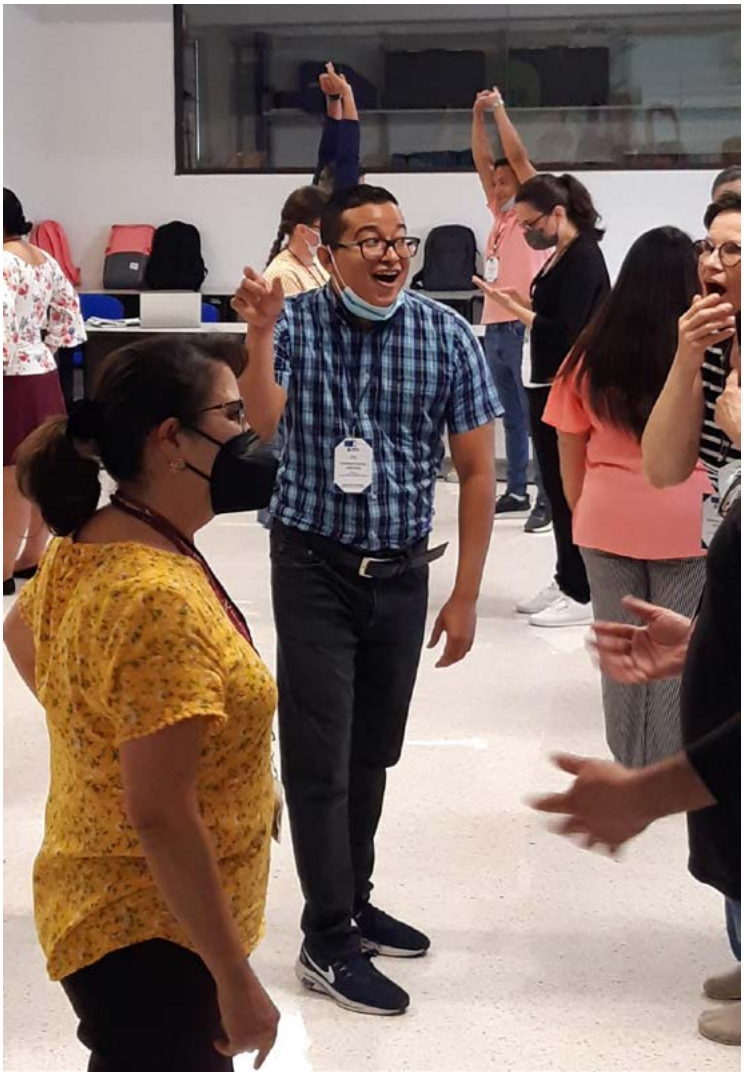


Figure 31. The Pedagogical Process and The Elements of the Teacher Trainings

When transitioning teaching practices to support students' active learning, pedagogical models can be invaluable. A pedagogical model refers to the way a teacher designs a course or organizes teaching and learning activities. The advantage of a pedagogical model lies in its provision of a structured approach and demonstration of how different methods can be applied throughout the process (Stewart, 2012, p. 3-20). These models consider how learning is understood, which is why they operate within the framework of learning theories and active learning.

In the Teacher Trainings, various pedagogical methods, digital educational tool, and applications were introduced and practiced during and between the training sessions. Not all of them were directly associated with specific pedagogical models, but the aim was to deepen teachers'

understanding of the diverse approaches that can be applied in educational settings. The principle of learning by doing was emphasized throughout the training process (Stewart, 2012, p. 3-4). Participants engaged in hands-on practice of pedagogical methods during training sessions. For example, they practiced drama pedagogy (Picture 7). In sessions focusing on Problem-Based Learning (Read more in Chapter 3.5), they formed small groups to simulate real-life classroom scenarios and participate in various phases of this learning method. By actively experiencing and experimenting with active pedagogical methods, individuals were able to reflect and evaluate their effectiveness for application in their own teaching practices and curriculum.



Picture 7. Members of the SmartNurse Consortium Practicing Drama Pedagogy (Picture taken by Nina Smolander, 2022)

In the SmartNurse project, cross-cutting themes that combined various methods, tools, and approaches to learning were also present. These themes are indicated by the arrows in the umbrella figure (Figure 31). As participants learned and trialed student-centered active methods, discussions arose about assessing and evaluating students' learning outcomes within the SmartNurse project partners. Therefore, during the Teacher Trainings, it was important to introduce different approaches to evaluating students' learning and acquired competence.

Integrating teaching with active learning methods that prioritize students' activities, experiences, and discussions fosters an environment where students can construct knowledge and enhance their professional capabilities. This, in turn, fosters competence through transformative learning (Peterson & Lundquist, 2021). It is also worth considering whether the active learning methods themselves produce evidence for evaluation, with or without a formal exam, but rather by trusting in the engagement and commitment of the students and activities requiring higher-order thinking, as well as structured pedagogical design (Shi et al., 2020).

Hence, a crucial aspect in supporting the pilots (Read more in Chapters 4.1, 4.3-4.7) was learning design. Throughout the pilots, teachers from Latin American partner HEIs required resources for both individual learning sessions and comprehensive coverage of entire courses. The primary objective was to aid them in integrating active learning methods and digital technologies into their existing nursing curriculum, while also helping them gain experience and confidence in transitioning from traditional lecture-based instruction to student-centered active learning.

> ***The primary objective was to aid teachers in integrating active learning methods and digital technologies into their existing nursing curriculum***

In the Teacher Trainings, the topic of nursing was included on the handle of the umbrella (Figure 31), facilitating the interaction of other content described in the umbrella with the content of the SmartNurse project. Patient coaching was introduced and tested as a method to be used both in the education of future nurses and by nursing professionals when working with patients with noncommunicable diseases.

Practical Solutions for Teacher Trainings

Teacher Trainings faced challenges with busy schedules, time zones, and language barriers, but were effectively managed based on feedback. Scheduling was initially challenging due to participants needing to fit sessions into workdays, worsened by the Europe-Latin America time difference. A compromise was made with early mornings for Latin American partners and late afternoons for European colleagues.

Another aspect was the SmartNurse consortium's proficiency in both English and Spanish, with acknowledged language barriers. Majority of participants were better at reading English than writing and listening, and over half lacked confidence in speaking it. Notably, there were slight national variations, with Mexicans rating their skills slightly higher than Salvadorans.

To overcome language barriers and ensure alignment with EU priorities and the Erasmus+ Program Guide (Erasmus+, n.d.b.), the training approach was adapted. Special focus was placed on planning and conducting sessions and materials. State-of-the-art digital solutions, including simultaneous online interpretation and translation programs for bilingual materials, were utilized. Moreover, project members accessed a shared online platform for material downloads.

> ***Digital solutions, including simultaneous online interpretation and translation programs for bilingual materials, were utilized in the Teacher Trainings.***

The training sessions, led by TAMK experts in English, were attended by participants from partner HEIs in El Salvador and Mexico, who benefited from online interpretations in Spanish. Participant questions were also interpreted online, with TAMK experts using interpretations from Spanish to English. Naturally, the need for non-native language communication and interpretations extended session durations beyond those conducted in a shared language.

Evaluation of Teacher Trainings

The evaluation of each training session was thorough, aiming to identify the areas of knowledge participants aimed to master. UL experts conducted the evaluation, collecting anonymous feedback through online surveys in both English and Spanish. Participants were provided with a survey link at the end of each session to ensure the continuity of evaluation. The survey included a structured questionnaire, both in English and Spanish, comprising a demographic section, the adapted Kirkpatrick model for quantitative evaluation of Teacher Trainings, and open-ended questions aimed at gathering participants' experiences, suggestions, and opinions regarding the training session.

The evaluation of the Teacher Trainings employed the Kirkpatrick model, a widely recognized framework for training assessment. Initially developed by Donald Kirkpatrick in the 1950s, the model was adapted in 2021. It comprises four hierarchical levels: Reaction, Learning, Behavior, and Results (Kirkpatrick, 1959; Kirkpatrick & Kirkpatrick, 2021). These levels are designed to comprehensively assess the impact of training interventions.

Four levels of the Kirkpatrick Model
(Kirkpatrick, 1959; Kirkpatrick & Kirkpatrick 2021):

The 1st level, Reaction, assesses participants' immediate response to the training, focusing on their perceptions of the training's quality, relevance, and engagement. It gauges whether learners find the training engaging, positive, favorable, and pertinent to their work. A crucial aspect is the emphasis on the learner's perspective rather than the trainer's.

The 2nd level, Learning, evaluates the extent to which participants have acquired new knowledge, skills, attitudes, confidence, and commitment. It measures the degree to which participants are actively engaged in the learning process.

The 3rd level, Behaviour/Impact, examines whether participants apply what they learned during training in their workplace. It measures the extent to which participants were able to apply their acquired knowledge, skills, attitudes, confidence, and commitment on the job because of the training.

The 4th level, Results, assesses the broader organizational outcomes resulting from the training, such as improved performance and increased productivity. It measures the extent to which the organization's desired outcomes are achieved because of the training. We assessed participants' self-reported usefulness of the knowledge they acquired and their empowerment to teach and conduct research.

Participants responded to feedback questionnaire statements measuring Reactions, Learning, Impact/Behaviour, and Results levels on a 5-point Likert scale (1 - strongly disagree, 5 - strongly agree) (Table 3).

Table 3. Statements for Teachers Trainings evaluation
(Kirkpatrick, 1959; Kirkpatrick & Kirkpatrick, 2021, modified)

Level of evaluation	Questions
Reaction	My expectations were met
	The provider organised the training well
	I am satisfied with the organisation within my institution
	I am satisfied with the content
Learning	I have understood the content
	I participated actively
	Participants were supported in their active role
Behaviour/impact	I will use the knowledge/skills in my work
	I could share gained knowledge/skills with my co-workers
	Gained knowledge/skills are applicable in my country
Result	I feel more empowered for changes in teaching/research
	I have gained useful knowledge/skills

While the Impact/Behaviour and Results levels would ideally be assessed through in-depth interviews conducted several months after the training, logistical constraints, and the need for anonymity of responses led us to integrate these levels into the online questionnaire. The statements were tailored to align with the unique context of the SmartNurse project. The resulting outcomes underwent preliminary analysis following each training session and were made accessible to the project team members via the joint collaborative platform. The reports generated from individual training sessions served as a crucial foundation for enhancing and enriching subsequent training sessions.

Participant responses to open-ended questions gathered their opinions on lessons learned and how they can apply the acquired knowledge in their teaching, what further knowledge they seek, and their suggestions for future training sessions. This facilitated an understanding of participants' personal reflections and their expectations nurtured during the immersive Teacher Trainings.

Participants in Teacher Trainings

Participants in the Teacher Trainings mainly worked in nursing and nursing-related fields e.g. education, research, health administration, and reproductive health. Additionally, the training sessions attracted participants with backgrounds in curriculum design, sexual law, technical English, computer science, information systems, and informatics, further enriching the interdisciplinary nature of the program activities.

Most participants held positions as teachers or researchers at the Latin American partner HEIs and had a work experience from early-career educators to matured experts in education. Also, administrative management personnel, and individuals specializing in international relations were in attendance.

Teacher Trainings Feedback Results

Participation in the Teacher Training sessions varied, and on average, 46 participants (range 29–54), predominantly females, attended the sessions. One person may have attended more than one Teacher Training. On average, 31 teachers (range 14–46) responded to the survey after each training session.

Participants in the SmartNurse Teacher Trainings from Latin American partner HEIs gave very positive feedback on the trainings. Responses from participants in the feedback survey are described in Table 4 according to a 5-point Likert scale. In the narrative text below, the Agree and Strongly Agree options in the survey have been combined. The presentation of the results unfolds in two sections. Firstly, the assessment encompassing all Teacher Trainings using the adapted Kirkpatrick Model is presented by its four levels (Table 4) and narratively by each theme. Subsequently, the second section describes qualitative results of the data organized thematically.

Table 4. Results of Evaluation of the Teacher Trainings based on the Kirkpatrick Model (N=311)

Level of evaluation	Questions	1 strongly disagree % (n)	2 disagree % (n)	3 neutral % (n)	4 agree % (n)	5 strongly agree % (n)
Reaction	My expectations were meet	4.2 (13)	1.9 (6)	4.2 (13)	16.5 (51)	73.2 (227)
	The provider organised the training well	4.5 (14)	2.3 (7)	3.9 (12)	11.9 (37)	77.4 (240)
	I am satisfied with the organisation within my institution	4.2 (13)	3.9 (12)	3.9 (12)	15.8 (49)	72.3 (225)
	I am satisfied with the content	5.5 (17)	1.3 (4)	2.9 (9)	13.3 (41)	77.0 (238)
Learning	I have understood the content	4.8 (15)	1.3 (4)	3.5 (11)	21.9 (68)	68.4 (212)
	I have gained useful knowledge/ skills	4.5 (14)	2.6 (8)	2.9 (9)	14.1 (44)	75.9 (236)
	I will use the knowledge /skills in my work	5.2 (16)	1.9 (6)	1.3 (4)	12.9 (40)	78.6 (243)
Behaviour/ impact	I could share gained knowledge /skills with my coworkers	4.5 (14)	2.9 (9)	2.9 (9)	14.5 (45)	75.2 (234)
	Gained knowledge/skills are applicable in my country	5.2 (16)	2.3 (7)	4.8 (15)	18.4 (57)	69.4 (215)
	I participated actively	4.8 (15)	6.5 (20)	12.6 (39)	22.3 (69)	53.9 (167)
Result	Participants were supported in their active role	4.5 (14)	3.9 (12)	3.5 (11)	17.4 (54)	70.6 (219)
	I feel more empowered for changes in teaching/research	4.2 (13)	3.6 (11)	5.5 (17)	21.0 (65)	65.7 (203)

1st Kirkpatrick level: Reaction

After the Teacher Trainings, 89 % (n=278) of respondents were content as their expectations were met. Furthermore, 89 % (n=277) of respondents acknowledged the impeccable organization of the training sessions and most of the respondents (90.3 %, n=279) were satisfied with the content disseminated during the Teacher Trainings.

Contentment with the organizational aspects within their own institutions was expressed by 88.1 % (n=274) of respondents. Collectively, these findings underscore a remarkable level of satisfaction among respondents, signifying their endorsement of the training‘s quality,

organization, and content. Thus, at the level of Reactions, it is evident that most respondents found gratification in their expectations being met, the internal organization of their institutions, the professionalism of the training providers, and the excellence of the training content.

2nd Kirkpatrick level: Learning

The majority of the respondents (90.3 %, n=280) indicated their understanding of the content delivered during the Teacher Trainings. While there was a relatively lower self-evaluated level of active participation due to other institutional obligations and the duration of sessions, 76.1 % (n=236) of respondents indicated that they were actively engaged despite these obstacles and language barriers. The support provided to participants in their active roles was acknowledged by 88.1 % (n=273) of respondents.

At the Learning level, three-quarters of respondents not only comprehended the training content but also substantiated their active involvement in the teacher training sessions. This outcome is good considering the various barriers and indicates an effective execution of the Teacher Trainings.

3rd Kirkpatrick level: Behaviour/Impact

The impact of the Teacher Trainings extended beyond the sessions. A majority 91.6 % (n=283) of respondents expressed their intention to apply the knowledge and skills gained from the training sessions into their work. Furthermore, the majority (89.7 %, n= 279) reported feeling confident in sharing acquired knowledge and skills with their colleagues at their respective HEIs, suggesting a potential ripple effect that may positively influence not only participants but also their co-workers, as well as other teachers regionally and nationally. The applicability of the acquired knowledge and skills in El Salvador and Mexico was affirmed by 86 % (n=272) of respondents, indicating its tan-

gible applicability. Thus, on the level of behaviour/impact, the transfer of gained knowledge beyond participants may be expected.

4th Kirkpatrick level: Results

After the Teacher Trainings 86.7 % (n=268) of the respondents reported feeling more empowered for both teaching and research because of the training sessions. Majority of respondents (90 %, n=280) considered Teacher Trainings beneficial for gaining practical and valuable knowledge and skills further highlighting the positive outcomes of the trainings.

Overall, the Teacher Trainings conducted at the beginning of SmartNurse project achieved notable success across all levels of Kirkpatrick's evaluation framework, indicating their effectiveness in meeting participant needs and yielding impactful results across local, regional, and national educational community.

Results of the Open-Ended Questions

The results from the open-ended questions mirrored the positive outcomes observed in the questionnaire. Upon analysis, two themes emerged: Acquired Knowledge and Desire for Further Learning. The training sessions garnered praise for their quality and shared knowledge on active learning methods that was perceived innovative, offering participants a unique opportunity to share their experiences on both at national and international level. Many respondents described putting enthusiastically the acquired new knowledge on pedagogical methods and digital tools and applications in use in their teaching practices, extending their application beyond the scope of the project pilots.

Acquired Knowledge

Respondents indicated that the Teacher Trainings had taught them about student-centred learning, active learning methods and digital tools utilized in the classroom as well as new learning opportunities where the active role of the students and new ways of engaging with students are fundamental.

> *"The more individualized work, more focused on the student in their training of skills, include activities that allow them to gain individual experiences or with small groups to have a more personalized experience."*

They learned how to promote collaborative learning and analytical, critical thinking among students. They learned how to use active learning methods such as CBCL, the Learning Café and Flipped Classroom (Read more in Chapter 3.5) in their teaching and gained new insights into how to engage and empower students by changing the teacher's role from teaching to guiding students. Several respondents indicated how they had learnt new ways of integrating technology into the curriculum (Read More in Chapter 3.6).

> *"I learned different ways of working distance learning with the use of technologies. When we met in groups, I was able to reflect on the different forms as in other educational institutions active learning is implemented with the use of digital tools. Then I was able to analyse questions that each team asked in the Flinga. For example: How to integrate the use of technology with practical learning? I can apply all of this in my workplace, from the way the course was conducted to the different forms that we share of active teaching and ICTs. It seemed like an excellent space for reflection."*

The respondents acquired knowledge on conducting classroom assessments as different evaluation methods (active/group/dialogue) were included in the training sessions. This provided participants

means to turn traditional, formal evaluation into meaningful learning experiences using virtuality and types of exams were presented. Towards the end of the training sessions respondents gained new knowledge on designing the learning process, programme development, planning a course as a flexible process, focusing on learning from the student's perspective and different degrees of freedom in implementing learning pathways in Latin American partner HEIs..

During the Teacher Trainings participating teachers started to think how to motivate students to participate more, how to observe for instance their work and skills acquisition. In doing so, students and their needs are taken into consideration, which indirectly determines the need to change of the teacher's work process.

> *"The most valuable thing I learned today is that the role of the professor can be modified and model to integrate skills as a mentor, facilitator, and the professor. As well, not all students want to become active learners, so we have to be patient about it."*

The respondents found the content of the training sessions relevant to their work, considering the benefits of using active learning methods, and digital tools, as well as stating their intention to transfer the acquired knowledge to their teaching their classrooms.

> *"I can apply all this knowledge from teaching strategies and technological tools to greatly improve my performance as a teacher and of course this is for the benefit of the nursing student."*

Respondents reflected that the SmartNurse Methodology which integrate active learning approach and digital technologies is useful and can be incorporated into their nursing curriculum. They were very satisfied that they had the opportunity to take an active part in the acquisition of new knowledge and that they were working in a practical way.

"What I liked the most was that they have applied the flipped classroom methodology in this training which allowed me to experience it in real-life session."

The impact of the knowledge gained was in two fundamental areas: in the learning process and understanding of the new role of both teachers and students. The acquired knowledge may positively affect the relationship between teachers and students, which will be interesting to follow up after the project period.

Desire for New Knowledge

After each Teacher Training session, the participants were invited to share what they preferred to learn in the future sessions. Based on their input, further training sessions were tailored for their needs when consistent with project objectives. Participants made many suggestions for the oncoming trainings (Figure 32) and by each training session their interest in additional topics and areas enhanced.

The Teacher Training respondents wanted to gain in-depth knowledge of the areas already presented and to try out the provided techniques in their teaching practice. Additionally, they wanted to know more about the use of digital tools, especially gamification in higher education. They also repeatedly indicated their desire to learn more about implementing the tools and knowledge to their working environment when teaching nursing students. The enquiries related to possibilities to use the information in training sessions in their nursing education environments came up many times.

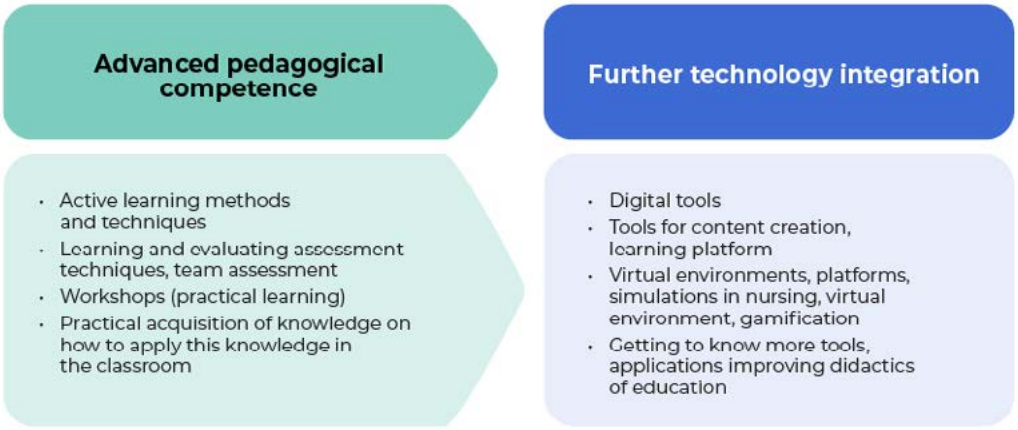


Figure 32. Teachers' Suggestion of Topics for Future Teacher Trainings

In summary, the Teacher Trainings have provided participants with new knowledge in various active pedagogical methods emphasized with the use of technology and modern student-centric approaches, which is very useful in their daily practice in the field of nursing education, with the aim of promoting the development of the various skills of the students that are essential for the work of a nurse.

Discussion

The evaluation of Teacher Trainings, based on the Kirkpatrick model and participants' feedback, revealed several key findings. At the Reaction level, participants expressed satisfaction with training quality, relevance, and engagement. Despite language and cultural barriers, participants actively engaged with the content at the Learning level, demonstrating their understanding and participation. Despite challenges, including existing obligations and session duration, participants remained actively involved, highlighting the effectiveness of the training sessions at the Behaviour/Impact level. The year-long duration of the trainings emphasized the project's long-term goals and the gradual acquisition of knowledge and skills. Finally, at the Results level, participants demonstrated an intent to apply their newly

acquired knowledge and skills, contributing to the broader impact of the SmartNurse project through knowledge sharing and application in their work contexts.

The SmartNurse Teacher Trainings had a profound impact, empowering participants from partner HEIs in Mexico and El Salvador for enhanced teaching and research roles. Feedback indicated satisfaction with organization and content, highlighting the transformative outcomes of the trainings. Participants gained valuable knowledge and felt empowered to enact change in teaching and research within their fields, while also seeing possibilities for integrating the SmartNurse Methodology into their nursing curricula after the Teacher Trainings.

This transformative experience has challenged the traditional teaching paradigm, ushering in a new era of student-centered, active learning approaches. The shift to innovative teaching methodologies has broadened participants' horizons and empowered them to create engaging digital learning environments, influencing the landscape of nursing education and practice.

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4.3 Experiences in University of El Salvador (UES)

Jorge Henríquez Rodríguez, Juan Luna Gómez and Mayra Henríquez de Cortez

The SmartNurse project included various training sessions for teachers in Latin American partner Higher Education Institutions (HEIs), offering opportunities to test and gain experiences in utilizing active learning methods. The University of El Salvador piloted active learning methods in their existing courses with third and fourth-year nursing students. In this chapter, we share their experiences with the creative adaptation of Problem-Based Learning in the Bachelor's Degree Programme in Nursing.

The curriculum for the Bachelor's Degree in Nursing (LE) at the University of El Salvador (UES) comprises ten modules and two research courses. Modules V and VI are designated for the third year, while Modules VII and VIII are designated for the fourth year. These modules focus on holistic nursing studies, exploring individuals, families, and communities as bio-psycho-social entities. Various aspects are addressed, including illness, life cycle-specific situations, and social roles.

To implement Problem-Based Learning (PBL) as part of the SmartNurse pilot, two subjects were chosen: nursing intervention in adult patients with psychopathological problems (third-year students) and nursing intervention in children aged zero to twelve (fourth-year students). The instructional materials for the psychopathology component included videos and cases related to nursing clinical guidelines, pharmacological management, and protocols for mechanical containment and electroconvulsive therapy. The pediatrics component involved videos on child growth and development, vaccination, and immunization guidelines for children under ten years. The PBL method was applied to 125 students with the guidance of six teachers.

The theoretical component was delivered through both asynchronous and synchronous virtual formats. Preparations for the PBL method (Read more in Chapter 3.5) included teaching preparation, material development for Tutorial 1 and Tutorial 2, and an explanation of the technique to students. Groups were formed, and roles (leader, secretary, and observer) were assigned by the students. The teacher also provided guidelines for the final report.

> ***The preparations for the Problem-Based Learning method included teaching preparation, the development of materials for Tutorial 1 and Tutorial 2, and the explanation of the technique to students.***

Five groups of four students underwent three rotations, resulting in 20 students per rotation for each module. In Tutorial 1, focusing on the psychopathology component, each group received a question related to real clinical practice situations based on videos and/or cases from guidelines regarding the correct application of psychotropic drugs, nursing principles, and adherence to the protocol for mechanical containment or electroconvulsive therapy.

For the pediatrics component, questions centered around the vaccination and immunization program for children aged 0-12 years, aiming to help students identify missing vaccines and justify their answers. Following a 20-minute discussion, students engaged in a brainstorming session to select and agree upon ideas, with the teacher assessing and redirecting as necessary.

The subsequent phase involved students initiating a review of relevant literature, lasting a week with two follow-ups. In this technique, the teacher played a crucial role in guiding students to focus on the

chosen question, preventing the introduction of new questions. Additionally, the teacher ensured that the quality of the collected data was based on the literature.

> ***After a 20-minute discussion, students conducted a brainstorming session, selecting and agreeing upon ideas.***

For Tutorial 2, the teacher organized a day dedicated to group presentations, discussions, and reflection on problem-solving. This tutorial involved a change of roles within working groups, where each group was allotted 20 minutes to present their reports. At the end of the session, the observer provided comments on data synthesis and problem resolution. To facilitate evaluation, students uploaded their syntheses on the UES platform, as this activity was meant to be assessed.

The preceding phases allowed students to grasp a theoretical and practical methodological process, applying various techniques to address issues such as identifying shortcomings in health programs, adhering to guidelines or regulations like vaccination schedules, healthy child control, family planning, and the national tuberculosis control strategy.

The students' experience was encouraging as they found the method to be motivating, fostering exploration, promoting student growth, comprehensive reading, and analysis of situations. It involved the synthesis of knowledge learned in different modules and allowed for improvement through interaction with peers.

> ***The PBL method motivated exploration, promoted student growth, comprehensive reading and analysis of situations.***

The challenge of implementing Project-Based Learning (PBL) lay in the requirement for the teacher to allocate more time than usual. This involved increasing the number of classroom hours and independent work dedicated to the subject to accommodate group discussions, consultations, and the presentation of group information. For students, the primary challenge was to construct a scenario that would enhance their understanding and execution of the protocol or guideline, and enabling them to identify areas for improvement or completion in their work.

Picture 8. UES Team Members Working Together
(Picture taken by Nina Smolander, 2022)

In conclusion, we recommend teacher guidance in the implementation of Project-Based Learning to assist students in problem identification. It is crucial for teachers to guide students towards finding answers independently. Group assessments played a pivotal role in

facilitating the application of PBL, allowing for pre-, trans-, and post-assessment of the technique. Overall, PBL successfully instilled specific competencies for each subject, integrating theory and practice in the health-illness process. This approach empowered nursing students to discern strengths and weaknesses in various healthcare scenarios.

4.4 Experiences in University Gerardo Barrios (UGB)

Laura Chavarría de Cocar, Brenda Gutiérrez de Medina, Marvin Montoya Amaya, Claudia González Quintanilla, Salvador Ernesto Manzanares and Sandra Martínez de Díaz

When developing the SmartNurse Methodology, the competence of teachers in Latin Amarican partner Higher Education Institutions (HEIs)was increased by training them to use various active learning methods. Gerardo Barrios University piloted active learning methods in their existing courses, gaining firsthand experience in teaching with active methods. In this chapter, we share their experiences after testing the Simulation method.

Simulation is an active learning method that utilizes realistic scenarios to replicate clinical situations, providing nursing students with a secure and controlled environment to hone their clinical skills (Koukourikos et al., 2021). This involves the accurate recreation of a nursing care environment using mannequins or actors as patients, digital instrumentation, and other essential resources to simulate clinical situations (Read more in Chapter 3.5).

At the University Gerardo Barrios, simulation was implemented in the context of the course 'Nursing Care for Teenagers and Adults I.' It was utilized to teach content related to non-communicable diseases such as diabetes, hypertension, and chronic kidney disease. Detailed descriptions within each pathology covered key aspects such as definition, etiology, signs and symptoms, diagnostic methods, treatment options, and necessary nursing care. The choice of simulation was based on the fundamental benefits it brings to nursing practice, including improving technical skills, timely and effective decision-making, and immediate feedback to assess acquired knowledge.

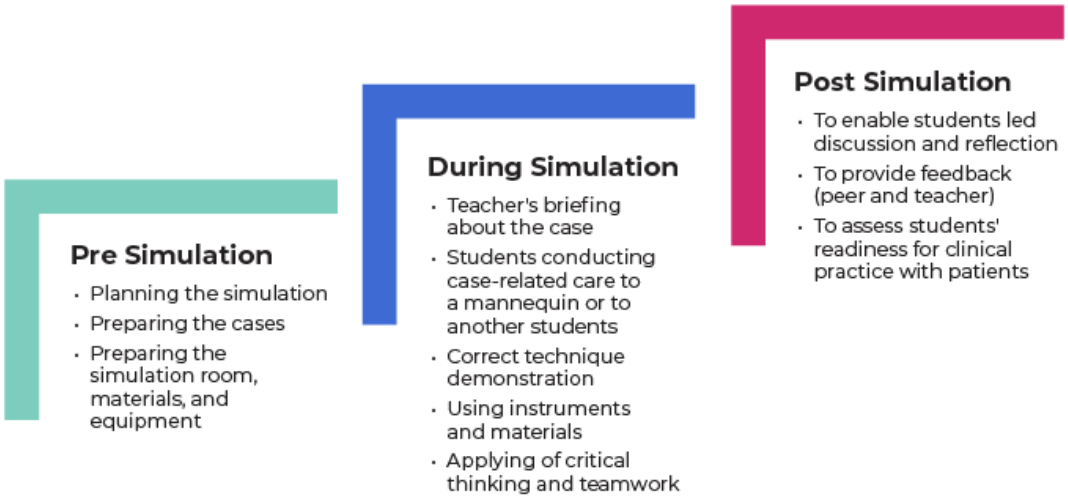

Figure 33. Activities During Different Phases of Simulation in UGB

Prior to the simulation, 59 students had studied theoretical concepts within the course, acquiring fundamental competencies related to the comprehensive care of individuals at various stages of development suffering from non-communicable diseases. The teachers developed the didactic planning for the simulation by creating three scenarios involving patients diagnosed with hypertension, diabetes mellitus, and renal insufficiency, immersing students in situations that mimicked daily life. Necessary preparations were made, including adapting the laboratory rooms and arranging the materials and equipment required.

> ***The teachers developed the didactic planning for the simulation, creating three scenarios with patients***

In the Fundamentals of Nursing simulation laboratory, teachers provided instructions to students on the correct techniques for measuring blood pressure, glucose levels, and oxygenation using digital materials and instruments. Demonstrations of the procedures were also given. Subsequently, students practiced these procedures initially on adult mannequins and later performed them on each other. In a student-to-student simulation, one student played the role of the nurse, while another assumed the role of the patient, after which they would switch roles. The instructor utilized a checklist to assess the correct execution of each step of the procedure.

> ***One student would play the role of the nurse, and another would be the patient, then they would switch roles***

Following the simulation, valuable feedback was provided, significantly enhancing students' education through the use of a checklist. Those students who did not complete all the steps properly were given the opportunity to repeat the procedure, while those who succeeded were allowed to proceed to real patient practice. Furthermore, students were encouraged to reflect on and discuss what worked well, identify areas for improvement, and draw lessons learned from the simulation.

> ***Students reflect and discuss what worked well, identify areas for improvement, and draw lessons learned from the simulation.***

After completing the simulations, students transitioned to clinical practice, applying the techniques learned in the simulation laboratories to adults suffering from non-communicable diseases. In addition, students utilized virtual platforms and gamification to provide feedback to patients. These practical experiences took place at the Santa

Elena and Miraflores Community Family Health Units, involving two teachers, 59 students, 114 adults, and various health, education, and community leaders.

As nursing professors, we were pleased with the simulation's development, as it provided an excellent opportunity for an active approach with students, fostering the construction of their own learning. This allowed them to share clinical situations with their peers that they may encounter in their future practice.

> ***Students provided feedback to patients using virtual platforms and gamification***

We recommend offering immediate and constructive feedback to students during simulation sessions. This practice has proven valuable in identifying areas for improvement and promoting critical thinking. Additionally, we emphasize the importance of students rotating between different roles, experiencing both the patient and student perspectives. This rotation not only enhances their understanding of various roles but also fosters the development of empathy.

4.5 Experiences in the Specialized Institute of Higher Education for Health Professionals of El Salvador (IEPROES)

Karen Sanchez

The SmartNurse Methodology was tested in all Latin American partner institutions, enhancing the competence of teachers in partner institutions by enabling them to experience teaching with active learning methods themselves. At the Specialized Institute of Higher Education for Health Professionals of El Salvador, Case-Based Collaborative Learning method was trialed in an innovative way. In this chapter, we share their experiences with the method.

Case-based Collaborative Learning (CBCL) is an active method of teaching and learning (Read more in Chapter 3.5), where its process involves narrating, constructing, and disseminating structured cases of various health problems among students. The Specialized Institute of Higher Education for Health Professionals of El Salvador (IEPROES) chose this method to achieve significant learning outcomes among nursing students, focusing on practicing critical thinking, leadership, and teamwork (Sartania et al., 2022).

CBCL was implemented with bachelor's degree nursing students in the course Nursing in Community Health II (year 3, semester VI) at IEPROES as part of SmartNurse pilot three. At the beginning of the academic semester, a general didactic planning of the course was prepared, incorporating the CBCL method into the scheduling of lecture plans according to the topics to be covered.

> ***CBCL was applied to achieve significant learning outcomes among nursing students, focusing on practicing critical thinking, leadership, and teamwork.***

During the development of the lectures, students were informed about the use of this innovative learning method. The CBCL method was applied to the topic "Vaccination schedule for children under 5 years of age in El Salvador, according to the Ministry of Health," providing detailed information about the vaccines administered in the country. This included the components of each vaccine, the diseases they prevent, the recommended ages for administration, the anatomical site, the route of administration, the syringe size, and potential adverse effects after each vaccine's application. This information was presented in a classroom session using the Genially program (Genially, n.d.), providing students with the theoretical basis of the topic.

Building upon the provided theory, students utilized the digital tools Canva and Genially (Canva, n.d., Genially, n.d.) to develop a gamified version of the national vaccination schedule. Students were drawn to this technology because interactive icons allowed them to navigate forward or backward through the content, facilitating feedback and enhancing comprehension.

> ***The nursing students developed a gamified version of the national vaccination schedule.***

Ten realistic cases were constructed based on the experiences that teachers have encountered in various community health units. Eight work teams, each consisting of five members, were formed. These teams engaged in discussions regarding the approach to each case, identification of the stakeholders involved, brainstorming potential causes, and effective clinical management strategies tailored to each scenario. Each team was tasked with analyzing the ten presented cases and proposing solutions aligned with the explained theory and respective intervention criteria.

> ***Each team thoroughly analyzed the presented cases and proposed solutions that were in alignment with the theoretical framework provided.***

During the CBCL process, it was observed that students within their teams participated with dynamism, creativity, and a spirit of cooperation, sharing their ideas, and exposing each member's point of view along with potential solutions. As a result, students engaged more actively in the activity, feeling empowered to make mistakes and later listen to and consider feedback. Furthermore, their ability to analyze detailed cases was evident. However, some students encountered difficulties and showed resistance to the implementation of the method, expressing that the content is inherently challenging to learn due to the complexity of the subject, even during the presentation and discussion of the theory.

> ***Students engaged more actively in the activity, feeling empowered to make mistakes and later listen to and consider feedback.***

From the teacher's perspective, it was evident that students sought possible solutions through discussions within their teams. A rubric was utilized as an evaluation method to assess each student's understanding of the topic and their competence achievement. It was observed that the CBCL method was effective in the teaching and learning process, particularly in fostering the appropriate management of the vaccination schedule according to the child's age within the posed problem.

In fact, the students demonstrated self-confidence in selecting the vaccines to be administered, providing advice to the person responsible for the child based on their knowledge acquired during the theoretical classes. Furthermore, by implementing this method, students were encouraged to seek and utilize additional digital tools to enhance their learning of both theory and practice. As a result, each student submitted a dossier containing a step-by-step description of the entire activity's development and their personal perspective on the assimilation of the content. Moreover, when the students were in clinical practice, they demonstrated confidence in the knowledge they had acquired, and this self-assurance allowed the patient to trust the procedures they were performing.

As a teacher, creating a gamified approach to facilitate understanding of the topic was a challenge, requiring the integration of the most relevant information. Based on our experience, we recommend that teachers utilize this method, ensuring clarity in the elaboration of cases, as it allows for diverse perspectives on problem resolution, which future professionals will apply. Consequently, teachers must be prepared for the variety of solutions that students may offer. With the use of the Genially program, anyone with access to the link will have the opportunity to see all updates made to the content.

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4.6 Experiences at the Autonomous University of San Luis Potosí (UASLP)

María Leticia Venegas Cepeda, Edgardo Garcia Rosas, Claudia González Acevedo, Leticia Villarruel Hernández, Aracely Díaz Oviedo Aracely and Erika Torres Hernández

The fundamental component of the SmartNurse Methodology is the utilization of active learning methods. This necessitates nursing teachers to acquire new knowledge and skills if active methods are relatively novel to them. In this project, we provided nursing teachers with opportunities to pilot selected active learning methods. At the Autonomous University of San Luis Potosí in Mexico, teachers piloted Flipped Learning. In this chapter, an educational experience during the SmartNurse pilot, of the implementation of the Flipped Classroom learning method is described.

The nursing degree program at the Faculty of Nursing and Nutrition of the Autonomous University of San Luis Potosí (UASLP) includes a subject on Fundamentals of Nursing in the second year. The purpose of this course is to further develop students' critical thinking skills for decision-making in nursing care. To achieve this objective, it is necessary to consider the incorporation of the most appropriate pedagogical strategies.

The Flipped Classroom method (Read more in Chapter 3.5) was chosen because it allows students to have a preliminary approach to knowledge individually, with complete freedom to organize their time. Thus, during face-to-face sessions, problems can be solved, doubts clarified, and application in clinical practice observed (Ke et al., 2023). This approach makes the content more engaging for students and enhances social skills, contributing to a more enriching academic experience (Prieto Martín et al., 2019).

> *The flipped classroom method allows students to have a preliminary approach to knowledge individually.*

The topic in which the Flipped Classroom was implemented was nursing care for patients with pain. The objective was for students to identify different treatments for pain, both as a nursing diagnosis and as an interdependent problem. The planning took into consideration the importance of presenting various perspectives on pain treatment, including Western medicine and alternative medicine. The process consisted of three key stages, as summarized in Figure 34.

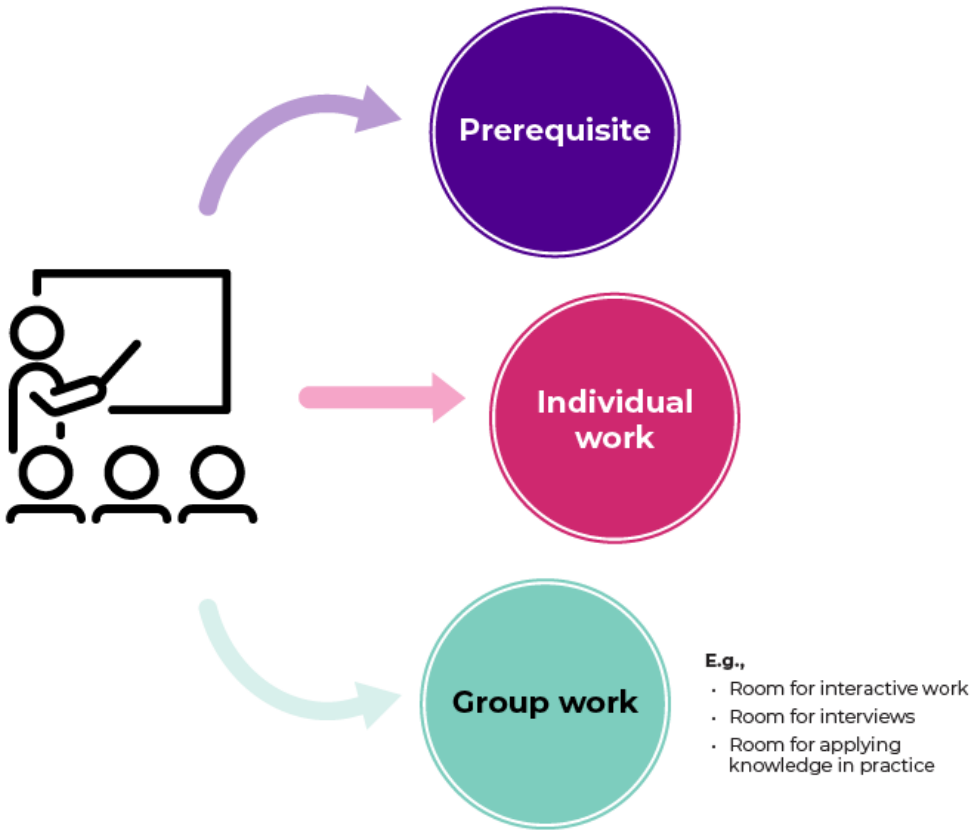

Figure 34. Phases of Planning the Flipped Classroom for the Topic of Pain

The teacher prepared review material for the students, which consisted of two videos selected from the Biomedical Library of the University. One video was 19 minutes long, while the other was 17 minutes long. The professor formulated five questions to guide students' reflections while watching the videos. Students were given a four-day timeframe to complete the pre-task with flexibility. They engaged with the videos to gain knowledge on the subject, preparing them to apply it during group discussions in class. Additionally, they were instructed to formulate three questions related to nursing care for this type of patient, addressing areas they wanted further clarification on or wished to explore in more depth during the video review. Completion of the pre-task was mandatory for all students before participating in the group activity.

> ***Five questions were provided to the students to give them a specific focus for reflection while watching the video.***

To enable more effective facilitation by the teacher, it was decided to divide the group of 30 students into teams of ten people each. This required the teacher to arrange three small classrooms, providing space for each group separately. Each subgroup rotated through each room for a period of one hour, during which one student from each subgroup was selected to serve as a timekeeper, notifying when the hour was up. Based on this experience, it is recommended to allocate sufficient time in each room, particularly in the room dedicated to applying knowledge.

One of the rooms served as an interactive space where students engaged in autonomous work with interactive exercises prepared by the teacher. They utilized tools such as Wordwall and Educaplay, which allowed them to reinforce their understanding of the information presented in the videos, including self-correcting exercises.

Another room served as an interview space, where the teacher organized an activity inviting a nursing graduate specializing in critical care and expert in nursing care and pain management. In this room, each student had the opportunity to ask questions to gain further clarification and delve deeper into the subject matter. It is important to note that the selection of the guest should be based on the students' learning needs regarding the topic.

> ***Each student had the opportunity to ask questions to gain further clarification and delve deeper into the subject matter.***

The third room served as a space for applying knowledge. In this area, students were paired up and tasked with constructing a care plan based on the diagnostic label of acute pain. They selected a related factor and defining characteristics, and under the guidance of the teacher, constructed the plan with a scientific basis. The time was divided into two phases: 30 minutes for elaborating the care plan and 30 minutes for socializing and reflecting with their peers.

The final phase of this process involved a reflective closure, during which the teacher listened to the students' perceptions regarding the educational experience and the learning process. This allowed students to provide feedback that could improve the activity and inform future redesigns. At the conclusion of the activity, students remarked that it was dynamic and interactive. The method proved highly relevant for achieving the objectives outlined in the lesson plan.

> ***The Flipped Classroom method proved to be highly relevant for achieving the objectives outlined in the lesson plan.***

For the teacher, this activity requires a significant amount of planning time. It involves establishing an academic relationship with the students that fosters effective communication, allowing them to confidently express their learning needs and suggest adjustments to the didactic planning schedule. Additionally, the teacher needs to make the necessary arrangements to secure physical infrastructure, such as classrooms, as well as prepare essential materials like videos, exercises, and digital tools required to implement the educational strategy. It is also important to ensure the timely invitation of guest speakers. Despite these demands, engaging in such academic activities brings satisfaction to the teacher, as they witness the educational process unfold and observe the achievements students attain within the framework of disciplinary and cross-cutting competencies.

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4.7 Experiences at the Autonomous University of Aguascalientes (UAA)

Mariely Acosta Álvarez, Nery Guerrero Mojica, Silvia Patricia González, Lizeth Solano Romo and Carlos Arévalo Mercado

The cornerstone of the SmartNurse Methodology lies in the adoption of active learning methods. This requires nursing educators to acquire new knowledge and skills if these active methods are relatively new to them. In this project, we offered nursing educators the opportunity to test selected active learning methods. At the Autonomous University of Aguascalientes in Mexico, educators piloted the World Café approach. This chapter delves into the experiences during the SmartNurse pilot, focusing on the implementation of the Learning Café.

The World Café method was applied during the SmartNurse pilot to 42 students in the Occupational Health Nursing subject taught in the seventh semester of the Nursing degree program at the Autonomous University of Aguascalientes (UAA). The objective was to present elements that would enable students to promote health in the workplace, as well as to forecast work-related risks through the Nursing Process and self-care, with ethical sensitivity and responsibility.

Before implementing the World Café method, the teacher tasked students with investigating the main causes of accidents, morbidity, and mortality related to work at international, national, and state levels. Additionally, to create a comfortable atmosphere, all participants were asked to bring their thermos with coffee or tea to enjoy during the activity.

The group was randomly divided into seven teams, with each team selecting a member to act as a host. Each host visited the tables of other teams, allowing members to share information they knew about the given topics for 10 minutes. The teacher provided questions and cases,

including: What are the main causes of death in workers? What causes disability in workers? What is the importance of Nursing in occupational health? How can we prevent diseases and deaths in workers? Would you like to work as a nurse in this area? To keep track of time, a cellphone with alarms was used, prompting hosts to move to the next team in a clockwise order upon hearing the alarm.

After collecting information from all groups, hosts organized and shared it in a plenary session with the entire group. Each host presented a question or case, along with the collected information. If any host had additional information, it was added.

Students expressed that they were able to collaboratively build knowledge quickly and effectively. They showed great interest and participation during the activity, achieving the objectives established in the subject's program regarding the reviewed topic. The activity fostered a comfortable, relaxed, and informal atmosphere, with participants enjoying their coffee and tea.

This method was chosen because theoretical information required prior research by students. The World Café helped to immerse them in the subject and begin mastering information. It aimed to facilitate fun, dynamic, and attractive learning, which this method offers. Additionally, on a cold day, consuming a hot drink in the classroom changed the atmosphere, making students happier, more participatory, and facilitating learning almost unconsciously.

As a recommendation, to carry out this activity, the teacher must ensure that the method aligns with the content to be addressed. It is necessary to have a good understanding of the subject and to prepare the cases or questions accordingly, whether by printing them or sharing them in digital format based on the number of hosts. Additionally, it is essential to choose a space that facilitates the formation and rotation of teams, preferably comfortable, well-lit, and climate-controlled. The questions or cases should be specific and concrete to prevent

students from losing track of the information requested at each point. Clear instructions should be provided, and the teacher should confirm understanding before starting. During the group plenary session, the teacher should plan where all the synthesized information will be captured, whether on an electronic whiteboard, bond sheets, projected Word document on the classroom screen, or through individual note-taking by students. It is crucial that everyone receives the same information, verified from a reliable source.

We believe that the activity was executed successfully, thanks to the prior trials and training undergone by the teacher within the SmartNurse consortium. Planning and preparing the material, envisioning how it could be conducted, and understanding the subject matter are fundamental for validating information and sources and focusing the content. The plenary session also allows the teacher to correct, reinforce, or even reevaluate the information. The end-of-session plenaries for information sharing can take various forms, such as individual questionnaires, restructuring of team members to solve group questionnaires, written presentations by each host, collaborative construction of new content on a blackboard, or rearrangement of subgroups based on affinity or randomly.

In conclusion, the World Café is a highly effective active learning method that will be utilized going forward. This method has yielded positive results for both students and teachers, fostering knowledge production through student-teacher collaboration while enhancing autonomy, competence, and stakeholder relationships, thereby strengthening student commitment, and promoting self-directed learning.

Read more about other pilot experiences of UAA

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González Flores, S. P., Acosta-Álvarez , M., Arévalo-Mercado , C. A., Solano-Romo , L., & Guerrero-Mojica , N. (2023). Application of pedagogical drama in primary healthcare practice during piloting 2. Lux Médica, 18(55). https://doi.org/10.33064/55lm20234764

4.8 SmartNurse Pilot Results

Jožica Čehovin Zajc, Tina Gogova and
Marija Milavec Kapun

The main objective of the SmartNurse project was to modernize the curriculum of nursing education in Latin American partner Higher Education Institutions (HEIs) in El Salvador and Mexico using digital educational tools and active learning methods (Read more in Chapter 3.5). In the project, a pedagogical framework, the SmartNurse Methodology (Read more in Chapter 3.2) was developed. By enhancing and improving teachers' competencies, nursing students' digital health literacy is enhanced, along with their knowledge and skills related to the necessary digital healthcare competencies for the future, especially in supporting patients' self-care.The development of the SmartNurse Methodology essentially involved its piloting by nursing teachers and students. This chapter provides further justification for the content of the SmartNurse pilots, with the results available for review in chapters 4.8.1-4.8.3.

The implementation of active learning methods in nursing education has been demonstrated to be highly beneficial (Pivač, 2021; Coffmann et al., 2023; Sullivan, 2022). Active learning methods carry several positive implications for nursing education, including fostering a learner-centered, dynamic, meaningful, and engaging learning environment, as well as facilitating bidirectional collaborative interaction between teachers and learners, and providing ongoing constructive and nonjudgmental feedback (Franco-Tantuico, 2022). Additionally, active learning methods can enhance students' emotional characteristics and improve teaching effectiveness (Culha, 2019; Waltz et al., 2014). Identified antecedents include the learner's capacity for higher-order thinking as well as the teachers' active learning expertise (Franco-Tantuico, 2022; Pivač et al., 2021). Conversely, studies have shown that the lack of teachers' preparation and structural support contributes to students' dissatisfaction (Ghezzi, 2021). It is crucial to acknowledge that the success of implementing active learning methods depends not

only on the methods themselves but also on the evolving relationship between method, students, and teachers (Kane, 2004).

> ***Active learning methods facilitate bidirectional collaborative interaction between teachers and students.***

The utilization of digital tools in education enhances students' study motivation and active participation while also promoting the recognition of the relevance and applicability of newly acquired knowledge and skills (Culha, 2019). Additionally, there is a need to improve the digital health literacy of nursing students (Mensah et al., 2023). Adequate digital health literacy (van der Heide et al., 2018), particularly the ability to identify trusted health-related information resources and to utilize this information in making health-related decisions (Konttila et al., 2018; Prodhan et al., 2018), is crucial. Future studies on digital health education programs in the Latin American region could offer valuable insights into training needs at various levels (decision-makers, digital health providers, and users), the profile of trainees (including leadership skills), and underscore the urgent necessity to monitor, evaluate, and disseminate the lessons learned from these experiences (Curioso, 2019).

In Latin America, the necessity for improvements in teaching and learning methodologies within nursing education is paramount (Cassieani et al., 2017). There is a significant demand for the development of innovative intercultural and multilingual teaching tools and solutions to address the health needs of the population, particularly in underserved areas. Given the limited resources in the Latin American region, it is crucial to encourage the creation and strengthening of networks among public and private healthcare institutions with academic centres experienced in digital health education and research (Curioso,

2019). However, it is imperative to provide appropriate resources and adequately prepare nursing teachers with pedagogical, andragogical skills, and active learning expertise.

> ***It is imperative to provide appropriate resources and adequately prepare nursing teachers with pedagogical, andragogical skills, and active learning expertise.***

In response to these needs of the Latin American region, the SmartNurse project developed the SmartNurse Methodology (Read more in Chapter 3.2), incorporating elements such as active learning processes, digital learning, and curriculum development. To facilitate the integration of active learning methods enhanced with digital educational tools, nursing teachers underwent a series of comprehensive Teacher Training sessions (Read more in Chapter 4.2). These trainings aimed to educate, train, motivate and encourage participants to incorporate active learning methods alongside digital educational tools into their teaching practices.

After and intertwined with the Teacher Trainings, three distinct pilots of SmartNurse were executed (Read more in Chapter 4.1). In these pilots, nursing teachers applied the new knowledge acquired through the training sessions and implemented active learning methods in teaching, integrating digital educational tools into three pilot processes within their regular courses. Following each pilot, nursing teachers and students from participating HEIs in Mexico and El Salvador were invited to provide feedback on their experiences and contribute project data to evaluate the methodology. Based on participants' responses, adjustments were made to refine the methodology, and the potential impact of the project outputs in Latin American partner HEIs was assessed.

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4.8.1 Nursing Teachers' Focus Group Results

Marija Milavec Kapun, Jožica Čehovin Zajc and Tina Gogova

The SmartNurse project emphasizes the central role of teachers in integrating active pedagogical methods and digital tools into nursing education. To develop these competencies, Teacher Trainings were organized in the SmartNurse project (Read more in Chapter 4.2), and active learning methods (Read more in Chapter 3.5) and the use of digital tools in nursing education (Read more in Chapter 3.6) were piloted. The various activities of the project were relevant for the development of the SmartNurse Methodology (Read more in Chapter 3.1 and 3.2), and the feedback from teachers after the pilots was crucial. This chapter presents feedback from teachers at Latin American partner Higher Education Institutions (HEIs) collected through focus group method.

Assessing the quality and impact of the SmartNurse pilots involved using various evaluation methods. A focus group was conducted to comprehensively explore teachers' experiences during the pilots in the SmartNurse project. For the evaluation of Pilot 3, a focus group comprising five teachers from Latin American partner HEIs was assembled, representing five Latin American partner HEIs. To facilitate the focus group, a protocol with instructions was prepared for a member of the project team. The focus group took place in June 2023.

The focus group discussion was conducted in Spanish, and the verbatim transcripts were later translated into English and reviewed by a proficient English teacher. Qualitative content analysis with an inductive approach was employed, and NVivo software was utilized for coding. The coding process underwent rigorous validation by two independent researchers. Participant anonymity was maintained during the analysis, and informed consent was obtained from all participants before the focus group.

Focus Group Results

The content analysis of the focus group discussion reveals a paradigm shift in teaching and a multifaceted change, at least in part, in nursing education at the Latin American partner HEIs during the SmartNurse project's duration. Themes describing teachers' experiences and perspectives for the future include **Change in education, Impact on students, Wider impact, Challenges and problems, and Plans for the future** (Figure 35).

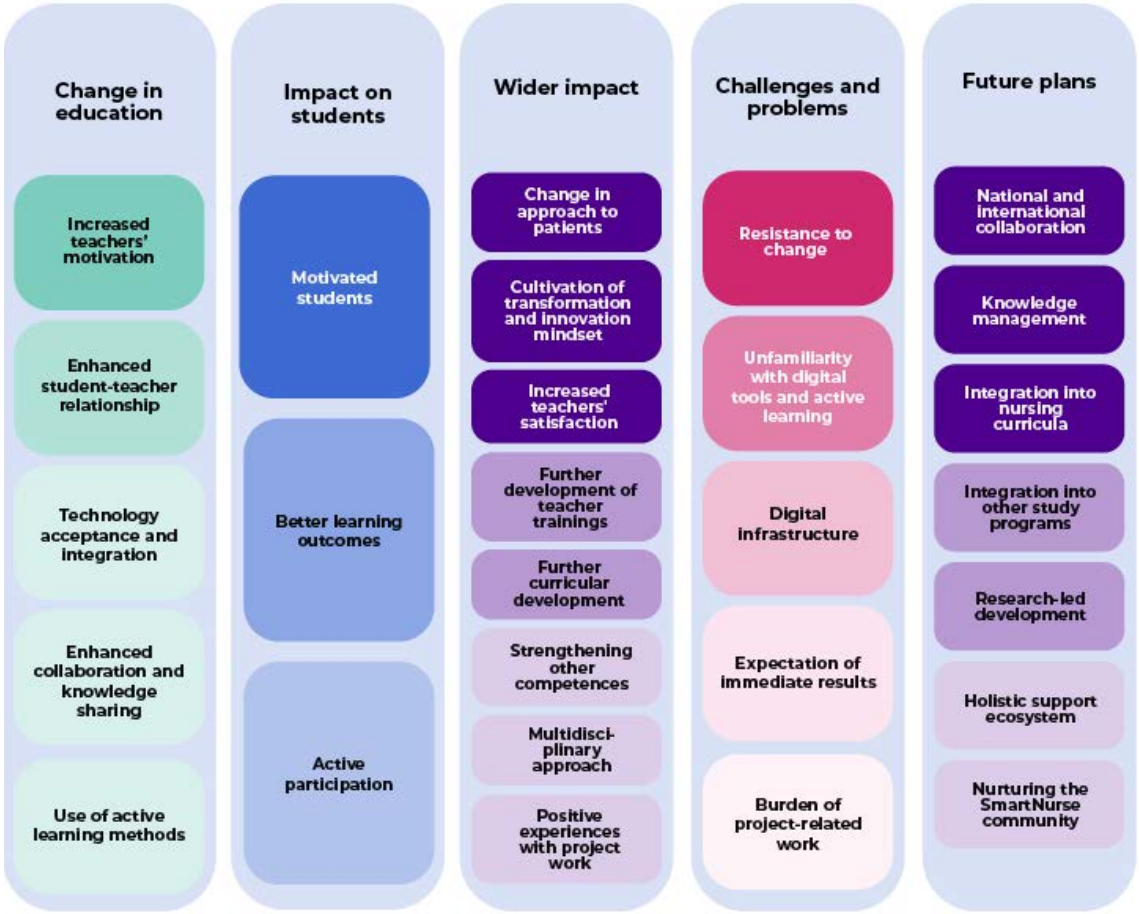

Figure 35. Nursing Teachers' Experiences of the SmartNurse Project, Main and Sub-categories

Change in Education

The participants recognized their involvement in the project activities and the use of the SmartNurse Methodology (Read more in Chapter

3.2) as a profound paradigm shift in teaching within their educational setting. This shift not only impacts the teachers but also the students. The educational landscape has been enriched with improved student-teacher relationships, higher motivation, better technology acceptance, collaborative knowledge sharing, and student-centered active learning.

> *"... we saw that very nice part that now our teachers recognize that they have changed, the way of teaching, the way of addressing the students and the way of applying each one of their contents and the way of evaluating. So for us it has been a change from the previous paradigm that they had, because now it is more technological."*

In terms of **increased teacher motivation**, focus group participants highlighted the positive impact of implementing project activities such as training. The incorporation of active learning methods (Read more in Chapter 3.5) alongside the integration of digital technology (Read more in Chapter 3.6) reignited teachers' enthusiasm for their profession. Teachers discovered a renewed sense of purpose in their role as knowledge facilitators, spurred by the tangible impact observed in their students' engagement and learning outcomes. They found that both themselves and the students enjoyed this new approach to teaching. This fostered opportunities for more open communication, where students felt empowered to voice their ideas and concerns, thus creating a conducive environment for holistic professional development.

> *"I didn't miss anything, but what I missed was time, because with the traditional method the class felt longer, but now we felt it was to short. Sometime we had class for 4 hours and when we realized it was already time to have a break and even the students would ask, is the class over? "*

> *"Now we work together even with the students"*

Better acceptance and integration of technology in the classroom translated into acquired skills and motivation for a paradigm shift in technology acceptance and integration in education. Project activities facilitated a transformative journey aimed at promoting dynamic learning experiences with digital tools in the educational process. Participants noted that while some teachers already possessed knowledge about using digital technologies in the classroom, others had none before the project.

> *"... before participating in SmartNurse Project, we teachers were not very familiar with the technologies."*

> *"I feel that our teacher where more familiarized with the technological part, that is, when we started to provide training in seminars about the methodology our teachers had more knowledge and had applied many of the tools and technologies that we are suggesting in the methodology ..."*

Improved collaboration and knowledge sharing entailed motivated teachers equipped with new knowledge, leading to a notable enhancement in collaboration and knowledge exchange among peers. This signifies a significant shift in teaching practices towards a culture of collective learning. The project has nurtured a vibrant community where staff exchange ideas, methods, and best practices, enriching their pedagogical approaches and invigorating the teaching and learning ecosystem.

> *"We really share everything, we share the links, we share the videos that are made, as well as the advantages that we have obtained based on the resources of the Erasmus program. It is about disseminating and sharing with the rest of the teachers so that all students are able to use digital tools."*

The discussion on the **use of active learning methods** highlighted a paradigm shift towards student-centered active learning methods. Participants emphasized the transition from traditional didactics to innovative didactic approaches that place students at the core of their learning process. By employing active learning methods like flipped classrooms, simulations, and gamification, students were empowered to assume ownership of their education, resulting in enhanced comprehension and skill development.

> *"We perceived that in subjects that were applied, for example, active methods such as drama technology or simulation, the acquisition of knowledge was more effective because there were situations that simulated real life and different scenarios could be considered, different situations that could emerge from the acquisition of knowledge. It was more effective."*

Impact on Students

The focus group participants reported the impact of implementing the SmartNurse Methodology on students' educational journeys. This impact on students encompassed increased motivation, better learning outcomes, and active participation.

The project's impact was prominently seen in the heightened allure of teaching, particularly in bolstering **student motivation**. By blending active learning methods with digital tools, both students and teachers found themselves more engaged and connected within the educational process. Through hands-on activities and interactive learning experiences, students were empowered to take ownership of their learning. This improved motivation not only had an immediate impact but also holds promise for positively shaping teaching and nursing practices in both Latin American partner countries in the long run.

"We had less absenteeism because they always wanted to be in class, as the colleague mentioned, and they wanted to know which activity we were going to do and which exams because we used gamifications. There was more motivation on their part, more compromise, better performance, and greater responsibility. The classes were more interactive and their self-care competences were also improved. "

The impact of the SmartNurse Methodology on **better learning outcomes** emerged in the focus group discussions. Participants highlighted that students demonstrated a stronger grasp of nursing interventions and competencies. The project's emphasis on active participation and collaborative learning facilitated a deeper comprehension of complex nursing concepts applicable to real-world scenarios. Teachers observed this transformative effect during clinical placements, where students adeptly applied their acquired skills in patient care. Regarding the **active participation** of students, participants underscored how the project encouraged active engagement and contributions, prompting students to pose questions and explore further. This active participation not only enhanced their understanding but also nurtured vital skills like critical thinking, communication, and problem-solving – integral aspects of holistic professional growth.

"Very positive, very enthusiastic, participative. It was observed that students who normally don't participate or that are not that motivated to participate, especially the active methodologies, encouraged a greater contribution and participation in the students and they asked to participate and that the use of these methodologies could be more constant. "

Wider Impact

The impacts of the project were identified to encompass transformative changes that extend beyond the project's initial objectives. Participants described **wider impacts**, including change in approach to patients, cultivation of transformation and innovation mindset, increased teachers' satisfaction, further development of teacher trainings, further curricular development, strengthening competences, multidisciplinary approach, and positive experiences with project work.

One theme highlighted was the **change in approach to patient** care and community engagement. Teachers observed that project activities facilitated a paradigm shift, prompting nursing students to embrace a patient-centered perspective. This transformation is poised to have profound implications for future nursing interventions.

"I saw in the students, what happens to us, like when we started as teachers. We, as teachers, started teaching as we were taught, then the students, you see, some of them anticipated and gave health education as we were teaching them and that was fascinating to me, because they really transferred: this is how I am learning, this is how I am teaching, and they replicated it with their patients."

Participants described the cultivation of a **transformation and innovation mindset** as a broader impact. The project has nurtured a culture centered on innovation, encouraging individuals to think critically, challenge themselves, and devise novel solutions. There has been a noticeable shift from traditional knowledge providers to facilitators nurturing active future nursing professionals, fostering a generation of change-makers poised to address intricate healthcare challenges. Teachers involved in project activities expressed **increased** job **satisfaction** and newfound fulfilment. The adoption of innovative teaching methods and collaborative approaches positively influenced their enthusiasm for teaching, empowering them to enhance student learning experiences within their HEIs.

" It is also hopeful because what we want is a transformation from traditional teaching to innovative teaching."

Further development of teacher training, the focus group discussion underscored the importance of ongoing teacher training. Participants expressed a commitment to continuing and adapting training sessions to align with the cultural and theoretical contexts of each university. They emphasized the necessity of extending teacher training into the future and attracting a new generation of educators to familiarize themselves with the SmartNurse Methodology. This theme highlights a ripple effect, demonstrating the ongoing dissemination and success of the methodology.

"We tried to make the training process more applicative, this means that they learn by making, but I think it's a first step. Our next step is to make it more of a match to the pedagogical part, that is, not to use the tool just as a tool, but as part of a cognitive process that allows the student to learn."

The concept of **curricular development** emerged as a symbol of progress in education. There is a clear intention to incorporate the SmartNurse Methodology into specific nursing subjects, reflecting a commitment to innovation. Some participants are also involved in curricular committees, acting as change agents to facilitate the integration of innovative approaches into the nursing curriculum. Participants highlight the transformative impact of the project, as the institution's curriculum evolves into a platform for innovation that shapes the future generation of nursing professionals.

Strengthening competences encompassed improvements in their digital skills during the project activities, which were also influenced by the Covid-19 pandemic. Participants highlighted that the project greatly assisted them in navigating emergency remote teaching. Given the cultural and linguistic diversity of the team, they emphasized how the project expanded the horizons of team members and

equipped them with diverse skills to thrive in the dynamic global landscape.

A clear paradigm shift towards a **multidisciplinary approach** in nursing education was observed. Participants cited examples of collaboration between different disciplines, harnessing collective expertise to tackle multifaceted challenges. This underscores the significance of an educational ecosystem where boundaries between disciplines are blurred, fostering an environment of holistic understanding and cross-pollination of ideas.

The participants reported **positive experiences with the project work**. The dynamics of the project, the collaboration, and the impressive results fostered a sense of pride and achievement among the SmartNurse team members. They expressed gratitude for the opportunity to contribute to the project and a strong sense of camaraderie, feeling connected as a family.

> *"Mixed feelings of work pressure, of satisfaction, but also of a dream to achieve, at least as far as I am concerned, I never thought I would work in a project. "*

Challenges and Problems

Applying something new in our work often comes with challenges, and participants also reported encountering some when applying the SmartNurse Methodology. They highlighted challenges such as resistance to change, unfamiliarity with digital tools and active learning, digital infrastructure, expectations of immediate results, and the burden of project-related work, from the perspectives of students, teachers, and institutions.

Each HEI reported teachers' **resistance to change** as one of the challenges. Expectations of change were often met with resistance, reflecting a reluctance among some teachers to embrace new pedagogical

approaches and digital technologies in their classrooms. Inertia resulting from entrenched teaching practices posed a challenge. Some teachers were apprehensive about departing from traditional teaching methods, requiring a conscious effort to bridge the gap between familiarity and innovation. Participants noted that this bridging was largely successful through Teacher Trainings provided by EU partners and national training seminars.

The transition to technology-driven active learning faced obstacles due to some teachers' **unfamiliarity with digital tools and active learning methods** in education. Some teachers even resisted using digital technologies in the classroom. Many of the active learning approaches were novel to most teachers, necessitating extensive training and support for implementation. Another challenge was the **expectation of immediate results**, as project members recognized that substantial change takes time. While the project initiated an innovation in teaching, participants observed a tendency among stakeholders to anticipate immediate and tangible outcomes.

> *"... it was difficult because they were still not familiarized with the technology or to the use of tools or the research of some tools that they could use during their class."*

Digital infrastructure posed challenges, with internet connectivity being a recurring issue observed during project meetings, especially during the Covid-19 pandemic. In an era, reliant on digital technology, unreliable internet access hindered the seamless integration of digital teaching tools. Participants also noted students' limited internet access due to financial constraints and hardware availability issues. While teachers benefited from technical equipment provided as part of the project, they later reported limitations in digitally equipped classrooms post-Covid.

Project members encountered the **burden of project-related work** alongside their regular teaching commitments, leading to occasional feelings of overwhelm and fatigue. Balancing these tasks proved challenging and highlighted the need for improved workload management in future SmartNurse activities and other projects.

Plans for the Future

Participants exhibited a strong commitment to continue their activities, involving a multifaceted exploration of strategies and considerations to guarantee the ongoing impact and advancement of the SmartNurse Methodology. From the focus group discussion, several interconnected aspects emerged. These plans include national and international collaboration, knowledge management, integration into nursing curricula, integration into other study programs, research-led development, holistic support ecosystem and nurturing the SmartNurse community.

The participants intend to foster **national and international collaborations** with key stakeholders at various levels. Collaborating aims to share knowledge and facilitate the exchange of experiences and best practices. This synergy will aid in disseminating the SmartNurse Methodology across diverse academic and other contexts.

> *"... to maintain communication once the project is finished between national and international institutions and be on the lookout for the following calls to continue with the work."*

Central to sustainability is the effective dissemination and **management of knowledge.** Participants highlighted the need to develop comprehensive approaches to transfer the knowledge and skills acquired to other teachers through regular training and as part of induction training for new teachers. This will ensure **integration into future curricula** and maintain the methodology. The HEIs plan to further

apply the SmartNurse Methodology in nursing subjects that were not updated during the project. In one of the HEIs, the nursing curriculum is currently being renovated. During this renovation, the methodology has been included in the renewed study program, which means that the methodology will be integrated into nursing education for at least 5 years. Participants also have plans to reshape nursing education at the national level.

> *"We plan to replicate the training with all the teachers, with full time teachers and also with part time teachers, so we plan to create a training program for all."*

Participants explored ways to extend the reach of the SmartNurse Methodology beyond its original boundaries, including **integration into other study programs** and broader educational contexts. Discussions revolved around how the principles of the methodology could permeate different disciplines and academic programs, paving the way for a ripple effect across borders.

Participants recognized the importance of research as a cornerstone for sustainability, acknowledging its role in refining instructional strategies, exploring new pedagogical paradigms, and assessing the evolving impact of the methodology. They envisioned a continuous cycle of research efforts, ensuring the methodology's continued relevance and effectiveness. This commitment to **research-led development** underscores the project's enduring impact and lays the foundation for future innovations. Additionally, such endeavours could be further advanced through participation in new projects.

> *"...we want to explore a little bit more the data that has been recollected throughout the project to have a bigger socialization in internal and external publications, disseminate the specific results so that it can be sustainable and in the academic also continue with the application of active methods and technologies outside our department."*

Ensuring sustainability necessitates establishing a robust, **holistic support ecosystem**. Participants discussed multifaceted support mechanisms, including financial assistance, technical support, mentorship, and professional development. This comprehensive support structure enhances teacher confidence, addresses challenges, and fosters a culture of continuous improvement.

Nurturing the SmartNurse community was deemed meaningful, with participants stressing the importance of regular SmartNurse team meetings and collaborative activities, extending beyond the project's official completion. They believed that such interactions would invigorate the network, fostering a culture of shared learning and ongoing development.

Conclusion

The teachers have significantly empowered nursing students by enriching their learning experiences, igniting motivation, and encouraging active participation throughout the SmartNurse pilots. This empowerment extends beyond the classroom, shaping students into enthusiastic lifelong learners equipped with essential nursing skills to address public health challenges.

The SmartNurse project's impact extends to broader educational implications and staffing considerations for Latin American partner HEIs, potentially transforming nursing care and society. However, challenges encountered during piloting underscore the need for tailored solutions to overcome connectivity barriers, reduce resistance to change, enhance teachers' digital literacy, manage expectations, and alleviate the burden of additional tasks. Addressing these challenges requires perseverance, adaptability, and collective effort to enhance nursing education in Latin American partner HEIs.

4.8.2 Nursing Teachers' Digital Competence Results

Jožica Čehovin Zajc, Tina Gogova and Marija Milavec Kapun

In today's rapidly evolving education landscape, digital technologies are essential for effective teaching and learning. As teachers aim to prepare students for a digital future, enhancing their digital competencies is paramount. The SmartNurse project emphasizes the vital role of teachers in integrating digital tools into their classrooms and the need to cultivate digitally proficient educators. Advanced digital skills empower teachers to offer engaging, inclusive, and personalized learning experiences for students. This chapter presents the results of a survey on teachers' personal use of digital teaching technologies from partner Higher Education Institutions (HEIs) in El Salvador and Mexico. Teachers' digital competencies were measured through both self-assessment and self-reflection using the DigCompEdu framework.

The availability of digital technologies in our daily lives and within education is unprecedented, significantly enhancing opportunities for teaching and learning. Developing essential skills such as lifelong learning, digital literacy, intercultural competence, and collaboration is crucial for both students and teachers (Shonfeld et al., 2021). Students must cultivate the ability to utilize digital technologies effectively for creation, communication, and collaboration. Consequently, teachers play a vital role in designing and delivering meaningful digital learning experiences for their students (Finger, 2015)."

Method

A structured online questionnaire was utilized to assess the digital competences of teachers from five Latin American partner HEIs within a socio-economic context. The questionnaire comprised three sections: demographic data, self-assessment of digital competences, and the DigCompEdu self-reflecting tool (DigCompEdu) (European

Commission et al., 2017). The first section gathered information on demographic and broader socio-economic factors. The second section focused on the self-assessment of teaching digital competences before 2020 and in 2023, as well as personal use of digital technologies. Initially, the self-assessment approach was employed to gain insights into teachers‘ perceptions of their teaching digital competences. Teachers were requested to assess their current teaching digital competences in general and their competences prior to 2020 on a scale ranging from basic user (Newcomer: A1 level) to advanced expert (Pioneer: C2 level). This self-assessment yielded insights into teachers‘ perceived teaching digital competences.

In the third part, the DigCompEdu, a standardized and well-known framework, was utilized to enable teachers to self-reflect on their digital competences. Teaching digital competence is recognized as one of the eight key competences for lifelong learning and is an essential prerequisite for participation in our increasingly digitized society (Ferrari, 2013). DigCompEdu outlines 22 competencies organized into six areas: Professional Engagement, Digital Resources, Teaching and Learning, Assessment, Empowering Learners, and Facilitating Learners‘ Digital Competences, providing a comprehensive and objective assessment of their performance level. A new, seventh area, Open Education, has been added. This underscores the importance of embracing open educational practices and ensuring open access to resources within digital education contexts. (European Commission et al., 2017.) The framework also presents a progression model to assist teachers in assessing and enhancing their digital competence across six competence levels: Newcomer (A1) and Explorer (A2), where teachers absorb new information and develop basic digital practices; Integrator (B1) and Expert (B2), who further develop and structure their digital practices; Leader (C1) and Pioneer (C2), who can share their knowledge, critique existing practices, and develop new ones (European Commission et al., 2017; Ghomi & Redecker, 2019).

Prior authorization from the authors of DigCompEdu was obtained to ensure adherence to established protocols. The questionnaire link, along with comprehensive instructions and invitations, was disseminated among teachers from Latin American partner HEIs, with instructions to share it among their colleagues to ensure a diverse range of responses. Data collection occurred between March 1 and July 31, 2023, allowing participants to choose between responding in Spanish or English. The systematic approach, which combines a structured questionnaire with the DigCompEdu framework, provided insights into the interaction between digital skills and socio-economic factors.

Results

The teachers' responses from the questionnaire are organized into three distinct sections, providing a comprehensive understanding of the results. The first section examines findings related to participants' personal use of digital technologies, while the subsequent section reports on their self-assessment of teaching digital competencies. The results section is further enriched by responses collected through the DigCompEdu self-reflective tool.

Results on the Personal Use of Digital Technologies

Generally, respondents reported finding personal use of digital technologies easy and having positive attitudes towards them (Table 5). Almost all teachers (35.3% Agree, n=65, 58.2%; Strongly agree, n=107) who responded to the questionnaire reported high proficiency and comfort in using computers and technological devices, indicating their confidence in technology integration in everyday life. Moreover, respondents demonstrated extensive and competent internet usage; more than half (55.1% Strongly agree, n=102) felt highly competent in navigating online.

Table 5. Teachers' Private Use of Digital Tool

Items	strongly disagree % (n)	disagree % (n)	neither agree nor disagree % (n)	agree % (n)	strongly agree % (n)	Total % (N)
I find it easy to work with computers and other technical equipment	0.5 (1)	1.1 (2)	4.9 (9)	35.3 (65)	58.2 (107)	100 (184)
I use the internet extensively and competently	1.6 (3)	1.1 (2)	3.8 (7)	38.4 (71)	55.1 (102)	100 (185)
I am open and curious about new apps, programs, resources	1.6 (3)	1.1 (2)	4.3 (8)	37.1 (69)	55.9 (104)	100 (186)
I am a member of various social networks	1.1 (2)	4.4 (8)	18.6 (34)	38.3 (70)	37.7 (69)	100 (183)

The majority of respondents (37.1% Agree, n=69; 55.9% Strongly agree, n=104) expressed openness and curiosity towards new apps, programs, and resources, while three-quarters of the respondents (n=70, 38.3% Agree; n=69, 37.7% Strongly agree) reported actively engaging in various social networks.

Results of the Self-assessment of Teaching Digital Competencies

The largest group of respondents (38.8%, n=69) self-assessed their current general teaching digital competences at the B1 level, indicating an intermediate level (Figure 36). However, almost two-thirds of the respondents (63.2%, n=110, levels A1 and A2) self-assessed themselves as having a lower level of teaching digital skills before 2020, indicating a significant change in their digital skills over the past three years.

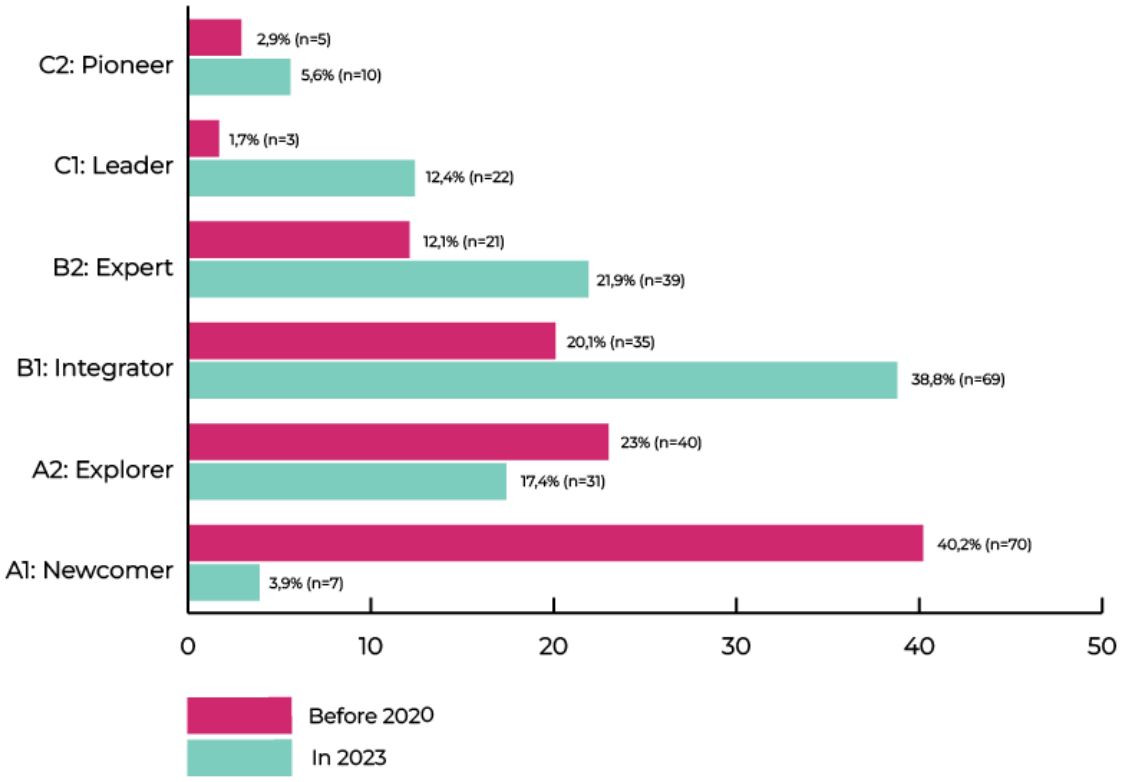

Figure 36. Self-assessed Digital Competencies of Nursing Teachers (Before 2020: N=174, In 2023: N= 178)

Furthermore, the proportion of teachers with higher levels of teaching digital competencies has almost doubled in three years (n=56, 60.7%, levels B1 and B2).

Results of the DigCompEdu Self-reflecting Tool

Self-assessed digital competences (Figure 36) revealed that after the pandemic, almost one-fifth of respondents assessed their digital competencies at the highest C-level proficiency (C1: Leader 12.4%, n=22 or C2: Pioneer 5.6%, n=10). However, data gathered with the standardized DigCompEdu self-reflection tool revealed an even more positive picture, with a quarter of the respondents reaching C levels (C1: 20.3%, n=35; C2: 4.1%, n=7). Participating teachers with computer science proficiency (n=12, 5.7%) were presumed to possess higher digital competencies (Table 4).

Table 4. Nursing Teachers' Digital Competencies by DigCompEdu (EU Science Hub, n.d) in percentages and frequencies

Items	A1: Newcomer % (n)	A2: Explorer % (n)	B1: Integrator % (n)	B2: Expert % (n)	C1: Leader % (n)	C2: Pioneer % (n)
Mean Digital Competence (N=172)	2.3 (4)	16. (28)	28.4 (49)	28.4 (49)	20.4 (35)	4.1 (9)
Professional Engagement (N=174)	2.2 (4)	16.7 (29)	23.6 (41)	32.8 (57)	16.7 (29)	8.0 (14)
Digital Resources (N=173)	1.2 (2)	15.6 (27)	20.2 (35)	24.9 (43)	23.7 (41)	14.5 (25)
Teaching and Learning (N=173)	2.3 (4)	18.5 (32)	23.7 (41)	22.0 (38)	19.7 (34)	13.9 (24)
Assessment (N=169)	3.0 (5)	14.2 (24)	29.6 (50)	21.9 (37)	17.8 (30)	13.6 (23)
Empowering Learners (N=169)	2.4 (4)	11.8 (20)	22.5 (38)	19.5 (33)	28.4 (48)	15.4 (26)
Facilitating Learners' Digital Competence (N=165)	1.8 (3)	16.4 (27)	23.0 (38)	24.8 (41)	20.0 (33)	13.9 (23)
Open Education (N=163)	27.0 (44)	31.3 (51)	11.7 (19)	11.7 (19)	13.5 (22)	4.9 (8)

In comparison, almost one-fifth of the respondents assessed their digital competences at the A-levels (A1 and A2 18.4%, n=33), whereas only 4 respondents (2.3%) considered themselves novices at the A1 level. More than half are at the intermediate B level, with a balanced distribution between B1 and B2 levels (each category 28.4%, n=49).

Regarding specific competences, respondents excelled the most in areas like Empowering Learners (C1: Leader 28.4%, n=48; C2: Pioneer 15.4%, n=26) and Using Digital Resources (C1: Leader 23.7%, n=41; C2: Pioneer 14.5%, n=25), with significant B-level competencies in Empowering Learners (B1 and B2 42%, n=71) and using Digital Resources (B1 and B2 45.1%, n=78).

On self-assessment of other digital competences, over one-third of the respondents considered themselves Experts (B2) in Professional Engagement (32.8%, n=57), while in Assessment, one-third of the respondents felt they had the competence of an Integrator (B1: 29.6 %, n=50). The distribution of results for Facilitating Learners' Digital Competence showed that nearly three-quarters of the respondents assessed themselves as Integrators (B1: 23.0%, n=38), Experts (B2: 24.8%,

n=41), or Leaders (C1:20.0%, n=33). Digital competence related to Teaching and Learning was self-assessed across all levels, but slightly less than half of the respondents assessed themselves to be Integrators (B1: 23.7%, n=41) or Experts (B2: 22.0%, n=38).

In contrast to most areas, where the majority of the respondents self-assessed their digital educational competences at levels B or C, the area of Open Education demonstrates significant potential for further development. Over half of the respondents evaluated themselves as either Newcomers (A1: 27.0%, n=44) or Explorers (A2: 31.3%, n=51), revealing low familiarity with open education practices. Furthermore, less than one-fifth of the responders considered themselves at the highest competence levels of Leader (C1: 13.5%, n=22) or Pioneer (C2: 4.9%, n=8), indicating a lower proportion of teachers with advanced skills in this area.

It is important to note that self-assessment might be conservative, whereas the standardized tool DigCompEdu provided a more accurate and comprehensive assessment that considers different aspects of digital educational competences. It should be noted that teachers self-assessed their competencies using the questionnaire, while their digital competencies in teaching practice could differ.

Conclusion

The assessment of teachers' digital competencies reveals a broad spectrum of proficiency levels, ranging from beginners to experts. Understanding these levels is crucial for tailoring training programs, enabling continuous growth, and preparing teachers for the dynamic digital education landscape (European Commission et al., 2017).

Open Education's rapid evolution demands heightened awareness and targeted training, bolstered by investments in specialized programs to enhance teachers' competencies and foster inclusivity and resource sharing. HEIs in Latin America and policymakers should

prioritize such training and resource provisions, empowering teachers to contribute to the advancement of open education (European Commission et al., 2017). This philosophy of open access stands to benefit teachers, HEIs, and nursing students alike, fostering technological and didactic innovations to make high-quality nursing education materials accessible regardless of economic barriers. Particularly vital in low- and middle-income countries, this accessibility enables individuals to build sustainable careers while positively impacting countless patients throughout each nurse's professional journey (Berland et al., 2020).

Competency areas like Empowering Learners and Using Digital Resources underscore teachers' commitment to integrating technology and innovative pedagogy, benefiting students in a technology-driven era. SmartNurse project activities, including Teacher Training (Read more in Chapter 4.2), positively contribute to these competencies, highlighting the significance of targeted professional development.

The positive attitude and high digital proficiency exhibited by participants are commendable. Their adeptness with technology and eagerness to explore new possibilities serve as exemplary models for students and colleagues alike. The adaptability of participating teachers and their openness to innovative tools ensure their continued leadership in educational development, enriching student learning experiences and contributing to a dynamic educational community.

During the Covid-19 pandemic, educational institutions globally faced urgent transitions to distance learning, revealing shortcomings in digital teaching preparation, including technical challenges and insufficient teacher digital skills (Hanafy et al., 2021; Plesec & Milavec Kapun, 2023; Rasmussen et al., 2022). The increase in self-assessed teaching digital competencies among teachers is attributed to the pandemic's impact and potentially, initiatives like the SmartNurse project. As teachers embrace digital tools, their enhanced competencies improve teaching practices, benefiting students, and fostering a tech-savvy

educational environment. Nonetheless, there is still room for improvement, ongoing training is essential to address various aspects of digital skills for sustained progress. In conclusion, the journey to enhance teachers' digital competencies highlights the importance of continuous support, enabling educators to evolve and enrich student learning experiences within a vibrant and technologically advanced educational community (European Commission et al., 2017).

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4.8.3 Nursing Students Pilot Results

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In the SmartNurse project, nursing students' experiences were evaluated following the piloting of the SmartNurse Methodology. Understanding their encounters with this novel methodology, which utilizes active learning methods, allows for assessing the efficacy of these innovations and enhancing future nursing education in Latin American partner Higher Education Institutions (HEIs). This has the potential to improve learning outcomes and equip nursing students to address emerging demands, particularly in empowering patients with noncommunicable diseases for improved self-care through digital technology. This chapter explores nursing students' experiences in Pilot 3 of the SmartNurse project, focusing on their perceptions of the pedagogical shift from traditional teacher-led to student-centered learning. It examines their active participation, motivation to learn, usage of digital tools, and perception of applicability in nursing practice.

Evaluating nursing students' post-pilot experiences is essential for understanding the quality and impact of the SmartNurse pilots. The implementation of the SmartNurse Methodology in Pilot 3 marked a departure from nursing students' previous educational experiences, introducing novel learning methods. Their insights on active, student-centered learning, participation, motivation, and digital tool usage are pivotal for innovating learning approaches. Additionally, their experiences with digital tools in learning and their applicability in nursing practice offer valuable insights for teachers and HEIs in curriculum and pedagogical development.

Methods

Student feedback on SmartNurse Pilot 3 was collected via a questionnaire covering socio-economic background, ICT equipment availability, and the DigiNurse questionnaire. Data was collected from April 13 to June 8, 2023. The online questionnaire was completed by 1071 undergraduate

nursing students from all Latin American partner HEIs. Of these respondents, 324 had previously participated in SmartNurse Pilots, where teachers utilized digital tools and active learning pedagogies.

The results focus on data from students who participated in all three pilots, particularly their feedback on changes in teaching methods and the utilization of digital tools. This subset comprised 137 students from Mexico, 181 students from El Salvador, and 6 students from unidentified HEIs.

Results from students (N=322) regarding closed questions were assessed on a 5-point Likert Scale (Table 5). For analysis of answers on the open-ended question regarding the teaching approach: "What was different in Pilot 3?", thematic analysis was conducted using an inductive approach (Braun & Clarke, 2006). Their feedback in Spanish was first translated into English, and the translations were verified by a bilingual English teacher.

Nursing Students' Feedback on Pilot 3

The feedback from nursing students' experiences in SmartNurse Pilot 3 was generally positive (Table 5), with less than 5% (Disagree and Totally disagree) expressing negative views. Most respondents (Agree 29.5%, n=95; Totally agree 59.9%, n=193) favoured using digital tools in teaching, acknowledging their effectiveness. Moreover, the majority (Agree 29.8%, n=96; Totally agree 53.4%, n=172) of respondents reported increased motivation when digital tools were used, with a similar majority (Agree 34.8%, n=112; Totally agree 48.8%, n=157) actively participating in Pilot 3.

Most participating students (Agree 30.4%, n=98; Totally agree 60.6%, n=195) acknowledged the relevance of using digital tools in education, and the majority (Agree 38.5%, n=124; Totally agree 46.0%, n=148) understood their practical application in clinical settings. Additionally, the ma-

jority (Agree 35.4%, n=114; Totally agree 52.8%, n=170) also felt they gained valuable knowledge and skills through the utilization of these tools. An encouraging finding is that the largest share of participating students (Totally agree 64.6%, n=208) believed the newly acquired knowledge and skills would be applicable in their future professional careers.

Table 5. Evaluating the Use of Educational Digital Tools by Nursing Students, N=322

Items	totally disagree % (n)	disagree % (n)	neutral % (n)	agree % (n)	totally agree % (n)
I liked this way of teaching with the use of digital tools	2.2 (7)	2.5 (8)	5.9 (19)	29.5 (95)	59.9 (193)
I consider the use of digital tools in teaching relevant	2.2 (7)	0.3 (1)	6.5 (21)	30.4 (98)	60.6 (195)
I have gained useful knowledge/skills through the use of digital tools	1.9 (6)	1.2 (4)	8.7 (28)	35.4 (114)	52.8 (170)
I have understood how to use the digital tool in practice	1.9 (6)	1.2 (4)	12.4 (40)	38.5 (124)	46.0 (148)
I will use the knowledge / skills in the future	1.9 (6)	0.6 (2)	4.0 (13)	28.9 (93)	64.6 (208)
I actively participated	2.2 (7)	0.9 (3)	13.4 (43)	34.8 (112)	48.8 (157)
I was more motivated during the classes, when the teacher used a digital tool	1.6 (5)	1.6 5)	13.7 (44)	29.8 (96)	53.4 (172)

Students' Perception of Changes in Learning Methods

In Pilot 3, nursing students engaged in courses incorporating active learning methods and technology usage. Students perceived the **use of technology and digital tools** in teaching and learning as novel, easier, and more effective. They acknowledged that the approach used in Pilot 3 was new and different from their previous experiences, partly due to their prior lack of access to digital equipment. Students described these new approaches as **innovative**, finding the use of digital tools in teaching to be **more didactic** and creatively easy, leading to a sense of increased knowledge acquisition.

> *"It was easier for me, since technology is part of our daily lives and has always been a tool that facilitates tasks."*

"I think it was quite good that he made it digital since we are all accustomed to that type of technology, and it makes teaching more dynamic and entertaining."

During the pilot, students observed a significant shift in the course's **dynamic**, moving from passive to active engagement. They highlighted the increased dynamism compared to the traditional approach, finding the new method more interactive, interesting, and entertaining. They described the new learning approaches as fun, exciting, enjoyable, attractive, and engaging.

"It was very fun and exciting since we had never done anything like this before."
»It was much more entertaining because we went from just seeing a boring and tedious slide to discovering new, more didactic and attractive tools to learn«.

The transition from traditional methods to active learning was predominantly acknowledged. The increased dynamism and integration of digital technologies facilitated greater student participation. Students were no longer passive observers but active contributors, able to share their viewpoints. They found the new approach made learning more manageable and perceived the course as more interactive and **motivating** compared to traditional methods. They also noted the teachers' enthusiasm. Besides enjoying the interactivity and fun, students found the new approach easier to grasp.

"The classes became more dynamic, and we were all able to participate."

"... we are used to sitting, listening and writing down what the teacher says, but this time it was a lot of fun, because it was interactive, in addition to each stage of the game giving you feedback and motivating you to keep going."

Students also emphasized the establishment of **dialogue between teachers and students**, which fostered greater confidence. One of the main differences recognized in the new approach was the departure from traditional one-way, top-down knowledge sharing.

> *"...there was more dialogue between the teacher and the student, creating a sense of trust."*

The students expressed a positive attitude towards the introduction of new approaches, finding them both enjoyable and useful for learning. They also found the new approaches more **practical and realistic** compared to traditional methods. The use of real images and practical examples helped them better understand the learning content. A difference was also recognized in the shift from **theoretical to more practical** evaluations.

> *"The fact that they use new tools is a pleasant feeling, since it is like discovering a new world for one, and they are so useful."*

The students recognized the **usefulness** of the new didactic approaches in nursing practice. They appreciated the opportunity to apply what they learned during the semester to real-life clinical cases. In fields like nursing, they found the use of new mobile health applications and other digital tools in nursing practice to be highly valuable. The students also acknowledged the practicality of new digital technologies for health self-care. They found value in using mApps to track their health and engage with various digital tools.

> *"We use apps to keep track of our health, it encouraged me to be self-taught, I use a lot of new digital tools for myself."*

Conclusion

The integration of SmartNurse Methodology had a profoundly positive impact on surveyed Latin American nursing students. This novel methodology was seen as more accessible, aligned with global trends, and significantly distinct from their prior educational experiences. The use of digital tools and active learning approach enhanced the didactic nature of the courses and cultivated a dynamic and interactive learning environment. The integration of digital technologies in clinical practice and to support patients in selfcare was seen as particularly useful, enhancing their learning experience, and preparing them for real-world scenarios in different clinical settings.

In contrast to their traditional learning experiences, students actively engaged in the learning process, participating in dialogues with their educators and expressing their perspectives. Overall, SmartNurse Methodology was received positively, motivating students to actively invest in their education, resulting in a more enjoyable and effective learning experience.

These positive experiences and student perceptions regarding the integration of the SmartNurse Methodology into nursing curricula underscore the advantages of integrating digital tools and innovative learning methods into nursing education. This integration holds the potential to yield affirmative impacts on nursing practice, particularly in providing support for patient self-care, especially in the context of non-communicable diseases. By empowering patients to actively manage their health and well-being and by offering digital healthcare services, this approach can have a positive social impact in the Latin American region.

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5

Curriculum Integration

In the SmartNurse project, like in all international collaborative curriculum development projects, the implementation of the achieved outputs into existing curricula or standalone courses is imperative. This ensures the impact of the project outcomes and their sustainability potential. This chapter provides a brief overview of the curriculum development process in general and discusses the implementation of the Smart Nurse Methodology and the resulting changes in courses at the institutional level in Salvadorian and Mexican partner Higher Education Institutions (HEIs). Additionally, recommendations on how to apply the methodology in curricular integration are provided.

5.1. Curriculum development

Hanne Mäki-Hakola

The overarching goal of the SmartNurse project has been to modernize the nursing education curriculum in Latin American partner Higher Education Institutions (HEIs). The project has focused on implementing digital educational tools and active pedagogical methods to teach and learn the contents of primary health care, health promotion, and self-care support for patients with non-communicable diseases. This chapter discusses the concept of curriculum and curriculum development.

In discussions surrounding curriculum development or modernization, it's crucial to first deepen our understanding of the concept. Overall, the curriculum encompasses values related to specific disciplines, professions, and universities as institutions, serving as a tool to transmit these values. It addresses what to teach, how, and why. Therefore, the curriculum can only be comprehended within the personal, institutional, or societal power dynamics that reflect a specific historical context. During curriculum development, these factors and their effects may be overlooked or unrecognized (Annala et al., 2016; Kandiko & Blacmore, 2012).

While the concept of curriculum is commonly used, it does not have a shared meaning. In research about higher education and in practice it seems to refer to variety of things. When the concept of curriculum has been studied, it has been found that it's meaning can vary from content to process. Based on the extensive literature review four approaches to curriculum has been found: syllabus, product, interactive process, and praxis. (Annala et al., 2016.)

The first two approaches primarily focus on the content aspect. For example, the syllabus outlines degree requirements, with less emphasis on the nature or implementation of the study program. When describing curriculum as a product, it includes learning objectives, relevant

learning experiences, teaching and learning methods, and assessment criteria. The aim is to impart the necessary knowledge, skills, and attitudes for professional practice in society. (Annala et al., 2016.)

These **content-based approaches** have been utilized in nursing education and curriculum research in Latin America (Álvarez Yañez, 2016; Luengo Martínez & Sanhueza Alvarado, 2016). For instance, a review of curriculum structures across 19 Latin American countries indicates that curricula are based on a professional profile of a nurse, although this profile varies between countries and universities. This diversity might be considered a weakness for the discipline and the nursing profession. The review suggests implementing a common curricular framework in the region to strengthen the professional profile of nurses. (Luengo-Martínez & Sanhueza Alvarado, 2016.)

When considering **curriculum as a process**, two additional approaches emerge. Curriculum as an interactive process refers to the written curriculum as a negotiated artifact. This negotiation encompasses its implementation in teaching-learning processes and considers the student's autobiographical experience and learning engagement. Curriculum as praxis entails a continual evaluation of what is valuable and what needs to be changed in the curriculum and why. It represents a developmental approach in which the curriculum evolves through dynamic interaction between action and reflection. (Annala et al., 2016.)

The four aforementioned approaches are not sufficient for fully understanding the conceptualization of the curriculum. Therefore, Annala et al. (2016) developed a framework (Figure 37) that locates these approaches based on their differences in orientation to knowledge and ownership. This framework facilitates a theoretical understanding of the pedagogical culture (teaching, learning, power relations, and roles of different actors) in higher education when developing curriculum.

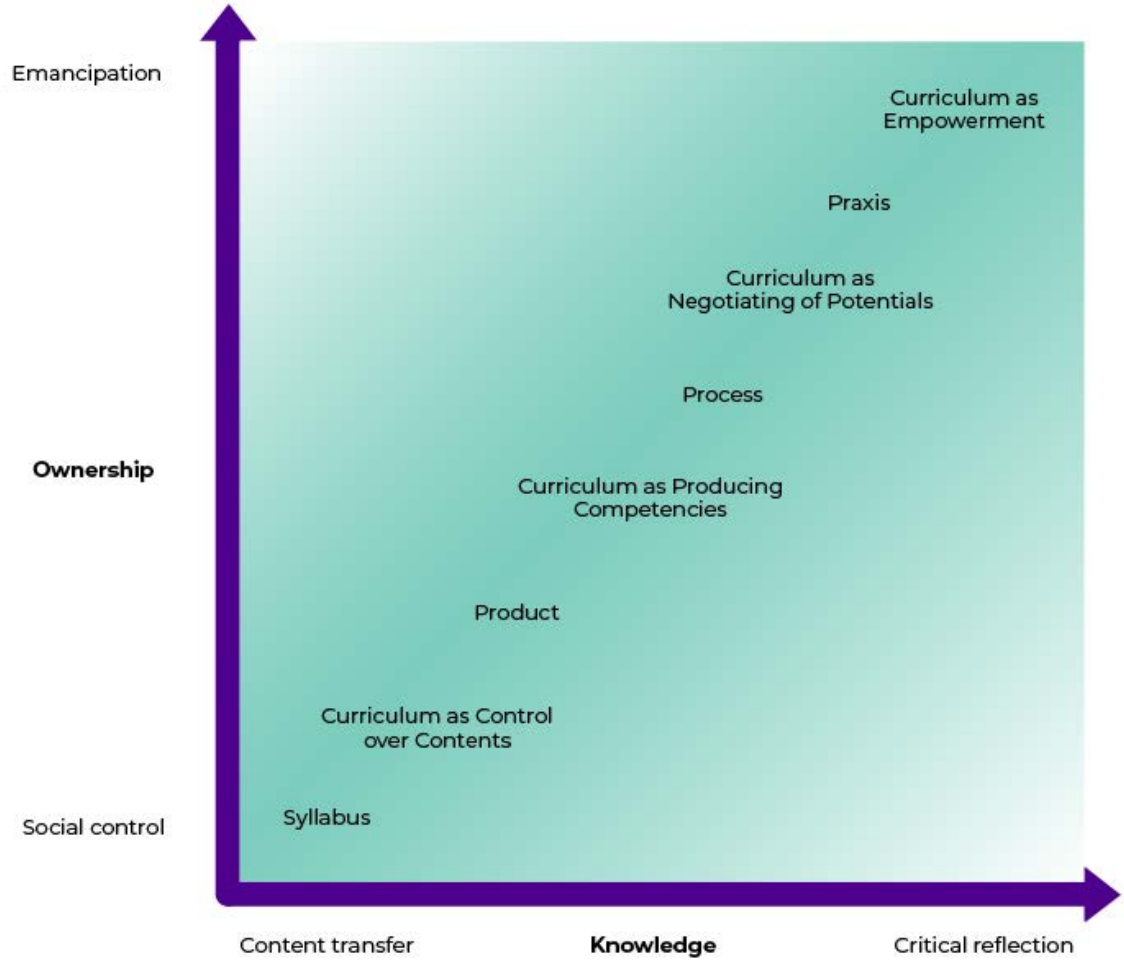

Figure 37. Framework for Conceptualizing Curriculum Approaches (Annala et al., 2016, modified)

Curriculum development can be viewed as a comprehensive reform affecting the entire university (Annala, 2017; Kandiko & Blackmore, 2012), or it may involve more incremental changes. From a teacher's perspective, curriculum development should be an ongoing process that involves reflection on how individual courses are designed and implemented, their relationship to other courses in the degree program, and the overall design of the entire degree program.

> ***From a teacher's perspective, curriculum development should be an ongoing process that involves reflection on how individual courses are designed and implemented***

The SmartNurse project has aimed at curriculum development and integration of the SmartNurse Methodology not only at the level of official written curriculum and course plans but also in the daily practices of implementation.

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5.2 Achieved Changes in the Courses

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The Latin American partners integrated the SmartNurse Methodology (Read more in Chapter 3) into specific courses and piloted two of the methodology-enhanced courses in pilot 3 (Read more in Chapter 4.1, 4.3-4.7). The main changes in course implementations were related to the use of various active learning methods and digital educational tools. The pedagogical paradigm shift and changes were significant for both nursing teachers and students. In this chapter, each Latin American partner HEI describes the changes they achieved.

Teachers who have actively participated in the development and integration of the SmartNurse Methodology describe the integration process as much deeper than simply adding new methods, tools, or themes to their teaching. They discuss a fundamental shift in their own and their colleagues' teaching and learning paradigm and understanding. The SmartNurse Methodology and the training for its implementation have encouraged teachers to be innovative in their teaching delivery and more willing to experiment with new methods. Teachers report that the methodological changes have made their courses more dynamic, interactive, and innovative, creating a friendlier learning atmosphere. They note that the paradigm shifts and changes in teaching style have been profound and empowering for both students and teachers alike.

The Curricula Integration

The curricula of Latin American partner HEIs generally did not specify learning methods in a way that would hinder the integration of the SmartNurse Methodology within the current curricula. However, in El Salvador, the curricula of two institutions defined the mode of learning as in-person, which initially hindered hybrid and online learning options. Nonetheless, due to the Covid-19 pandemic and health regulations, this curricular restriction had to be adjusted, paving the way for changes to enable different digital forms of teaching and learning.

> ***Covid-19 pandemic paved the way for changes to enable different digital forms of teaching and learning.***

The SmartNurse project aimed to update two courses in each Latin American partner HEI by integrating the SmartNurse Methodology into the course implementation. Some institutions may use terms like module, subject, unit, or affiliation instead of the term “course.” Here, a course refers to a component of study that typically spans several weeks, usually one semester, and involves approximately 50-300 hours of study. It may include theoretical lessons, self-study components, and possibly clinical training.

The SmartNurse Methodology was integrated into a significantly greater number of courses than originally planned, with partners reporting an updated total of 24 courses. These courses span from first-year to fourth or fifth-year studies in bachelor’s degree nursing programs, which aligns well with the methodology’s goal of progressively enhancing digital and self-care support competencies. They cover various areas such as primary care nursing, fundamentals of nursing,

family nursing, community nursing, nursing in the adult stage, as well as specific fields like occupational nursing, gerontological nursing, and didactics applied in nursing.

> ***The SmartNurse Methodology was integrated into a significantly greater number of courses than originally planned, with partners reporting an updated total of 24 courses.***

The partners describe that the changes in the courses have mainly involved shifts in learning modalities, teaching approach, student-centeredness, and interaction among students and between students and teachers. While the course contents have not undergone significant modifications, courses have been selected to emphasize themes of primary health care, prevention, and self-care support for patients with non-communicable diseases, while incorporating perspectives on digitalization in healthcare to enrich the content. Active learning methods and digital solutions have been integrated into patient education, with students practicing patient education using these active methods during their clinical training.

Achieved Changes in Curricula of Latin American Partner HEIs

The curriculum at **Autonomous University of Aguascalientes (UAA)** has been updated during the project (Autonomous University of Aguascalientes, 2022). The current curriculum aims to train Nursing graduates capable of providing comprehensive care to individuals across all stages of life, promoting self-care through the nursing process, and applying the scientific foundations of the discipline with the support of technology in healthcare, health education, research, and administration. It emphasizes a humanistic sense of service and social

responsibility (Autonomous University of Aguascalientes, 2022). The new curriculum incorporates themes from SmartNurse into course objectives and teaching methodologies, such as promoting self-care and utilizing information technology in primary care and individual, family, and community health.

University of El Salvador (UES) has been undergoing a curriculum update process since 2020, during which the SmartNurse project has significantly contributed to curriculum integration. The Bachelor's Degree in Nursing (BDN) at UES has collaborated with the curriculum committee to develop a new competency-based curriculum structure. Currently, the program is undergoing validation, with 32 programs expected to be approved. Each program incorporates digital educational tools for nursing education through the SmartNurse Methodology. Approval is anticipated from the Higher University Council in July 2024 and the Ministry of Education of El Salvador in October 2024.

The SmartNurse Methodology is already integrated into the existing module-based curriculum at UES. It is visible in the Didactic Charts supplementing the curriculum, particularly in the second, third, and fourth years. These charts outline various sub contents, with a specific emphasis on community and hospital-level education, focusing on health promotion and disease prevention using digital tools.

At **Gerardo Barrios University (UGB)**, the SmartNurse Methodology was integrated into the updated plan for the Bachelor's Degree in Nursing 2023, which is designed for semi face-to-face instruction. This curriculum transitioned into a blended learning model, with 50% virtual and 50% face-to-face instruction, wherein the active and digital learning methods of the SmartNurse Methodology have been well-received and smoothly integrated into daily practices.

The most important change has happened in the implementation of the methodologies in the written course programs which complement the curriculum, and which are worked collaboratively with the teachers

who teach each subject. This ensures the continuity in the implementation of these methodological strategies and digital educational tools.

In **Specialized Institution of Health Professionals (IEPROES)**, the course integration process has focused on developing components within courses related to primary care and patients with non-communicable diseases, with an emphasis on patient education. The integration of the SmartNurse Methodology is outlined in the Competence Charts of selected courses, which are documents that supplement the curriculum. Their curriculum is grounded in a constructivist pedagogical paradigm and competency-based assessment, which has facilitated the integration of the SmartNurse Methodology within the current curriculum framework.

Autonomous University of San Luis Potosí (UASLP) has integrated the SmartNurse Methodology into the course content, implementation plans, and lesson plans, which are supplementary documents to the curriculum. While the program contents themselves have not been directly modified, changes have been made to the teaching approach, tools, strategies, and time allocation for each unit. This includes the incorporation of active methods and digital teaching tools. These changes are documented within the structures of the lesson plans, where each teaching strategy is delineated per unit. The SmartNurse Methodology has been adapted into the didactic strategies of the program contents, not only in the piloted courses but also in other courses within the nursing degree program. Another significant change facilitated by this methodology is teacher training, which shifts from traditional teaching methods to innovative approaches, ultimately benefiting student learning.

The integration of the SmartNurse Methodology has transformed the approach to teaching and evaluation in the courses where it has been implemented. Even after the conclusion of the project pilots, the newly developed teaching structures remain in place. This methodology

has sparked innovation in teaching strategies for delivering program content, extending its integration to other academic programs within the nursing curriculum.

Institutional Work Community Enabling the Integration

When implementing a new methodology in teaching, the preparation and planning work of teachers undergoes changes. As part of the planning process, teachers need to assess the learning styles of students, the resources, and tools available to them, as well as their digital literacy and learning skills. Based on this assessment, teachers adapt active pedagogical methods, modify their teaching plans and assessment tools, provide training to students on virtual tools and active learning methods, and develop guides, protocols, and instructions to support different learners in using new methods and digital resources.

It is crucial for HEIs and the academic community to promote, support and facilitate innovative changes when integrating new elements into degree programs. For instance, partners at UAA believe that their institutional educational model fosters freedom and encourages innovation and diversity in teaching to meet societal demands and adapt to changes. At UASLP, teachers have organized themselves to cooperatively plan the concrete and innovative implementation of courses or subjects. Additionally, they incorporate various new evaluation strategies into their teaching, planning them before implementation.

> ***It is crucial for HEIs to promote, support and facilitate innovative changes when integrating new elements into degree programs.***

The Teacher Trainings and their local continuation were one of the key factors for the effective integration of the SmartNurse Methodology, not only in the implementation plans or course descriptions but also in the concrete practices in the classrooms or beyond. The HEIs have facilitated the continuation of teacher training within them among the staff, further strengthening the consolidation of the methodology integration. This transformation has shifted teaching from traditional lecturing to active and innovative methods in daily practices, incorporating elements of planning and evaluation. The teachers now creatively experiment with and utilize various digital tools (Picture 9) that are freely accessible to students.

Picture 9. SmartNurse Consortium Members in Virtual Lab for Social and Health Care in TAMK Testing the OiOi Smart Space Immersive and Interactive Wall (Picture taken by Nina Smolander, 2022)

Continuity in teacher training and collaborative planning among colleagues are essential for the sustainability of methodology integration. At UAA, a dedicated training course for teachers has been implemented. Additionally, at UGB and UES, teachers have received institutionally organized training, along with online training from the SmartNurse project, covering didactic planning and competency-based evaluation under a socio-formative approach. At UASLP, the methodology has facilitated the introduction of new teacher training sessions at the beginning of each semester, offering workshops on digital tools for teaching and student assessment. Through these training initiatives, teachers now possess a variety of educational techniques and can assess their applicability to enable students to achieve the required competencies.

Through these training initiatives, teachers now possess a variety of educational techniques and can assess their applicability to enable students to achieve the required competencies.

Changes can be exciting, but they are also challenging. The partners emphasize the importance of clear visualization of the expected changes and work processes for a successful development process. While some teachers initially resisted changes within the current curriculum, they recognized the need for updates to incorporate new methodological strategies for teaching and evaluation. Another important aspect of development work is making achievements visible. Partners note that colleagues have been highly motivated to update their didactic and digital competencies, and it has been encouraging to witness these achievements. Teachers involved in the process have demonstrated high motivation and enthusiasm in using the SmartNurse Methodology. They invest more effort in finding means and exercises to help learners reach the expected level of performance.

Student motivation has increased, and they are more engaged in their learning process. Learning has become more meaningful as teaching methods integrate theory into practical application, fostering the development of decision-making, critical thinking, and analytical skills.

Learn More about the SmartNurse Partner Universities and Their Degree Programs of Nursing

Autonomous University of Aguascalientes, UAA https://www.uaa.mx/portal/

Autonomous University of Aguascalientes (2022) Plan de estudios. https://www.uaa.mx/descubretucarrera/ccs/lic-en-enfermeria/plan.pdf

Autonomous University of San Luis Potosí, UASLP https://www.uaslp.mx/

University of El Salvador, UES https://www.ues.edu.sv/

University Gerardo Barrios, UGB https://ugb.edu.sv/

Specialized Institution of Health Pofessionals, IEPROES https://www.ieproes.edu.sv/

University of Ljubljana https://www.uni-lj.si/university/

Tampere University of Applied Sciences https://www.tuni.fi/en/about-us/tamk

Tampere University of Applied Sciences. Nursing degree and curriculum. https://www.tuni.fi/en/study-with-us/nursing

5.3 Recommendations for the Application of the SmartNurse Methodology

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The primary output of the SmartNurse project, the SmartNurse Methodology (Read more in Chapter 3), was designed to be adaptable for Higher Education Institutions (HEIs) with different curricula, facilities, and needs. Throughout the project, the methodology development enabled decision-makers at Latin American partner HEIs to update strategies and active learning methods using digital educational tools within nursing faculties. This aimed to enable nursing students to acquire competencies for promoting self-care and preventing non-communicable diseases. This chapter discusses recommendations for integrating the SmartNurse Methodology into the curriculum.

The SmartNurse Methodology has been a collaborative development activity within the SmartNurse project (Read more in Chapters 1 and 4.1) and has occurred within the context of nursing education. However, it is not limited to nursing education or exclusively to undergraduate and professional nursing training programs. It can be easily adapted to other healthcare curricula due to its focus on promoting health and supporting the self-care of individuals with non-communicable diseases. Additionally, the methodology is versatile and can be applied across various educational settings to develop digital competencies and utilize active learning methods.

The principles guiding the application of the SmartNurse Methodology are drawn from both administrative and nursing processes, as they provide a flexible, dynamic, and systematic approach for integrating

the methodology into various social, cultural, and educational contexts. The methodology's application involves several phases: needs identification, strategy design, execution, and follow-up. The interrelation of these phases facilitates the enhancement and refinement of the student learning process, curricula, and programs through the integration of virtual academic tools and environments—a goal that is currently a key focus in higher education. (Cordova, 2012.) Each phase encompasses a series of actions and activities crucial for the successful implementation of the SmartNurse Methodology.

Needs Assessment and Identification

Assessment of needs is a critical starting point for all changes, and implementations of new interventions. It is essential to understand your starting point, identify resources and strengths, and anticipate potential challenges. This can be achieved by utilizing various frameworks, such as the administrative process (Cordova, 2012) or the Consolidated Framework for Implementation Research (Means et al., 2020).

During the needs identification process, based on our experience with the SmartNurse project, we recommend considering three perspectives. Firstly, carefully assess and identify the current situation in the curriculum and study plans of each subject. Secondly, thoroughly explore the institutional context. The final important aspect is to assess the level of competence among teachers and students in applying active learning methods and utilizing digital educational tools.

> ***Carefully assess the current situation in the curriculum, explore the institutional context and assess the level of competence among teachers in applying active learning methods and utilizing digital educational tools.***

Assessing the **current curriculum situation** involves identifying the framework of the specific subject program within the curriculum and study plan. This process informs opportunities for implementing active learning methods or integrating digital competence. These frameworks may include explicitly declared educational models and indicated teaching methods. This allows us to determine the extent to which active pedagogical activities are already in place and which subjects require their inclusion in the planning process. Additionally, it is important to identify the set objectives, context, and potential needs for updates.

When exploring the **institutional context**, not only material resources and infrastructure are considered, but also the flexibility of programs and work culture, enabling the inclusion of new teaching strategies that promote student participation and engagement in their own learning, as well as organizational structures that facilitate training, co-planning, and reflection among teachers. The institutional context is where the active learning methodology is developed or intended to be developed, so the frameworks it provides define the types and extent of advancements that can currently occur. For example, students' access to the internet, various databases, or digital devices on campus is influenced by the pedagogical method choices that teachers can make.

During the assessment phase, it's crucial to assess **teachers' and students' competencies** in applying active learning methods and digital educational tools. Before introducing educational innovations, understanding these competencies is essential to ensure interventions meet current needs. For teachers, it's relevant to assess their understanding of constructivism and their competency levels in implementing active learning strategies. Similarly, it's important to evaluate students' skills in information retrieval, active reading, argumentative writing, result prediction, project design, and resolution evaluation (Castillo Rosas A; Cabral Rosetti 2022). Once students' development levels are identified, teachers can facilitate their progression to the next stages.

To ensure a structured assessment and identification process, the authors of this chapter recommend consulting the assessment instrument provided by the authors (Annex 1), which is based on reviewed literature (Benegas, 2013; Morales, 2020; Pilar, 2011; Sevilla, 2010). While this assessment instrument has not yet been statistically validated, a small peer-testing was conducted during the project. The instrument is intended to serve as a tool to assist in conducting institutional assessments and identifying needs for the implementation of the SmartNurse Methodology.

Strategy Design

The strategy design stage integrates the results of identifying the HEI's needs, encompassing potential use of active learning methods in curriculum subjects and courses, and areas for improvement in digital competences among teaching staff. The topic of **updating technological infrastructure** is crucial for continuous improvement processes and directly impacts the application of the SmartNurse Methodology. Variation in HEI administrative processes and funding sources, especially between public and private institutions and countries, must be considered.

Strategic design involves **curriculum development**, integrating digital educational tools and active learning methods into the curricular plan, and establishing objectives for digital competences and self-care support. These objectives and formats should be established within the study plan to ensure consistency and enable evaluation of their impact and progress within the classroom.

The implementation of the written curriculum hinges on teachers' readiness and competency for change (Read more in Chapter 5.1). As part of the strategic design, HEIs can devise **training plans** to equip teachers with updated pedagogical and digital competencies, while broadening their skills in diverse active learning methods. Transition-

ing from traditional pedagogy to active methodologies requires raising awareness among teachers about the benefits and providing training that extends beyond presenting scientific evidence. Teachers benefit from hands-on training in active learning methods, which actively promotes teaching skills and reflection. SmartNurse Teacher Trainings (Read more in Chapter 4.2) offer valuable insights and experiences in this regard.

> ***An integral aspect of training in active learning methods involves collaborative practice of the introduced methods***

These teachers' training sessions should foster individual reflection on teaching practices, identification of effective strategies, and understanding of students' learning challenges (Figure 38) (Benegas et al., 2013). An integral aspect of training in active learning methods involves collaborative practice of the introduced methods, such as engaging teachers in tasks like proposing solutions to their students' newly identified learning difficulties (Benegas et al., 2013). It is recommended that strategic planning for these trainings includes provisions for follow-up and result sharing. This ensures that the application of new methods can be further developed, and successes celebrated, serving as encouragement for further progress.

Figure 38. Diagram for Short Course for Professional Development of a Teacher (Benegas, et al., 2013, modified)

Designing lesson plans incorporating active learning methods is a crucial component of the strategic design phase. We advocate for collaborative lesson plan design involving a group of nursing teachers to facilitate sharing, innovation, and foster an environment conducive to experimenting with new methods. It is beneficial to integrate this developmental work with ongoing teacher training initiatives. When crafting lesson plans, it is imperative to consider factors such as the content's type and complexity, learning objectives, students' prior skills, learning styles, and available time and resources.

According to a dynamic model of active learning (Castillo Rosas & Cabral Rosetti, 2022), methods should be selected based on the desired level of complexity for student development (Table 8). This approach can also be applied to enhancing students' digital competencies and their ability to utilize active learning methods in patient education or digital assets for self-care support. Gradually increasing complexity and setting higher objectives can aid in achieving optimal outcomes in these areas.

Table 8. Model of Active Learning and Levels of Complexity (Castillo Rosas & Cabral Rosetti, 2022, modified)

Complexity level	Active learning methods
1st level	**Exercises to develop:** Listening Writing Observation Speaking Dramatization
2nd level	**Activities to train and deepen the previous level:** Active listening Analytical reading Experimentation Reflection Interaction with objects and situations Argumentative writing You can use learning based on questions, the prediction method, or constructive errors; model-based learning, among others.
3rd level	**Methodologies that deepen the level of development:** Attitudes Behaviors Critical observation Prediction Risk taking Decision making Problem solving contributing to a significant construction of the theory-practice relationship in any area of knowledge (e.g., problem-based learning, case study).
4th level	Activities that prepare the student to interact with phenomena, problems or projects from a more complex systemic perspective such as project-based learning and social hackathon.
	Smart learning, gamification and the flipped classroom are methods that can be used at all levels.

When designing or updating lesson plans, it's essential to also revise the learning assessment strategies, aligning them with the objectives and covering affective, cognitive, and psychomotor domains. Various assessment tools like rubrics, portfolios, diaries, narratives, essays, and scales can gauge student engagement in active learning.

Implementation and Follow-up

A crucial step in implementation is acquainting students with active learning methods and digital educational tools. These methods foster autonomy, commitment, and student engagement (Read more in Chapter 3.5), making early inclusion imperative. Students should be informed about the methods' purpose, scope, and benefits for their learning, emphasizing the value of their involvement and commitment. One effective approach is the use of a didactic contract strategy. This strategy prompts students to understand their responsibilities, level of autonomy, expected attitude, and available resources. It involves phases such as providing information, diagnosing prior skills, and learning styles, negotiation, application, and evaluation. The contract may explicitly outline learning objectives, content, evaluation methods, learning strategies, commitments, and available resources. (Seville & Ruggiero, 2010.)

Ethical considerations are paramount in pedagogical decision-making, also within the SmartNurse Methodology. When utilizing digital tools, platforms, and sources, it's crucial to address licensing, copyright, access equality, student privacy, and consent. Ethics is a foundational aspect of nursing education and the SmartNurse Methodology. Students must develop professional awareness regarding the ethical use of digital tools in healthcare, including confidentiality, privacy, safety, security, respect for patient autonomy, and informed consent.

When implementing active learning strategies, continuous monitoring is essential. The instrument proposed in the diagnostic phase (Annex 1) can be utilized to evaluate changes in structure, process, and results. Other effective follow-up methods include reflection exercises with teachers to identify challenges and successes, feedback forms, focus group discussions, and scales measuring student involvement in active learning or digital competencies, such as the DigCompEdu scale (Chapter 3.6 and 4.8.2).

Recommendations from the SmartNurse Project Team

An important part of disseminating and sustaining the SmartNurse project's outcomes is to share the results of applying the methodology and the outcomes it produces in various HEIs. It is essential to leverage collaboration experiences during and after the project, focusing on both positive aspects and challenges encountered during implementation, to optimally utilize all experiences and implementation options.

Based on the implementation experiences and feedback surveys collected by the SmartNurse consortium, ideas, and tips for implementing the SmartNurse Methodology have been gathered. Below, you will find practical tips for teachers (Figure 39), nursing educators' working groups (Figure 40), and our reflections for organizational stakeholders (Figure 41) when planning the implementation of the SmartNurse Methodology into their curricula at HEIs.

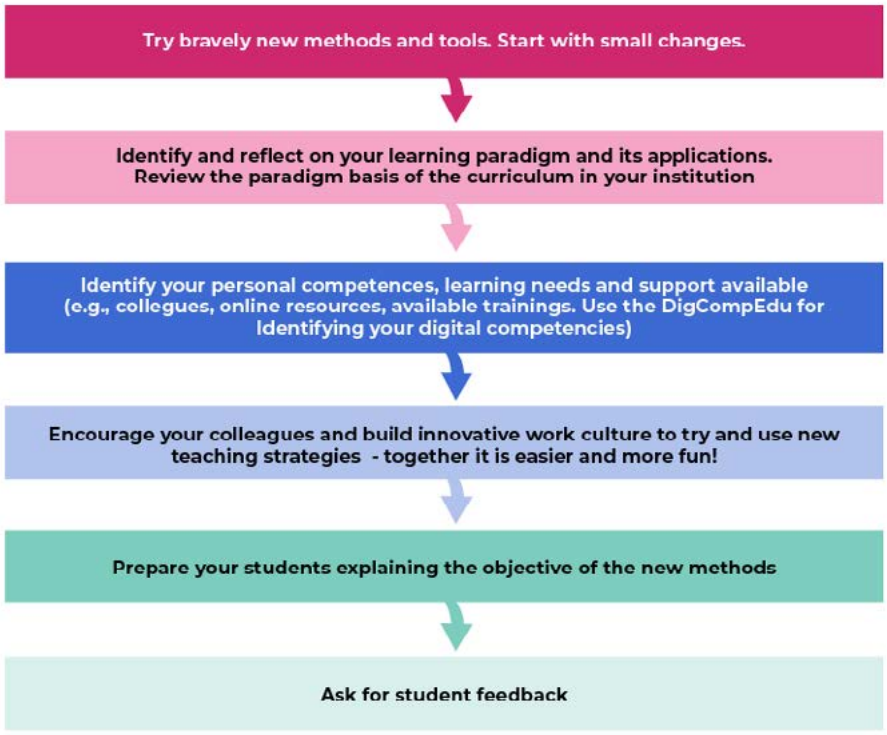

Figure 39. Practical Tips for Teachers for Implementation of SmartNurse Methodology

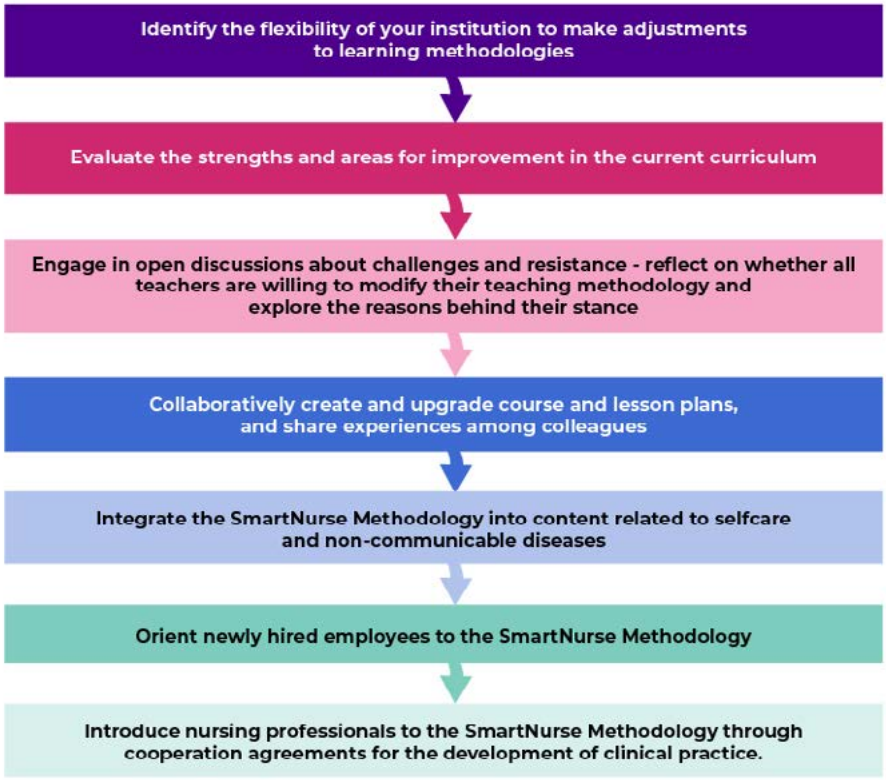

Figure 40. Tips for Your Work Team of Nursing Teachers

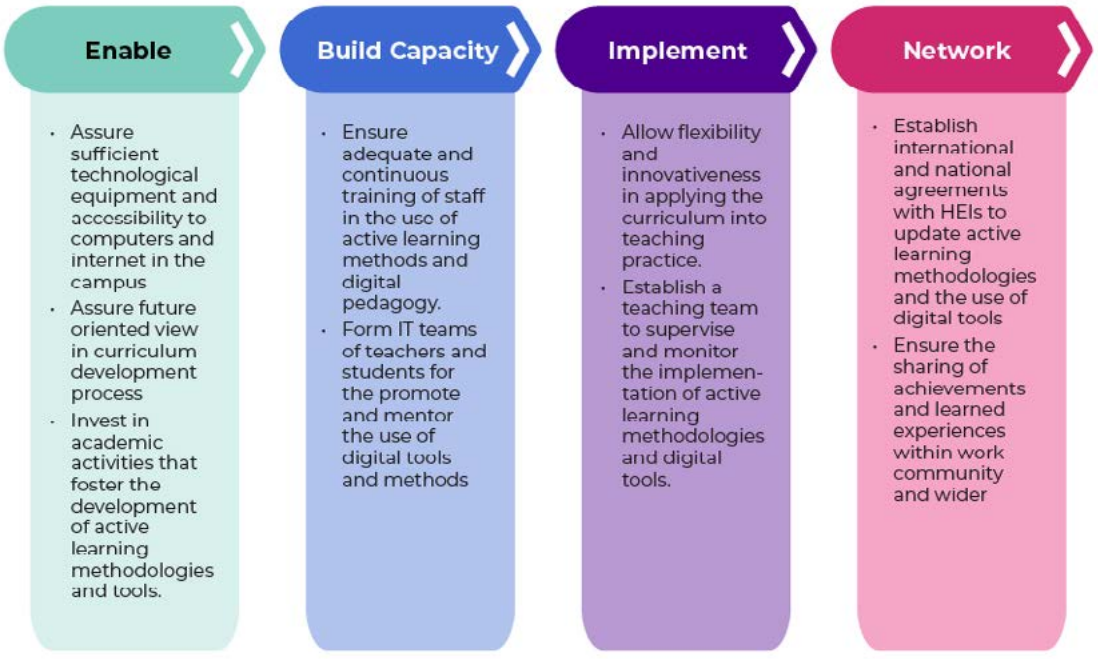

Figure 41. Recommendations for Institutional Level

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6

Discussion

Annukka Huuskonen and Nina Smolander

The SmartNurse project spanned three years, involving a multicultural team. The project work encompassed brainstorming, innovation, training, experimentation, learning from mistakes, trying again, and navigating through comfort zones, time zones, and language barriers. It entailed numerous online and face-to-face meetings, lively discussions, friendly debates, laughter, and hard work. Above all, it fostered a connection among us all, driven by a shared passion for developing nursing education. As a united SmartNurse consortium, we took a significant leap during and after the Covid-19 pandemic, aiming to enhance and improve teaching methods in Latin-American partner universities. The SmartNurse Methodology was collaboratively developed, piloted, refined, and integrated into the curricula of El Salvadorian and Mexican partner universities. In this chapter, we reflect on the accomplishments of the SmartNurse project, its outputs, and impacts, as well as the various stages of our vibrant project journey.

The SmartNurse project, a collaborative initiative under the Erasmus+ Capacity Building in Higher Education (CBHE) program, was co-funded by the European Union. This venture brought together a multicultural consortium, connecting higher education institutions (HEIs) from Finland (Tampere University of Applied Sciences), Slovenia (University of Ljubljana), El Salvador (Specialized Institute of Higher Education for Health Professionals of El Salvador, University of El Salvador, and Gerardo Barrios University), and Mexico (Autonomous University of Aguascalientes and the Autonomous University of San Luis Potosí). The project's primary focus lay in curriculum development within the El Salvadorian and Mexican partner HEIs.

The SmartNurse initiative placed a central emphasis on incorporating digitalization into both nursing education and care provision. This comprehensive effort not only entailed the development of teaching content and methods but also demanded a significant shift in mindset—from traditional to modern and active pedagogical approaches. Recognizing the imperative for this change, particularly as identified by our Latin-American partner Higher Education Institutions HEIs, the project responded through a collaborative effort. This involved the creation of the SmartNurse Methodology, conducting Teacher Training sessions to enhance educators' competences in digital and active learning methods, and implementing innovative pilot programs. These initiatives aimed to firmly establish the new learning methods in nursing education, integrating the methodology into existing curricula.

The overarching goal was to equip future nursing professionals with the essential competences needed to harness the opportunities brought about by digitalization in primary care clinical practice. Furthermore, the initiative sought to extend these benefits into health education and self-care support for patients with non-communicable diseases.

The project unfolded during the unprecedented challenges posed by the Covid-19 pandemic, an extraordinary time that both tested the

project's endeavors and underscored the significance of its objectives. The pandemic served as a catalyst, paving the way for the intended changes in nursing education. During the initial half of the project, the consortium faced the unique circumstance of having to collaborate solely through online connections due to pandemic isolation regulations, which did pose some challenges to the workflow. Despite these obstacles, the post-pandemic phase marked a significant turning point for the consortium, offering a genuine sense of accomplishment. This was, in no small part, attributed to the opportunities for the entire consortium to finally convene, innovate, and collaborate in person. This phase not only facilitated more effective teamwork but also nurtured innovative collaboration that truly flourishes when individuals have the chance to personally connect, understand each other's contexts within their institutions and societies (Picture 10).

Picture 10. The SmartNurse Transnational Meeting in Tampere, Finland 2022. The Team Visiting Tampere Centre for Skills Training and Simulation (Picture taken by Marta Gil-Carcedo Cabezon, 2022)

Collaborative creativity, brainstorming, and debates thrive most efficiently and freely when people become acquainted with each other and share the same physical space. Through this experience, we unequivocally grasped the value of face-to-face collaboration in an international project. However, we also recognize the complementary role of online connections. While online activities were integral throughout the SmartNurse project, they cannot entirely substitute for the richness of in-person interactions.

Outcomes and Achievements

The primary outcome of this project is the SmartNurse Methodology (Read more in Chapter 3). This methodology delineates the content and interconnections of key concepts pertinent to competence development in support of self-care for non-communicable diseases in the digital era. The core premise underlying the methodology is that specific contexts and pedagogical principles serve as the foundation for the development of concrete digital and active learning methods used in education, shaping the curricular framework, fostering personal growth in students transitioning into the nursing profession, and guiding teachers' continuous professional development. The tangible results emerge from the synthesis of these elements.

The SmartNurse Methodology posits that when nursing students, throughout their academic journey, cultivate active learning habits and creatively employ digital tools, they empower their patients to actively engage in self-care or health promotion. Furthermore, they gain the ability to recognize and leverage the opportunities presented by digitalization in healthcare and self-care support. This understanding and attitude evolve and deepen over the course of their studies, emphasizing that it cannot be acquired or applied through a singular, standalone course.

The SmartNurse Methodology takes the form of a tree (Read more in Chapter 3.1), effectively portraying the methodology through an analogy of growth and development. This methodology is designed to be versatile, allowing for its implementation in various institutions and diverse contexts, where it has the potential to evolve and grow into different shapes and sizes. The practical application of the methodology is influenced by the specific environment and requirements of the end-users. This includes considerations such as the availability of digital solutions in education and healthcare, as well as the adaptability of curricula. Nevertheless, the competences essential for navigating the rapidly evolving landscape of digitalization in societies remain equally crucial for both nursing teachers and students. Just as a tree continues to grow and bear fruit beyond its initial stages, the evolution of the SmartNurse Methodology should not come to a halt with the culmination of this project. Rather, the commitment to transform and modernize nursing education must be an enduring effort, akin to the persistent growth of a tree, consistently producing valuable outcomes.

Throughout the development and integration of the SmartNurse Methodology into the nursing curricula of Latin-American partner HEIs, the consortium has achieved significant milestones. A foundation was established through the creation of five descriptive literature reviews, providing the necessary theoretical underpinning (Read more in Chapter 2). The Teacher Training initiatives included 11 online sessions and 3 in-person trainings, involving a total of 98 participants from all partner HEIs. Furthermore, partners conducted various local workshops and internal training sessions, aiming to fortify competences in active learning methods and ensuring widespread distribution of competence among local nursing teachers. The implementation phase comprised three rounds of pilots (Read more in Chapter 4.1), with over 1800 students participating in the first pilot, over 1100 participants in the second, and 676 in the third. Feedback from participants in both Teacher Trainings (Read more in Chapter 4.2) and pilots (Read more in Chapter 4.8) was positive. Teachers and students expressed

satisfaction, citing motivation and enthusiasm to apply the acquired skills and methods in their studies and future professional endeavors.

The goal of incorporating digital and active learning methods into nursing education and healthcare prompted varied reactions among El Salvadorian and Mexican colleagues and students. While some participants in the pilot projects believed that digitalization held the potential to address several healthcare challenges, others were skeptical, expressing doubts about its feasibility within their healthcare context. However, the imperative for technology, underscored by the pandemic, became evident, emphasizing the necessity for its utilization in diverse environments. Furthermore, the pandemic highlighted that the efficient and innovative use of technology not only expanded educational opportunities generally but also diminished social and economic exclusion and mitigated geographic isolation. Additionally, leveraging technology aligns with the principles of the EU green deal on a global scale.

The introduction of technology also posed challenges, demanding a shift in the traditional roles within the teaching process. Teachers were challenged to redefine their positions, fostering students' self-directed learning, and emphasizing ownership of their educational journey. This paradigm shift from traditional to modern pedagogy necessitates time, enthusiasm, and support. Success in integrating it across nursing curricula requires both personal and institutional commitment, as well as a national commitment to embrace these changes.

The successful integration of project outputs into curricula is a crucial outcome for every international collaborative curriculum development effort. In this respect, the SmartNurse project stands out as highly successful, thanks to the unwavering commitment of consortium members and their respective HEIs. Notably, the SmartNurse Methodology has been incorporated into 24 different courses within the nursing curricula of partner HEIs (Read more in Chapter 5.2). This integration

extends beyond the mere inclusion in written course and lesson plans; it reflects a profound pedagogical paradigm shift, as described by participating teachers. The methodology's development has achieved flexibility and generality, allowing for a certain degree of variation in its implementation across different HEIs. Nonetheless, it has provided essential frameworks, enabling its integration to yield significant and meaningful changes and improvements in nursing education implementations.

The SmartNurse project has contributed to scholarly discourse through the publication of research articles in Spanish in LUX Medica (Número Especial, 2023). These articles draw upon the literature reviews conducted by partner HEIs (Read more in Chapter 2). Additionally, these articles derive insights from the outcomes of the pilot phases and are published in this e-book, serving as recommendations for the utilization of the SmartNurse Methodology (Read more in Chapter 5). These efforts further enhanced the capacity of the nursing teachers and specialists in the partner HEI's and played a pivotal role in disseminating and raising awareness of the project results at both national and regional levels across Latin America.

The efforts involved in dissemination activities and events, as well as sustaining project results, have demanded significant dedication from the consortium (Figure 43). Latin-American partners have taken the initiative to organize diverse local and online events aimed at presenting the project and its outcomes. They have also actively engaged with national nursing associations, healthcare education authorities, and other HEIs in the partner countries to amplify the impact of the project. Moreover, substantial work has been invested in disseminating results through various media channels, including social media campaigns. This has been complemented by the expansion of the DigiNurse Community on social media (DigiNurse Community, n.d.) and active participation in numerous webinars.

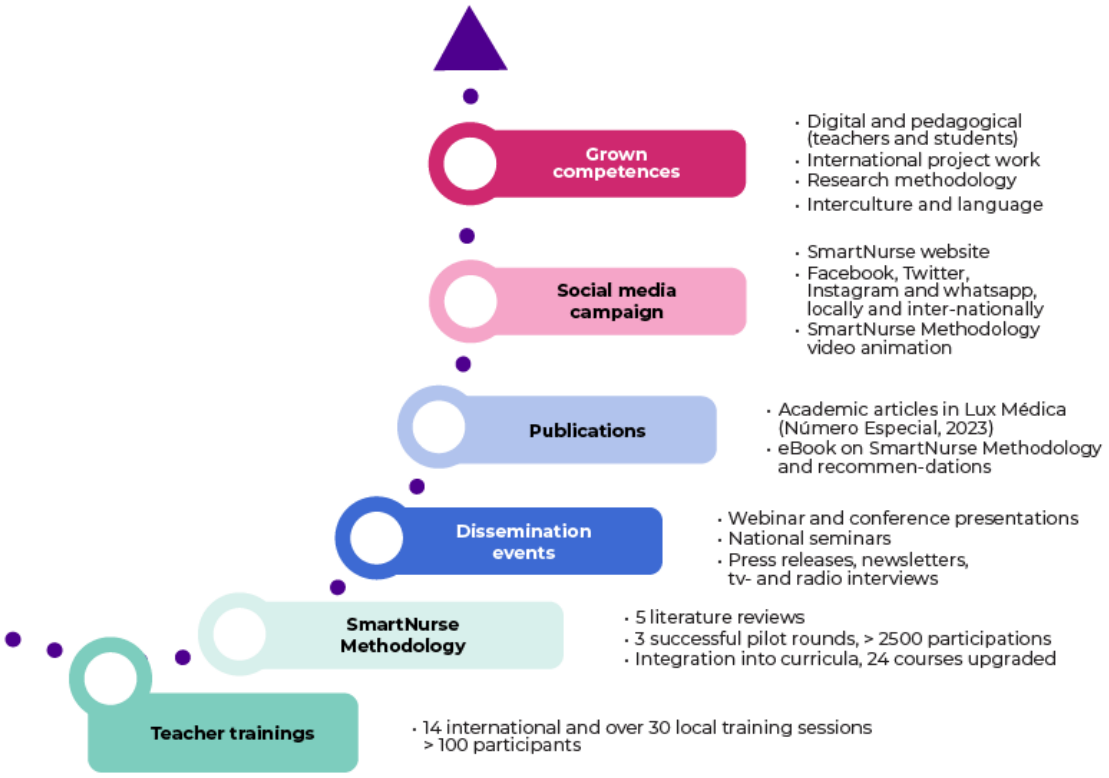

Figure 42. SmartNurse Project Achievements and Outputs

The SmartNurse project has not only met but exceeded expectations in achieving enhanced capacity, showcasing the epitome of successful joint collaborative projects. A central objective of the project was to fortify the competences of teachers in utilizing active learning methods and digitalization within nursing education, with a specific focus on primary health care, health education, and self-care support. The growth in digital and pedagogical competences among partners has been substantial, facilitated by carefully chosen working methods within the consortium. Aligned with the goals of a capacity-building project, the growth in capacity extends far beyond the initial project plan, encompassing dimensions unforeseen during the project's conceptualization. This bidirectional capacity growth underscores the mutual development experienced by all project members, marking a significant achievement in the collaborative journey.

Consortium Collaboration

The SmartNurse consortium brought together members from Europe and Latin America, representing four different countries with diverse teaching, and working cultures. Engaging in an international project was a novel experience for many of us, and some partner HEIs participated in an international project or an EU-funded initiative for the first time. Throughout the project period, there has been a substantial growth in project work competences, especially notable for team members and HEIs with no prior experience in international project work.

Throughout the project period, one aspect of our work that saw continuous development was intercultural communication. The Latin American team members notably improved their English language proficiency, gaining confidence in its usage, while European partners honed their Spanish skills. Additionally, we all learned effective and creative ways of utilizing interpretation and online translation options. The primary means of communication employed during the project included emails, a shared online working platform, and monthly consortium meetings. The use of a joint online working platform emerged as a successful solution, facilitating document sharing and co-writing. This platform significantly enhanced everyone's capacity by promoting collaboration, communication, file sharing, and access to meeting video files. Early in the project, the consortium decided to record meetings, ensuring that any team member could review them if unable to attend or to clarify any uncertainties. This practice guaranteed that everyone had the opportunity to stay updated with the ongoing project work.

In addition to these methods, bilateral online meetings proved to be an effective way of resolving and clarifying matters related to both ongoing development tasks and project management issues. Frequently, language barriers were more easily overcome in a brief video meeting, where questions could be clarified, and mutual understanding verified,

as opposed to lengthy email correspondence. However, the considerable time difference between Europe and Latin America limited the options for scheduling real-time communication.

The collaboration between European and Latin American consortium members has significantly enhanced research competences. A notable aspect of this collaboration was the concerted effort in conducting literature reviews, a pivotal step in establishing the evidence base for the SmartNurse Methodology. This task posed a considerable challenge as the employed research method was unfamiliar to most experts within the partner teams (Read more in Chapter 2). In the development process of the methodology, valuable insights were drawn from the evidence base of previous sister projects, namely DigiCare and DigiNurse (see DigiCare Model, 2023, DigiNurse Model, 2021), showcasing the effective utilization of prior research in informing and enriching the current project.

Considering the relatively short three-year project period, it is truly impressive to witness the substantial impact the project has made in shaping both thinking and practices within nursing education. This achievement would not have been possible without the unwavering commitment of the team members and the effective leadership provided by the partner HEIs. The partner HEIs have demonstrated a genuine ownership of the development process, dedicating staff time and facilitating capacity-building workshops and trainings.

Moreover, the Erasmus-funded project has played a pivotal role in supporting the investments that HEIs have made, and continue to make, in acquiring the necessary equipment and devices for digital pedagogics, thereby preparing students for the digitalization of healthcare. Recognizing that three years mark just the beginning of a development process, the ongoing work of curriculum development and the enhancement of facilities, such as improving internet connections on campuses, persist both within the HEIs and in society at large.

The success of the SmartNurse project can be attributed to the dedication, expertise, and collaborative efforts of each team member. All of us have courageously explored and innovated new ways of doing, teaching, and learning. Together, we have achieved remarkable milestones and made a positive impact on nursing education. Equally significant is the impact on collaborative connections, both within the consortium and beyond, fostering genuine friendships among its members (Picture 11). This collaboration has enriched us at professional, cultural, and personal levels, making the journey feel like it ended too soon. We ventured beyond comfort zones, traversed time zones, and surmounted language barriers, weaving a tapestry of experiences that strengthened our collective bond. It is certain that the strong connections formed between colleagues and institutions will persist.

Picture 11. The SmartNurse teams in Transnational meeting in Aguascalientes, Mexico 2023 (Picture Taken by Nazario Hernandez Reyes, 2023)

The TAMK team extends sincere thanks to all colleagues who contributed to the SmartNurse project, recognizing their hard work, enthusiasm, and the creation of a positive and supportive project family. Despite time differences and geographical distances, the SmartNurse

family remains connected. Our shared passion for advancing nursing care continues to nurture collaboration through the exchange of new project ideas, sharing expertise, and ongoing development.

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Appendices

Appendix 1

Instrument to carry out a diagnosis of pre-existing resources for the implementation of active learning in higher education institutions

UNIVERSIDAD AUTÓNOMA DE SAN LUIS POTOSÍ

FACULTAD DE ENFERMERÍA Y NUTRICIÓN

PROYECTO DE INVESTIGACION “SmartNurse”

Instructions:

- Mark with an X what you consider in each question.
- You can use pencil or pencil
- In the mapping section, you can answer using the subjects taught in the current semester.
- At the end there is a section for comments, where you can write if you find sections that need to be improved.

<table>
<tr><td colspan="4">Institutional context</td></tr>
<tr><td></td><td>ITEM</td><td>Yes</td><td>Not</td></tr>
<tr><td rowspan="4">Curriculum design and educational programs</td><td>Is Constructivism considered in the curriculum?</td><td>0</td><td>1</td></tr>
<tr><td>Is the active learning methodology considered in the study plan?</td><td>0</td><td>1</td></tr>
<tr><td>In the syllabi of subjects and subjects, is active learning explicitly described?</td><td>0</td><td>1</td></tr>
<tr><td colspan="3">Prepare a mapping of subjects with the methodology implemented by subject

<table>
<tr><td rowspan="2">Semester</td><td rowspan="2">Subject</td><td rowspan="2">Methodology</td><td colspan="2">Active learning is possible</td></tr>
<tr><td>Yes</td><td>Not</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
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</table>

infrastructure	Does the educational institution…		
	have internet access for students and teachers?	0	1
	have computer equipment for students and teachers?	0	1
	have specific areas for clinical simulation?	0	1
	have clinical simulation equipment?	0	1
	is flexible regarding teaching methodologies?	0	1
	Is flexible to changes?	0	1

Student competencies				
As a teacher, do you consider that the student…		GOOD	REGULAR	INCIPIENT
First level learning Skills	Is interested in her own learning?	2	1	0
	Has skills to search for information?	2	1	0
	Does active reading?	2	1	0
	Listens actively?	2	1	0
	Writes argumentatively?	2	1	0
	Interacts collaboratively?	2	1	0
	Reflects argumentatively?	2	1	0
Second level skills	Analyzes reality critically	2	1	0
	Identifies risks?	2	1	0
	Predicts results?	2	1	0
	Makes informed decisions?	2	1	0
Third level skills	Solves problems?	2	1	0
	Deigns projects?	2	1	0
	Operates projects or resolutions?	2	1	0
	Evaluates projects and/or resolutions?	2	1	0

Teaching competencies / didactic planning				
	ITEM	GOOD	REGULAR	INCIPIENT
	Does the teacher identify the constructivist pedagogical theory in the curriculum and/or subject program?	2	1	0
	Does the teacher clearly establish the role of students in the active learning process?	2	1	0
	Does the teacher set learning objectives? (performs a formative rather than informative function)	2	1	0
	Does the teacher design methodological strategies according to the stated objectives? (group dynamics, activities involving comprehension tasks)	2	1	0
	Does the teacher employ support strategies or aids in the classroom?	2	1	0
	(Helps clarify and understand concepts)	2	1	0
	Does the teacher apply assessment mechanisms consistent with the objectives?	2	1	0

Instrument Interpretation

Institutional context	
Punctuation	Interpretation
9 a 7	It is possible to implement active learning methodologies with some adjustments
6 a 4	Adjustments are required in the methodological structure of the curricular plan. As long as the institution is flexible enough to make adjustments
0 a 3	It is not possible to implement active learning strategies, particularly if you do not have the institutional flexibility and the disposition of the authorities for chance.
Student competencies	
15 a 11	Students have sufficient skills, and it is possible to start or continue with the implementation of active learning methodologies. With this level of competences, it is recommended to promote the fourth level of development
10 a 6	Students have a regular level of skills; it is possible to strengthen the skills of students. With this level of competences, it is recommended to promote the second level of development.
5 a 0	The students have an incipient level of competences, it is necessary to strengthen the competences of the students. With this level of competences, it is recommended to promote the first and second level of development
Teaching competencies / didactic planning	
16 - 11	Teachers have sufficient skills to implement active learning and it is possible to continue with the didactic methodology that has been implemented so far. With this level of competencies, teachers can use teaching strategies that promote the fourth level of development.
10 - 5	Teachers have a regular level of competencies; it is necessary to train them and encourage them to start working with teaching strategies that promote the third level of development.
4 - 0	Teachers have an incipient level of competencies; it is necessary to train them and encourage them to start working with teaching strategies that promote the second level of development.

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SmartNurse

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