

Situated Teaching Applied to Nursing Evaluation Based in Gordon's Patterns

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Abstract

Nursing evaluation (NE), the first step in Nursing Process (NP), is essential for the clinical judgment, although students bear limitations to integer the 11 Functional Patterns (FP) of M. Gordon. With the purpose to strengthen this competence, a strategy based in Situated Teaching (ST), mediated by the Case Method (CM) in students of the sixth semester of nursing, was designed and implemented. **Aim:** to promote the skills development for NE during the NP, through the ST implementation. **Method:** A mixed investigation-action study, quasi-experimental with repeated measurements and triangulation. Twenty-nine students participated, and a theoretical test of 20 items was applied, as well as an observation guide along 14 sessions, and 29 semi-structured interviews analyzed with MAXQDA. Paired *t* test, Wilcoxon, Kendall's W, and Hedges' g, were used. **Results:** The theoretical score increased from 18.17 ± 1.29 to 18.93 ± 1.09 ($p = 0.005$; $g = 0.55$). The performance showed progression ($10 \rightarrow 18 \rightarrow 28/30$; $W = 0.97$), and the qualitative analysis revealed five axial convergent topics. **Conclusion:** The ST, supported by the CM, potentiates the skills for the NE, integrating theory and practice and strengthening clinical judgment, being a didactic, effective, and reproducible model.

Keywords

Nursing Process, Nursing Evaluation, Functional Patterns, Situated Teaching, Case Method

1. Introduction

Nursing, as a scientific and humanistic discipline, has been consolidated during a long process of theoretical and practical transformation, seeking to warrant inte-

gral care and quality for patients; a fundamental pillar in this profession is the Nursing Process (NP), which is a methodological tool to plan and execute systematic and personalized care. Inside this process the Nursing Evaluation (NE), *i.e.*, the systematic and continuous process from which the nursing professional collect, organize and analyze data, relevant to determine the health status of the patient; it represents the first step, and the basis for to substantiate the clinical decisions (Nursing diagnoses), and the care plans [1].

Globally diverse studies highlighted the difficulties in implementing the NE in the training of health professionals in nursing, such that a report from the World Health Organization (WHO) highlights the importance of standardizing the teaching methods in Nursing, to ensure that the graduates own the necessary competencies to integrally evaluate the health status of patients [2]. A recent report shows that the use of Gordon's Functional Patterns (FP), substantially improved care quality when it is properly implemented in educational programs [3]. Although in Cuba Nursing training has advanced toward educative models, flexible and student centered, some challenges persist regarding the effective application of NP, in clinical teaching [4]. Whereas in Colombia last semesters students report difficulties to apply the NP in real settings, which jeopardizes their integral domain of the process [5].

In Mexico the NE also faces important challenges, just to illustrate, in a study where 68% of Nursing students from public universities showed difficulties to integer theoretical concepts of NE in practical settings [6], these deficiencies are mostly related with traditional teaching, the lack of updated didactic tools, and the absence of methods that promote the critical thinking and the Situated Learning. In a public University, the results of an exploratory study indicate that 75% of students, from the sixth semester, had difficulties to apply the Gordon's 11 FP during their clinical rotations, this situation is attributable to that teaching of NE occurs, predominantly, in a theoretical way in the initial semesters, without reinforcing it in higher clinical settings; along this line, authors evaluated the Problem-Based Learning (PBL), applied to situated surroundings (*in situ*), for teaching the evaluation within the NP in first year students, showing that the strategy allowed the students to develop clinical skills, through the direct evaluation of patients in hospital settings, being accompanied by the teacher in a social-constructivist model [7]. Ninety-three % of participants perceived that the teacher acted as a facilitator of critical thinking and collaborative work, and 80% of students manifested having thought about the consequences of their professional acting, thanks to this methodology; this evidence suggests that the PBL, in real settings, favors significant learning and the appropriation of NP from the initial steps [7].

In spite of the theoretical and practical advances in Nursing, effectively implementing the NE continuously is a challenge for the training of future professionals, such that diverse theoretical models, like that proposed by M. Gordon and its 11 functional patterns, have been adopted to structure the evaluation in an integral way; their application in clinical settings still faces limitations [8]; these defi-

ciencies impact the quality in the offered care, and in the capacity of students to integrate theoretical knowledge in the clinical practice [9]. Then the goal of this research was: to promote the development of skills for NE in the NP, based in the 11 functional patterns (FP) of health, in students from the sixth semester of Nursing from a public University, starting from the ST. With the understanding that situated teaching is an educational focus, anchoring learning in authentic contexts (real or simulated), and promotes the construction of knowledge via practical activity, solving problems, and collaboration, favoring the theoretical-practice transfer [10].

2. Method

2.1. Study Design

Research with a mixed approach allows for integral and profound comprehension of the studied phenomenon, through combining quantitative and qualitative methods, this focus facilitates data triangulation, strengthening the validity and reliability of the findings [11]. This focus selection responds to the need to evaluate the impact of the Case Method (CM), on skills development for the NE, based in Gordon's 11 FP from an objective and interpretative perspective, facilitating the integral analysis of the intervention. Its framework is under a constructivist paradigm, since this adapts optimally, constructivism is characterized by its emphasis on knowledge co-construction, through social interaction, critical reflection, and practical application of theory in significant contexts [12]. This guidance is relevant in Nursing education, where the goal is for students to integrate theoretical knowledge with practical skills in real or simulated settings, promoting significant learning based on experience. The selected design was investigation-action, a methodological approach characterized by its purpose to generate changes and improvements in specific practices, through a cyclic planning, action, observation, and reflection process [13]; which allows to analyze the educational phenomenon, actively intervention in the formative process of Nursing students, whom require to develop practical competencies in a stimulatory context of their future professional work. It was complemented with the Sequential Explanatory Design (DEXPLIS), a methodology characterized by a study in two distinct phases: first quantitative data were collected and analyzed, followed by a qualitative analysis to deepen in the initial results. While integrating DEXPLIS with the investigation-action approach, the intervention and analysis of the process was improved, generating a sequential structure that allowed to evaluate the effects of the educational intervention in two steps, offering an initial view of the impact of Case Method in teaching the NE, by using quantitative measurements, followed by a qualitative exploring that deepen in the experiences and perceptions of students.

2.2. Inclusion Criteria

Students of the Faculty of Higher Studies Iztacala, from the National Autonomous University of Mexico, enrolled in the sixth semester of Nursing, of 20 - 22 years

of age, both sexes, with previous knowledge of Models and Theories of Nursing, including the proposal of the Gordon's 11 FP, this background is essential to apply and implement the ST, the teaching of the NE, and the development of skills. The sample was obtained by judgment sampling or convenience.

The sample consisted of 30 students from the available classrooms, they were divided into 2 groups of 15 people each, to make it easier to provide better support and allow for a deeper intervention and data analysis. One student dropped out of the study, leaving 29 people.

2.3. Information Collection

Quantitative data were collected through structured questionnaires, validated by expert judgment, and standardized evaluations to measure competencies in NE, before and after the implementation of case method. These data showed an objective and generalizable view about changes in students' skills, and the initial impact of the intervention. The first instrument' objective was: to identify the background of sixth semester students on NP, NE, and the Gordon's 11 FP; the second instrument' objective was: to evaluate the impact of implementing the ST to develop skills in NE, through observing students' performance in simulated clinical situations. Later, semi-structured interviews were conducted aimed to collect qualitative information, about students' perceptions and experiences regarding implementing ST; this qualitative phase allowed to contextualize and explain the quantitative results, yielding a deep comprehension of the learning process from students' perspective [14]. The setting was a public university from the State of Mexico.

2.4. Procedure

The research implementation was through four phases organized sequentially, to warrant coherence and achievement of the objectives of the study, these phases were:

Phase 1: Instruments making and validation.

Phase 2: Diagnostic (Pretest). Instrument 1 was used to measure initial knowledge about NP, NE, and Gordon's FP.

Phase 3: Implementing the educational proposal based in ST and CM.

Phase 4: Evaluation (Posttest) and collection of perceptions and experiences. Instrument 1 (Posttest) was used again to assess changes in students' knowledge and skills after implementing the educational intervention.

Educational activities were designed and organized, including preparing relevant clinical cases, adapted to students' context. Fourteen teaching sessions were conducted, including: Present the clinical cases, group discussion and analysis, immediate feedback from teacher and students' collaborative work. Instrument 2 was used during practical sessions (analysis of clinical cases), to evaluate the progression in NE, and the integration of the 11 FP altered in the clinical cases. Sessions development was documented through the "Guide of structured observation"; it was finished with application of Instrument 2 (last applications), in a sim-

ulated clinical practice or a final session, to evaluate the improvement in the NE skills.

Interviews (Instrument 3) were conducted to explore perception and experiences on the ST and CM impact, regarding their learning and clinical skills development in NE.

2.5. Data Analysis

Results were recorded, stored in a safe database, interviews were transcribed observing the ethical, privacy, and anonymity principles. Quantitative and qualitative (triangulation) findings were integrated; quantitative data from Instrument 1 (Pretest and Posttest) and Instrument 2 (Guide of structured observation), were analyzed. Qualitative data from Instrument 3 (Semi-structured interview on perception of SL and MC), through categorization and coding techniques. Comparison and interpretation of Pretest and Posttest results were conducted to identify, and quantitate, the progress in students' knowledge; also, data from Instrument 2 were analyzed and interpreted, to evaluate the progress in skills of NE, implemented in the clinical cases (CM).

3. Results

From the original 30 students, 1 abandoned the study such that the study was conducted in 29 participants; 76% were women and 24% men.

Instrument 1: test of 20 items, multiple option (1 correct answer). Design: pre-test, didactic intervention, posttest on the same group (design quasi-experimental of repeated measures) (Figure 1).

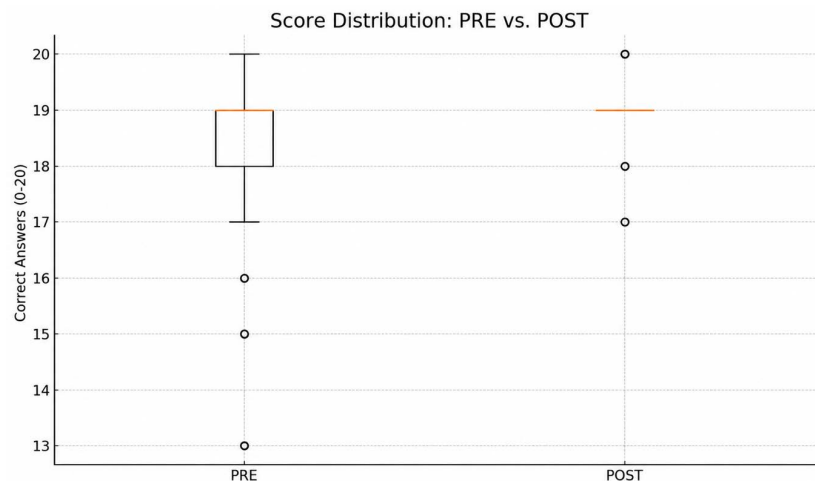


Figure 1. Scores distribution in theoretical knowledge before and after the intervention (PRE vs. POST). Boxes show the interquartile range (IQR, P25-P75), and the red line indicates the median value; while the whiskers represent $1.5 \times \text{IQR}$, and the dots are atypical values, $N = 29$. Median PRE ≈ 18.5 ; median POST ≈ 19.0 . Average median gain = $+0.79$ correct answers; $t(28) = 3.05$, $p = 0.005$; Hedges' $g = 0.55$ (moderate effect). A median elevated displacement is observed and a slight reduction in dispersion, with a possible ceiling effect due to maximal proximity (20 points).

Box plot confirms a global increase in score, it illustrates the obtained scores distribution before (PRE) and after (POST) educational intervention, revealing a general improvement in participants' performance. The median increased from 18 to 19 correct answers, indicating a positive displacement in global efficiency. The IQR remained narrow in both measurements, reflecting low dispersion and suggesting that most students maintained a high and similar scores range. Taken together, these results suggest that scores improvement was homogeneous and consistent, without major variability in individual results.

Instrument 2 (Guide of structured observation). It was evaluated with the global change test (Friedman) (**Table 1**).

Table 1. Friedman's test of performance change along 12 applications (n = 29).

χ^2	df	p-value	Kendall's W
307.699	11	0.0	0.965

Global difference significant between measurements, $\chi^2(11) = 307.70$, $p < 0.001$; effect size Kendall's W = 0.965 (concordance almost perfect).

The efficiency is not equal along the 12 measurements, there is a marked and consistent improvement; since Kendall W ≈ 0.97 it indicates an almost perfect effect (1 = maximal concordance with the improvement pattern), *i.e.*, students' performance was not constant along the 12 applications, overall, these results confirm that intervention generated a sustained and almost uniform effect, clearly evolving in a students' structured performance (**Figure 2**).

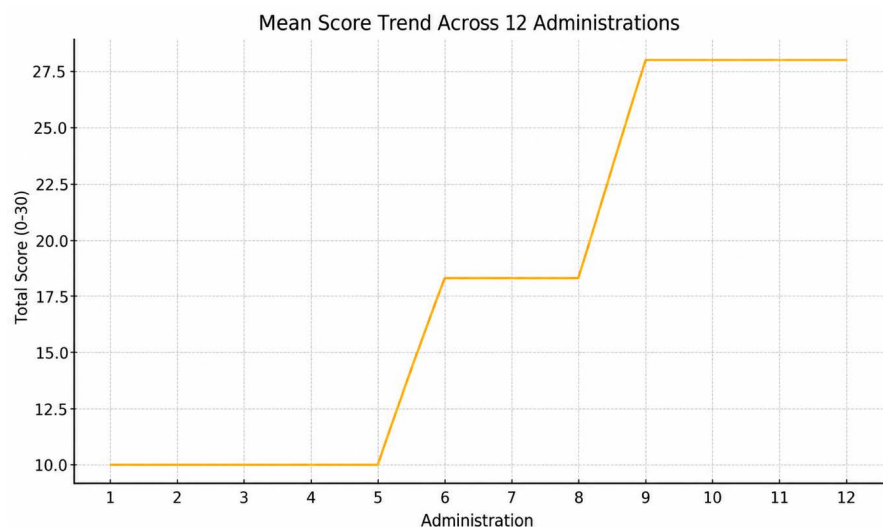


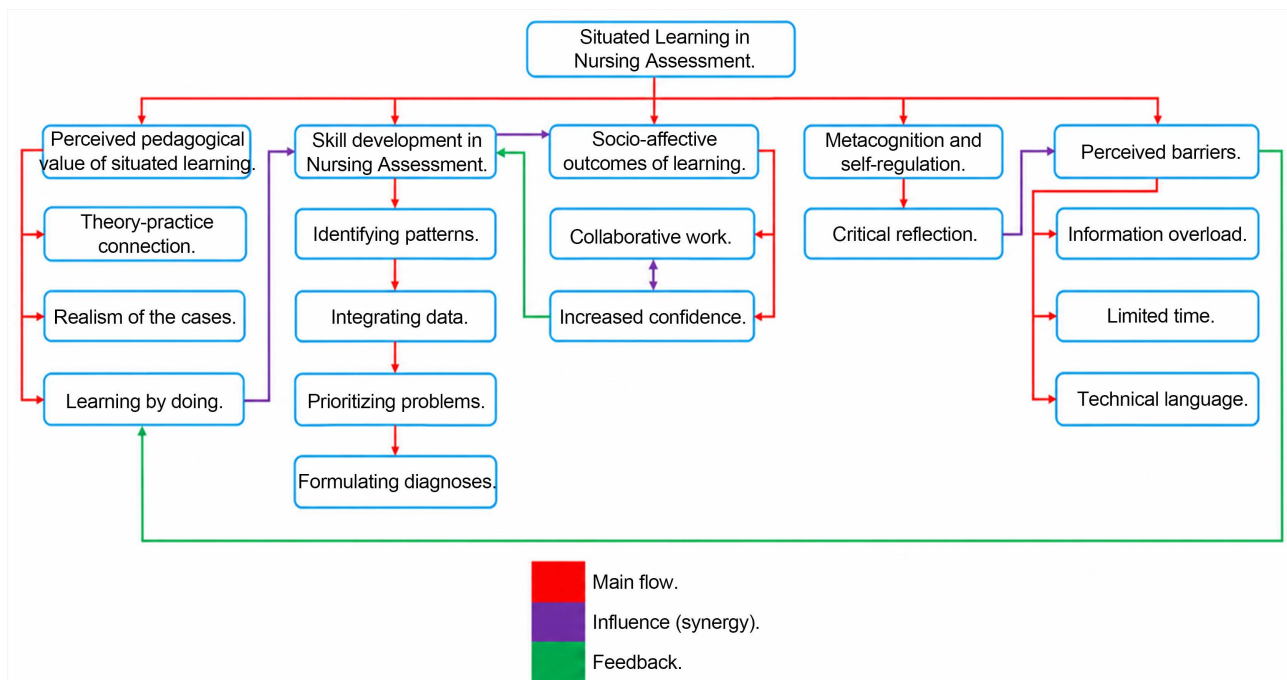
Figure 2. Average performance tendency in 12 applications of clinical skills instrument (0 - 30). The line is the score average per application. Three phases: initial stability (10/30, applications 1 - 5), jumped to $\approx 18/30$ (6 - 8), and domain in 28/30 (9 - 12).

The graph "in steps" reflects three clear phases: Initial phase (Apps 1 - 5)—Adjustment phase: minimal score (level 1) (**Figure 2**). Intermediate phase (Apps

6 - 8)—Consolidation: most get up to level 2. Advanced phase (Apps 9 - 12)—Domain: almost all reach level 3.

Figure 2 shows a clear pattern of steps learning, characterized by a curve “in steps” reflecting the progressive advance of students; in the initial phase (Apps 1 - 5), the score is stable in a minimal value (10/30), suggesting an adjustment lag in which students start interacting with the contents or the evaluative format, locating themselves in performance level 1. Later in the intermediate phase (Apps 6 - 8), an abrupt increase in the average score of $\approx 18/30$ is observed, indicating a learning consolidation and crossing to level 2, but with high individual variability; finally, in the advanced phase (Apps 9 - 12), a new performance step is reached (28/30), being homogenous between students, which shows a complete domain of the expected results (level 3).

In summary, the descriptive data analysis, along with the Friedman non-parametric test, the Kendall’s coefficient of concordance, and the graphical evolution of the average score, confirm a clear formative progression, staggered and sustained along time; the transit from an initial performance, uniform and limited (level 1), toward an intermediate consolidation with higher variation (level 2), and finally toward a complete and homogeneous domain in the evaluated indicators (level 3), empirically support the effectiveness of the implemented educational intervention (**Scheme 1**).



Scheme 1. Conceptual and integral map of the Situated Learning of the Nursing Evaluation. The diagram summarizes the five axial topics and their sub-categories: perceived pedagogic value (connection theory-practice, realism, learning by doing), skills development (to identify, to integrate, to prioritize, to formulate), affective-social results (collaborative work, trust), metacognition/self-regulation (critical reflection), and perceived barriers (information overload, limited time, technical language). Red arrows: internal advance sequences; Purple arrows: enabling bonds between blocks (*i.e.*, “to learn by doing” → skills); Green arrows: feedback loops that strengthen performance and close the improvement cycle.

The internal flow indicates a logical sequence, first the pattern is recognized, then data are integrated, prioritized, and finally diagnoses is formulated.

The purple flow (bridge), from learn by doing is directed to topic 2 (skills development), showing that practical experience is the enabling condition to develop skills. From skills to affective-social results influence this domain, generating satisfaction and trust; it promotes the critical thought → perceived barriers (self-evaluation allows to verbalize the problems).

The green return flow goes from gained trust, and feeds again the performance (who feels competent, risks and practices better), also a mutual effort of Collaborative Work and Trust could exist (purple arrow).

Green arrow: perceived barriers → Learn by doing (feedback), signifies that recognizing the barriers leads to adjust practice, and to refine the connection theory-practice, closing the cycle of continuous improvement.

Overall, it is inferred that for learning with cases works in a sustained way, it is a key to manage three operative conditions: First, the amount of information, the teacher must dose data by phases, and offer, for example, templates/check-lists, to organize evidence, while students summarize and distribute tasks; thus, avoiding saturation and focus the relevant information. Second, time for the task, a realistic rhythm is required with time-related steps (identify-integrate-prioritize-formulate), and short pauses to verify; the team self-manage with chronometer and small goals to diminish omissions. Third, accessibility of language, *i.e.*, a minimal glossary and short sessions of briefing/debriefing clarify terms and acronyms, and the team accord a common vocabulary to avoid stop their reasoning. Once these three conditions are recognized (critical reflection), and adjust in the next practical setting, the process redirects and activates a spiral of continuous improvement, every cycle experience-feedback-adjustment increases the performance, and consolidates NE without altering the intervention essence.

The strategy of integration (triangulation) of the three instruments occurred by joint display side-by-side, suggested by Fetters, to merge the quantitative and qualitative findings, such that it identifies convergence, complementarity, discrepancy, and expansion, and to derivate meta-inferences that explain the phenomenon, beyond each database separately [15]. Triangulation offers a coherent and complete panorama of the SN effect, while quantitative data confirm the improvement (gain in knowledge and “in steps” performance pattern); whereas qualitative data explain how it was constructed, since by applying the real case theory reinforced concepts, and the feedback-guided practice ordered the progression in skills (identify-integrate-prioritize-formulate), as well as showing that discordances (information overload, limited time, and technical language), do not contradict the global result. Rather they tune the model through point out limiting conditions, and orientate operative adjustments.

The qualitative expansion shows that trust, collaboration, and critical thought are an invisible mesh that supports the observed domain, and explains the homogeneity of the performance at the end, so the central meta-inference is that the

change was not a simple “before-after”, rather it was an iterative spiral where assessing the method: practice, pondering, and adjustment, allowed to consolidate NE, and closed breaches between students. Accordingly, the mixed and quasi-experimental design with repeated measurements of the study, allowed to detect changes with statistical strength (paired test, Friedman/Kendall for longitudinal tendencies), while the thematic analysis with double code verified the members (member-checking and saturation), warranting reliability in the qualitative interpretation; whereas, the structured integration by joint displays, produced solid meta-inferences by combining convergence, complementarity, discordance, and expansion. Thus, data and interviews not only coincided, but they mutually explain and point out actionable improvements (information dose, phases time, and semantic glossary). In this context, regarding the quantitative data, we can summarize that our results confirm that ST, significantly and structurally, improved students’ performance. With double code, member-checking and theoretical saturation, the quantitative results are reliable and show that intervention not only teaches “what to do”, rather how and why it does function, contributing a concrete guide to improve the teaching of NE.

4. Discussion

The results coincide with those of Díaz Barriga [16], where significant learning emerges when theory is experienced in authentic contexts, with progressive scaffolding and collaboration, the trust, and the reported team work point out an essential social-constructive component.

Paige and Daley [17], concluded on Nursing simulation that most of the cognitive and procedural benefits, are obtained when experience includes high fidelity, deliberate repetition, and structured debriefing immediately afterwards. The results coincide in two ways: first, the staggered pattern $10 \rightarrow 18 \rightarrow 28/30$, points out the progressive gain described by authors, when practice is repeated with feedback; second, students ascribed the improvement to the debriefing phase.

The systematic review of Cant and Cooper [18] concludes that median and high fidelity simulation, significantly improves knowledge, technical skills, critical thinking, and trust of nursing students, although it warns that the magnitude of the effect depends on context and debriefing quality, as well as practice repetition.

Baso and Arofiati [19] concluded that practice-based simulation increases the self-confidence of inexperienced nurses, since it recreates real tasks in a safe environment, with immediate feedback and a clear coincidence, since students stressed that after the cases, “now I feel confident to decide without a doubt”, and the collective domain 28/30 evidenced that confidence translated into homogeneous performance. Jaramillo-Vargas *et al.* [20] showed that direct interaction with an expert teacher during the simulation, is decisive for the student to construct meaning, connect data, and reinforce the clinical judgment.

Acevedo-Peña *et al.* [7] showed that Problem-Based Learning in Situ (PBL-IS) improves data collection, pattern analysis, and prioritize problems during NE, due

to cases attached in real clinical surroundings, and the accompaniment of advisers that guide the reasoning; however, authors identified difficulties to self-manage time, and quality variations in discussion among teams. The integral Nurse formation requires a pedagogical transition to models promoting active and contextualized learning, where the student is the self-protagonist of the formative process [21].

Burucu and Arslan [22] showed that Case-Based-Learning (CBL) clarifies the evaluation, reinforces confidence through team work, and, at the same time, demands moderation of data quantity, given more time for analysis.

Kim *et al.* [23] designed an educational program in patient transfer, supported in the theory of situated learning; they found that students improved the accuracy of the report, the confidence, and satisfaction, due to real settings and immediate feedback.

5. Conclusions

In general, the results obtained promote the development of skills for Nursing Assessment in the Nursing Process, based on Gordon's 11 Functional Health Patterns, in students studying in the sixth semester of Nursing through the implementation of Situated Teaching.

The ST operates as an iterative improvement spiral: initial pedagogic value → guided practice → skills development → trust and collaboration → critical thought → barriers identification → operative adjustments → new practice.

The convergent evidence shows that ST anchors theory with authentic problems, structures practice in phases with feedback, activates collaboration, and empowers skills development of NE, all in the framework of the Nursing Process.

Consent and Ethical Approval

The ethical and legal aspects were based on the Declaration of Helsinki principles, point 9 "It is the duty of physicians who are involved in medical research to protect the life, health, dignity, integrity, right to self-determination, privacy, and confidentiality of personal information of research subjects. The responsibility for the protection of research subjects must always rest with the physician or other health care professionals and never with the research subjects, even though they have given consent" Each participant signed an informed consent letter according to Nuremberg code and local law.

Author Contributions

This work was carried out in collaboration among all the authors. Author EJM designed the study, implemented it, and performed the statistical analysis. Authors EJM and MAPA managed the study analyses. Authors EJM, MAPA, and DCTP handled the literature searches. EJM and DCTP prepared the manuscript. All authors read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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