

# TECHNOLOGICAL COMPETENCY AS CARING IN NURSING: A DESCRIPTION, ANALYSIS AND EVALUATION OF THE THEORY

## OPIS, ANALIZA IN EVALVACIJA TEORIJE “TEHNOLOŠKA KOMPETENTNOST KOT SKRB V ZDRAVSTVENI NEGI”

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### ABSTRACT

#### Keywords:

Rozzano C. Locsin, technology, nursing theory, nursing practice

**Introduction:** When introducing and using technology in nursing, there is a danger that too much focus is placed on technology over caring for patients. The ‘Technological competency as caring in nursing’ theory can facilitate technology in caring, but the theory needs to be described, analysed and evaluated before it is used. The purpose of the literature review was to determine the possibility of applying the theory in education, research and practice, and whether the theory could be used to guide research into the use of electronic nursing record systems.

**Methods:** A literature search was conducted in PubMed, CINAHL, ScienceDirect, Google Scholar and Google Books, and supplemented with manual searching using the keywords ‘Locsin’, ‘technology’, ‘caring’ and ‘nursing theory’. The criteria for inclusion were fully accessible articles and books in English on the relevant topics. The review process is shown in a PRISMA diagram. A hierarchy of evidence was used to evaluate the relative strength of the results. Pajnkihar’s model was used to describe, analyse and evaluate the theory.

**Results:** A total of 26 hits were included in the final analysis. The theory in question meets the criteria of clarity, simplicity and complexity, adequacy, importance and significance; it can be tested; and it is useful in patient care that employs technology.

**Discussion and conclusion:** The theory is useful in nursing education, research and practice. The theory will be used to guide research on the perception of technological competency and care of internal medicine patients by nurses when using the electronic nursing record system in three Slovenian hospitals.

### IZVLEČEK

#### Ključne besede:

Rozzano C. Locsin, tehnologija, teorija zdravstvene nege, praksa zdravstvene nege

**Uvod:** Pri uvajanju in uporabi tehnologije v zdravstveni negi obstaja možnost, da se bolj osredotočamo na uporabo tehnologije kot skrb za pacienta. Teorija “tehnološka kompetentnost kot skrb v zdravstveni negi” olajša vključitev tehnologije v skrbno obravnavo pacienta, vendar jo je pred uporabo treba opisati, analizirati in ovrednotiti. Namen raziskave je bil ugotoviti možnost uporabe teorije na področju izobraževanja, raziskovanja in prakse zdravstvene nege ter njeno skladnost s podporo raziskave o uporabi elektronskega zapisa zdravstvene nege.

**Metode:** Pregled literature je bil izveden v podatkovnih bazah PubMed, CINAHL, ScienceDirect ter tudi Google Scholar, Google Books in dopolnjen z ročnim iskanjem s pomočjo ključnih besed “Locsin”, “technology”, “caring” in “nursing theory”. Kriterija za končno analizo sta bila polna dostopnost člankov in knjige v angleškem jeziku z ustrezno tematiko. Za prikaz poteka pregleda literature je bil uporabljen diagram PRISMA. Identificirani zadetki so bili uvrščeni v nivo glede na hierarhijo dokazov. Za opis, analizo in vrednotenje teorije je bil uporabljen model avtorice Pajnkihar.

**Rezultati:** V končno analizo je bilo vključenih 26 zadetkov. Izbrana teorija zadosti kriterijem jasnosti, enostavnosti in kompleksnosti, ustreznosti, pomembnosti in pomenu. Teorijo je možno testirati in je uporabna pri oskrbi pacientov, kjer se uporablja tehnologija.

**Zaključki:** Teorija je uporabna v izobraževanju, raziskovanju in praksi zdravstvene nege ter bo podpirala raziskavo o zaznavanju tehnološke usposobljenosti in skrbne obravnave internističnih pacientov pri medicinskih sestrah v treh slovenskih bolnišnicah, kjer se uporablja elektronski zapis zdravstvene nege.

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## 1 INTRODUCTION

The use of technology is becoming increasingly common in nursing (1, 2). It can be classified as a completer of human beings (prosthetic devices for missing body parts or non-functional ones), instruments, and gadgets that facilitate human care of persons (computers) and mimic human beings (robots) (3). Advances in technology can impact human health and enable nurses to perform their work efficiently and safely (4). Technology can bring the patient closer to the nurse by enhancing the nurse's ability to know more about the person. However, there is also the possibility that the focus of treatment moves from the patient and patient care to the technology itself. The use of technology can also increase the gap in the interpersonal relationship between the nurse and the patient, as exhibited by the conscious disregard of the patient as a 'person' (2) and ignorance of the nursing imperative to know the patient as a 'person' (2, 5). The latter affects patient and nurse satisfaction, and the quality and safety of patient care (1, 6). Focus should be placed on nurse-caring behaviours that contribute to patient satisfaction and well-being (7). Caring is a fundamental concept of nursing that manifests itself as the genuine, intentional presence of a nurse with the person cared for. Holistic care is needed, and the competent use of technology could support patient care (2, 5). Nursing theories can help nurses focus on caring for patients and their families. Locsin's 'Technological Competency as Caring in Nursing' (TCCN) theory is one of the nursing theories that refers to care and the use of technologies in nursing (5, 6). In caring for patients, this theory gives significance to knowing people, a continuous process in which the nurse and the nursed can affirm, celebrate and support each other (1). The empirical, personal, ethical and aesthetic ways of knowing that are fundamental to understanding patients as a whole increase the likelihood of being able to know patients (5). The use of technologies in nursing is consequent to the contemporary demands for nursing actions that require technological knowing. Technological knowing is a way of knowing in nursing, engaging the competent use of technologies of care to get to know patients as a whole. Through technological knowing, both nurse and nursed are appreciated as a whole, as people whose hopes, dreams and aspirations matter most in living their lives fully as whole persons (5). Locsin's theory represents the theoretical starting points for using technology and caring as a coordinated interaction in the nursing environment. Theory-based nursing practice is essential to high-quality nursing and healthcare (3).

The e-health project in Slovenia was launched in 2005; however, we still do not have a comprehensive health information system, which hinders the development of the healthcare system and affects the quality of healthcare services (8, 9). Important areas for further e-health development are the accessibility and completeness of personal e-health data (10).

The implementation of Locsin's theory can further develop the electronic nursing record system (ENRS), which is a part of the health information system. Theory-based ENRS could utilise the language of caring human dimensions of nursing practice, and not only physical needs and medical conditions. ENRS can provide patient information to multiple healthcare providers and allow better-coordinated care (4). ENRS development can improve the quality of healthcare services (9). However, the theory needs to be described, analysed and evaluated to determine its applicability to clinical settings, research and education (11).

This paper therefore sets out to describe, analyse and evaluate Locsin's 'Technological Competency as Caring in Nursing' theory.

The goals are to identify the usefulness of theory in nursing and to determine whether the theory can be used to guide research on using the ENRS.

## 2 METHODS

A systematic literature review was conducted.

### 2.1 Search and eligibility criteria

A search was conducted in November 2021 using PubMed, CINAHL, ScienceDirect, Google Scholar and Google Books. It was supplemented by a manual search. The search was performed using keywords in English with the following search combination: ("technology" OR "technological competency") AND ("caring") AND ("nursing theory"). Full-text articles, books and book chapters published in English by November 2021 were considered for review. The exclusion criteria were letters to the editor, editorials and literature in other foreign languages, as well as literature unrelated to the research topic.

### 2.2 Study identification and selection

Figure 1 contains a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (12) flow diagram of study selection. Two independent investigators were included in the study identification. Any disagreement was resolved by discussion or by the involvement of a third investigator.

### 2.3 Quality appraisal and data analysis

To assess the quality of the review, we classified the results into a hierarchy of evidence. A seven-level hierarchy of evidence was used: Level I (randomised clinical trials (RCTs) and systematic review of non-randomised trials), Level II (individual RCT studies, single non-randomised trial), Level III (systematic review of correlational/observational studies), Level IV (single

correlational/observational study), Level V (systematic review of descriptive/qualitative studies), Level VI (single descriptive/qualitative study), and Level VII (opinions of authorities, expert committees) (13).

To describe and analyse the theory’s context, content and scope, and to evaluate the theory in terms of its clarity, simplicity/complexity, importance/significance, adequacy, testability, acceptance, the model developed by Pajnkihar was used (11, 14).

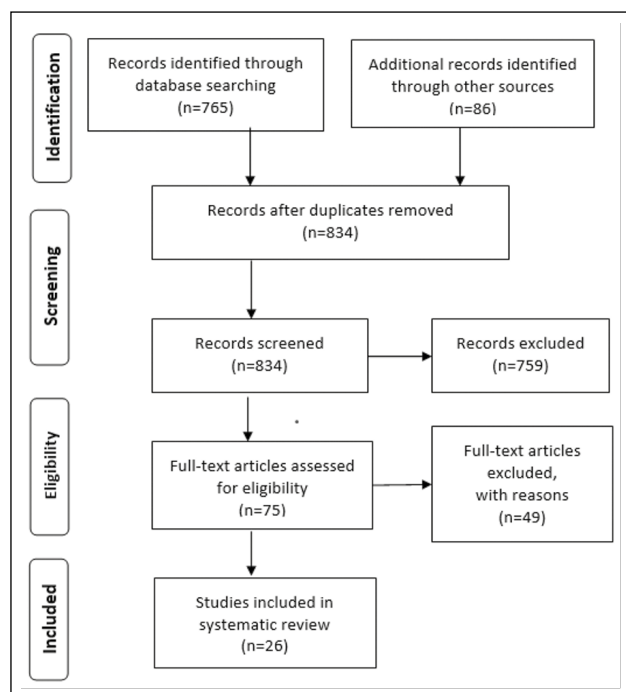


Figure 1. PRISMA diagram.

### 3 RESULTS

The search yielded a total of 765 records in electronic databases and 86 from other sources. Using the EndNote program reference manager software, we identified and removed duplicates (n=17) and then reviewed the remaining records by title and abstract to ascertain their eligibility (n=207). A total of 759 records were excluded. After the full texts were retrieved (n=75), 49 full texts were excluded because their content was not relevant to the study. A total of 26 records were included in the final analysis (Figure 1).

Table 1 shows the characteristics of the studies included and their classification in the hierarchy of evidence. The literature included was ranked with the fourth (15-22), fifth (2, 23), sixth (1, 6, 24-25) and seventh (3-5, 26-34) hierarchy of evidence levels.

Table 1. Summary of studies included.

Reference	Research design or typology	Aim of study	Sample	Key findings	Hierarchy of evidence
(15)	Quantitative, descriptive survey	To identify the impact of nursing education on nurses’ behaviour using the simulation technology supported by TCCN theory.	Nursing students (n=9)	Researchers have shown that caring behaviour can be developed using simulation technologies.	Level 4
(16)	Quantitative descriptive survey	To confirm the criterion-related validity of PITCCN.	Nurses (n=421)	The criterion-related validity of PITCCN could be confirmed.	Level 4
(17)	Quantitative, psychometric evaluation	Validation of the PITCCN questionnaire and performance of factor analysis.	Nurses (n=299)	The survey showed that the PITCCN questionnaire was valid and reliable for measuring TCCN.	Level 4
(18)	Quantitative, descriptive survey	To identify managers’ and staff nurses’ perceptions regarding the TCCN theory at 11 general hospitals in Japan.	Nurses (n=421)	Continuous education is needed regarding the practice of nursing based on the TCCN theory.	Level 4
(19)	Quantitative, psychometric evaluation	To assess the psychometric properties and establish the reliability and validity of the Japanese version of the TCCNI-R.	Nurses (n=590)	Content validity and reliability of the TCCN-R was confirmed.	Level 4

Reference	Research design or typology	Aim of study	Sample	Key findings	Hierarchy of evidence
(20)	Descriptive, psychometric evaluation	Validity of the instrument for measuring TCCN.	Experts in theory and practice (n=13)	The experts confirmed the substantive validity.	Level 4
(21)	Quantitative, descriptive survey	To explore how nurses working in intensive care units implement nursing practice based on the TCCN theory.	Nurses (n=426)	Ratings for TCCN were significantly higher in the group that conducted the training, which included caring behaviour.	Level 4
(22)	Quantitative, pre-test/post-test	Pre-test - post-test self-evaluations to rate students' confidence in using Locsin's theory.	Nursing students (n=27)	Students' confidence in using the theory in practice was significantly higher after the simulation.	Level 4
(23)	Descriptive, literature review	Describe TCCN theory and its contribution to science and the nursing process.	/	TCCN is a medium-range theory in nursing that provides a theoretical framework for research and is applicable in practice and education.	Level 5
(2)	Describe the development of TCCN theory.	Descriptive, literature review.	/	A theoretical framework for using the theory in both research and practice.	Level 5
(1)	Qualitative, phenomenological study	Describe the importance of the experience of nurses caring for patients who are vitally dependent on technologies in the intensive care unit.	Nurses (n=10)	The application of the theory is to assist nurses in achieving high-quality care for patients in the intensive care unit.	Level 6
(6)	Qualitative research, hermeneutic phenomenological study	Describe the importance of technology-dependent patient experiences in the intensive care unit.	Patients (n=10)	In practice, nurses should know the importance of their patient's experiences. This would allow them to anticipate the patients' needs and improve their experience by providing appropriate interventions involving the use of technology.	Level 6
(24)	Qualitative, hermeneutic phenomenological study	Describe the importance of the experience of family caregivers.	Family members (n=10)	Family caregivers described their experiences (nurses should support family carers and share care experiences, and should teach family carers to use technologies, alarms).	Level 6
(25)	Qualitative, hermeneutic phenomenology	To describe caring in nursing by Japanese nursing students.	Nursing students (n=61)	Caring in nursing focused on whole-person relating, practice competency and reciprocal relationships.	Level 6
(3)	Professional article	Clarify the impact of advanced technology on healthcare.	/	With timely development, the integration of technological competence into nursing practice for the professional use of advanced technology can be imbued with artificial intelligence.	Level 7
(4)	Professional article	Answer the research question 'How can nurses remain relevant in the technologically advanced future?'	/	Technology can perform routine tasks so that nurses can spend more time interacting with the patient. There is a need to transform nursing education that incorporates technology, and increase the focus on nursing research that explores the effects of using technology in practice.	Level 7

Reference	Research design or typology	Aim of study	Sample	Key findings	Hierarchy of evidence
(26)	Professional article	Describe the approach to student learning through the simulation of the use of technology and caring.	/	The use of simulation in the use of technology in patient care should be introduced in education at colleges.	Level 7
(27)	Professional article	Development of the idea of co-creation of moments as caring that arises in knowing people within the technological domain.	/	Technological competency as an expression of caring in nursing that maintains, supports and values caring people through mutually satisfying representations of co-creation moments in nursing.	Level 7
(28)	Professional article	Describe the application of the TCCN theory in nursing.	/	With the increased use of technologies and the consequent technological dependence of care recipients, the TCCN theory must be used.	Level 7
(29)	Professional article	Explain the process of nursing within the context of knowing persons within the TCCN theory.	/	Maintaining the impact of technological competency as caring in the complex world of nursing is critical to the mutual interaction between nurse and patient.	Level 7
(30)	Professional article	Describe the development of the TCCN theory.	/	The TCCN theory could encourage more opportunities for the growth of philosophical and practical values.	Level 7
(31)	Professional article	To describe the disciplinary recommendations of developing humanoid nursing robots.	/	The use of nursing robots will redefine conceptual frameworks of comfort and safety in particular.	Level 7
(32)	Professional article	To describe education programme for nursing administrators focused on the TCCN theory.	/	An organised education plan could improve the quality of nursing care.	Level 7
(33)	Author's opinion	Analysis of the TCCN theory.	/	Origin of the theory, clarity, simplicity, further theory generation, credibility, and the contribution of the theory to nursing.	Level 7
(5)	Author's opinion	Presentation of the author and the TCCN theory, the process of knowing persons as a whole.	/	In the nursing process, technologies are used to know the person as a whole at a given moment.	Level 7
(34)	Author's opinion	Understanding philosophies, theories, / models and taxonomies in nursing.	/	Frameworks for advanced nursing and research practice. Basic knowledge to improve understanding of the theory.	Level 7

Legend: TCCN - Technological Competency as Caring in Nursing, PITCCN - Perceived Inventory of Technological Competency as Caring in Nursing, TCCN-R - Technological Competency as Caring in Nursing Instrument-Revised.

### 3.1 Description and analysis of the theory

#### 3.1.1 Author, origins, development of the theory and the philosophy of science

Locsin developed the theory based on Boykin and Schoenhofer's 'Nursing as caring' theory: a model for transforming practice based on caring as the primary nursing role (35). It also feels the influence of theorist Ray

and her 'Technological caring: a new model in critical care', in which she stressed the importance of technological care in intensive care (2, 36). The development of the theory was greatly influenced by hermeneutic phenomenology and the philosopher Heidegger. He expressed concern about the adoption of technology without critical evaluation. He stressed that technology would be accepted insofar

as we do not become too dependent on it in the future (34). Locsin's perspective of caring for and understanding human beings refers to Parse's simultaneous paradigm (simultaneity) and the recognition that the whole person is more important than the sum of its parts (37). Locsin also included four ways of knowing (empirical, personal, ethical and aesthetic), which he summarised after the theorist Carper (2, 38), adding that technologies in nursing required technological knowing (5). We can speak of historicism and retroductive judgment in theory development, which led to the development of a new specific theory.

### 3.1.2 Scope, level of abstraction and metaparadigm

The selected theory is a middle-range explanatory theory, as it clearly describes phenomena and concepts, and provides relationships between them (5, 23, 27). Locsin explains the metaparadigm through a person, nursing, health and the environment. He defines a person as a whole, in a given moment, and one who is constantly growing, changes according to personal conditions and experiences, and is a union of mind, body and spirit. Technologies of care support the expectations of persons that they will be known as participants in their care rather than as objects of care (2, 5). Locsin's definition of nursing is the concept of caring and intentionality (33). Each person is unique and individual, so the definition of health varies from person to person, depending on their hopes and desires. The environment in Locsin's theory is narrow and tied to the technological environment (2, 5, 29).

### 3.1.3 Assumptions

Locsin grounded his theory in several key assumptions, the first two of which are derived from Boykin and Schoenhofer's theory:

- Persons are caring by virtue of their humanness (35).
- Nursing is a discipline and a professional practice (35).
- The ideal of wholeness is a perspective of unity (2, 3).
- Knowing persons is a multidimensional process (2, 3).
- Technologies of health and nursing are elements for caring (2, 3).

### 3.1.4 Phenomena

The theory focuses on recognising human beings as complete in their being without reference to composing a part. The nurses should focus on nursing as a shared lived experience between the nurse and the person cared for, rather than fixing the person or completing the person's missing parts. Three phenomena are addressed in theory: 'being cared for', 'caring for', and 'technology'. 'Being cared for' refers to the patient's experience. 'Caring for' is based on the nurse's experience. 'Technology' can bring the patient closer to the nurse, which allows the nurse to know the patient more fully as whole and complete (1, 6, 24).

### 3.1.5 Concepts and propositions

The following concepts are defined: technologies in nursing, caring in nursing, and human beings as persons (2). The focus of nursing is to know persons (2). Empirical, ethical, aesthetic and personal knowing are ways of knowing persons (38) and are fundamental to understanding a person as a whole (2). Technologies in nursing are tools that nurses use in practice. The use of technologies in nursing is consequent to the contemporary demands for nursing actions that require technological knowing. Technological knowing is a way of knowing in nursing that engages the competent use of technologies to enable a nurse to get to know a person as a whole (5). The use of technology in nursing can be complementary to human beings through technology (prostheses), the use of technology in the form of various machines (computers), and technologies that mimic man and his activities, such as cyborgs, anthropomorphic machines and robots (2, 27). Caring actions are perceived as compassion, conscience, trust and commitment (2). Locsin explains the view of a person as a person he sees as a whole, who is unique (with dreams, hopes, and desires), whole (body, mind, soul) and perfect (regardless of illness). He cited propositions as the continuous acquisition of information obtained through technologies in nursing - about human beings who are dynamic and unpredictable as a holistic person. The expansion of technology in nursing is an ever-changing and demanding process, while caring in nursing is the substantive body of knowledge that drives the practice of knowing persons (2, 5).

## 3.2 Theory evaluation

### 3.2.1 Clarity

The concepts and propositions of the theory are clear, described and presented in the schemes. Locsin is consistent in structure, but often cites the use of technology to know the patient as a whole while stating that technology, by its nature, reduces relationships with people, who can only become an object made up of parts (28).

### 3.2.2 Simplicity and complexity

The theory is simple, as it contains some concepts and propositions (11, 33). The concepts are logically connected, and the propositions clearly explain the connections between them, making the theory complex (11). Because of its simplicity and complexity, the theory can be applied in nursing environments in which technology is used (33).

### 3.2.3 Adequacy

The theory is adequate for practice, education, and research (33). The author cites a narrow field of application, which is mainly reflected in the use of technology, caring in nursing and knowing the person (2, 5, 33). Due to the increasing development of technology

in our environment, Locsin's theory could be applied to all areas of nursing. Technology is increasingly present in education, so it is necessary to also educate and develop technological competence in this field (4, 22, 25, 26, 32).

### 3.2.4 Testability

The theory can be tested because the instrument is developed and contains empirical indicators by which we measure concepts (20). The Technological Competency as Caring in Nursing Instrument (TCCNI) was developed by Parcels and Locsin (20). A survey of nurses in intensive care units in Japan was conducted to detect technological competency, using the developed Perceived Inventory of Technological Competency as Caring and Nursing (PITCCN). The PITCCN focused on nurses' technological caring behaviours in acute care settings (21). The PITCCN has been further upgraded and psychometrically tested (16, 17). The PITCCN constituted of four factors: (1) Training of nurses to provide optimal care, (2) Intentional and ethical nursing of a person, (3) Utilisation of information obtained from technology and continuous knowing, and (4) Empirical knowledge and whole human knowing. The results of the studies showed that the PITCCN questionnaire is valid and reliable for measuring TCCN (17). Technological Competency as Caring in Nursing Instrument-Revised (TCCNI-R) was also developed to measure technological competency as an expression of caring in nursing. TCCNI-R was constructed as a four-factor: (1) Nursing expression as caring, (2) Technological competency as caring, (3) Technology and caring, (4) Technological knowing (19). The TCCNI-R was also used in the survey to determine managers' and staff nurses' perceptions regarding the TCCN theory in general hospitals in Japan. (18).

### 3.2.5 Acceptance

Because the theory was only recently developed, there has not yet been a great deal of research (17, 21). Nevertheless, the theory can serve as a theoretical framework for nursing practice, as it coincides with the rapid development of technology. The research found that education related to caring behaviour and the use of technology was needed (25). There is a need to increase the focus on research in nursing that explores the effects of using technology in the profession and the ways in which the use of technology can be mastered in practice (4). Content related to the use of technologies and clinical simulation should be included in nursing education (15, 22, 25, 26).

### 3.2.6 Importance and significance

The importance of the theory in nursing relates to its clinical value, which is reflected in nursing areas, especially in highly developed technological environments such as intensive care units (5, 21, 23). The theory can

also be applied in environments where technology is used as a complement to man through technology that mimics man and his activities, and in the use of computers (2, 27). Its importance for the discipline of nursing is seen with the development of theory that contributes to the development of knowledge (2, 30).

## 4 DISCUSSION

Technology is becoming increasingly more integrated into nursing practice and increasingly complex. Locsin developed the TCCN theory as a way of solving problems using technologies in nursing (27, 29), and described the nurses' technological competency as expressing caring in nursing (19). The theory is useful in nursing research, education and practice. Despite certain limitations of the literature review, such as exclusively English texts and the inclusion of hits belonging to the fourth to seventh levels of the hierarchy of evidence, knowledge development is essential. The studies show that nursing education related to caring and technology is needed. The introduction of simulations in student education and the application of the theory are appropriate in the educational environment (4, 15, 32). The TCCN theory has been used in several studies of nursing practice (6, 16-19, 21, 24, 39). Nurses should involve family members in patient care and share experiences (24). The importance of patient experience was confirmed and can allow nurses to anticipate patient needs and improve their experience by providing appropriate nursing interventions involving technology (6). Several instruments were developed from the TCCN theory to measure nurses' behaviour of technological competency as expressing caring in nursing and tested in clinical settings. The TCCNI was developed by Parcels and Locsin (20), and the PITCCN was developed and tested in intensive care units (21) and acute care settings in hospitals in Japan (17). The TCCNI-R was tested in general hospitals in Japan (18, 19). The studies showed that the TCCN theory could be applied in high-tech developed settings (21) and all environments in which technology is used (18, 19). The theory has not been tested in various demographic areas, such as Europe. Most studies have been conducted in Asian countries. Nurses' professional practice environments are different, and are also related to demographic, cultural, health-system and technological development (17). The theory should therefore be tested in various countries (17, 19), including Slovenia. The TCCN theory can contribute to the development of an ENRS (40) and will guide our study in implementing the ENRS. Technology - ENRS will be used to know the patients as ever-changing from moment to moment (27). Technological knowing will be a way of understanding patients. We will include knowing as understanding the patients' needs, including physical and emotional needs

and health conditions, which will be documented in the ENRS. While using ENRS, it is necessary to understand the patients as unique in their wholeness (2, 19, 27). There are essential caring activities, such as carefully listening to patients, showing compassion, meeting the patients' needs and thoughtful consideration of patients' lifestyles (2, 18), that should be implemented and not focus on the use of technology, in our case the ENRS.

## 5 CONCLUSION

The theory provides important theoretical starting points in the competent use of technology, emphasising caring for the patient as a whole and not focusing only on the patient's medical condition. It also provides nurses with important guidelines for preventing technological dependence on technology, and places the patient at the centre of care. In our study on nurses' perceptions of technological competency and caring for internal medicine patients when using the electronic nursing record system, the TCCN theory will be included in three Slovenian hospitals. The theoretical starting points of TCCN theory will help us identify and propose strategies to include the language of caring and caring behaviours in the ENRS. The survey findings can also impact the further development of the ENRS and the health information system in Slovenia.

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## CONFLICT OF INTEREST

The authors declare that no conflicts of interest exist.

## ETHICAL APPROVAL

As this paper does not report on any study, ethical approval was not acquired.

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