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The Effects of the Case-based Learning Method on Nursing Students' Self-regulated Learning and Clinical Self-efficacy Perception: A Quasi-experimental Study

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Abstract

Background: Developing clinical self-efficacy (CSE) and self-regulated learning skills is essential for nursing students to navigate complex clinical environments and ensure safe patient care effectively.

Aim: The purpose of this research was to explore how the case-based learning approach influences nursing students' self-regulated learning abilities and their perceptions of CSE.

Methods: This study employed a quasi-experimental design with a single-group pretest-posttest approach, conducted with 48 first-year nursing students from a public university in Türkiye. Over six weeks, participants engaged in weekly sessions based on the case-based learning model. Data were collected using three instruments: the Student Information Form, the Self-Regulated Learning Scale for Clinical Nursing Practice, and the Clinical Self-Efficacy Perception Scale. The collected data were analyzed using SPSS version 22.0, applying descriptive statistics, paired t-tests, and linear regression techniques.

Results: Among the participants, 89.1% were female, with a mean age of 20.29±2.98 years. Following the intervention, no statistically significant difference was found in self-regulated learning scores ($p>0.05$); however, CSE perception scores showed a marked and statistically significant improvement ($p<0.001$). Regression analysis indicated that the predictive ability of self-regulated learning scores on CSE increased after the intervention, with explained variance rising from 11.2% at pretest to 16.3% at posttest.

Conclusion: Case-based learning effectively enhances nursing students' CSE, while the limited short-term gains in self-regulated learning highlight the need for sustained support. Developing both skills together is crucial for academic and professional success.

Keywords: Education, nursing, self-efficacy, self-regulated learning

Introduction

Nursing is an applied health discipline that goes beyond the simple transmission of theoretical knowledge; it requires the holistic development of decision-making, problem-solving, and clinical reasoning skills.[1] In today's rapidly changing healthcare environment, the growing complexity of patient care and ongoing technological advancements increase the risk of clinical errors, reduce performance, and threaten patient safety. Therefore, nurses must not only maintain up-to-date knowledge but also apply it effectively in complex clinical situations.[2] Undergraduate nursing programs, however, often struggle to translate theory into practice, and traditional lecture-based approaches may limit students' critical thinking and foster passive learning. In this context, nursing students need to adopt effective learning strategies that enable them to actively manage their learning and develop self-directed, competent clinical practice.[3,4]

At this stage, the concept of self-regulated learning (SRL) becomes increasingly important. SRL refers to a dynamic and intentional process through which learners establish their own academic goals and actively control, adapt, and direct their thoughts, motivations, and behaviors to reach those goals.[5,6] Students with well-developed SRL skills actively engage in learning, develop strategies, monitor their learning processes, and make necessary adjustments to achieve their learning objectives.[5,7,8] These skills not only support academic achievement and professional development but also enable individuals to become lifelong learning professionals.[8,9]

One of the fundamental components of SRL is an individual's perception of self-efficacy (SE).[5,10] SE describes an individual's confidence in their ability to effectively carry out a particular task. Those with strong self-efficacy tend to be more engaged in learning, exert more effort toward reaching their goals, and demonstrate greater resilience in the face of difficulties.[10,11] Clinical self-efficacy (CSE), in particular, reflects nursing students' confidence in applying clinical skills, making decisions, and assuming responsibility.[12] Previous studies emphasize that SE plays a crucial role in shaping students' clinical competence, supporting their professional growth, and ensuring safe clinical practices.[4,13] In this context, Chen and Hung[14] in 2025 reported that integrat-

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ing SRL activities with a flipped classroom approach not only improved nursing skills performance but also enhanced both clinical self-efficacy and SRL, illustrating the practical benefits of fostering self-efficacy in nursing education.

One instructional method that may be effective in enhancing these two critical variables—SRL and CSE—is case-based learning (CBL). Unlike traditional lecture-based approaches, CBL actively engages students in analytical thinking, decision-making, and problem-solving through realistic clinical scenarios. This approach not only helps students acquire knowledge but also apply it within a clinical context, thereby improving their ability to plan, evaluate, and regulate their learning while simultaneously increasing their confidence in clinical decision-making.[15–18] In alignment with the principles of SRL, CBL also fosters metacognitive awareness, strengthens motivation to learn, and supports the development of effective problem-solving strategies.[18,19]

Hwang and Oh[3] in 2021 suggested that SE and SRL should be considered together to enhance nursing students' problem-solving ability. Although previous studies highlight the importance of examining SRL and CSE concurrently, no experimental research has explored their combined effects, with most existing studies being descriptive or correlational.[3,10,20] To address this gap, the present study examines SRL and CSE concurrently within a structured case-based learning intervention. This approach provides insights into the interrelated effects of these constructs. Clarifying the role of case-based learning in enhancing SRL and CSE can guide the development of evidence-based, student-centered educational strategies, support curriculum redesign, and foster high-quality learning environments. Ultimately, such insights can help prepare nursing students to actively manage their learning and perform effectively in complex clinical settings.

Aim

The purpose of this research was to explore how the case-based learning approach influences nursing students' abilities in SRL and their perceptions of CSE.

Research Hypotheses

H1: The application of the case-based learning approach leads to a statistically significant improvement in nursing students' SRL from pretest to posttest.

H2: Following the implementation of case-based learning, nursing students exhibit a significant change in their CSE scores between the pretest and posttest assessments.

H3: Nursing students' post-intervention SRL scores serve as significant predictors of their CSE outcomes in the posttest evaluation.

Materials and Methods

Research Design

This study utilized a quasi-experimental design involving a single group with measurements taken before and after the intervention. To comply with reporting standards for quasi-experimental studies, the TREND (Transparent Reporting of Evaluations with Nonrandomized Designs) Statement Checklist was utilized during the preparation of this report.[21]

Population and Sample of the Study

The study population consisted of first-year nursing students enrolled in the Faculty of Health Sciences at a university in Türkiye during the Spring term of the 2024–2025 academic year. First-year students were selected because they had no prior clinical experience or established practice habits, allowing the educational intervention's effect to be observed more clearly. The total class size was 57 students, and the entire class was initially intended to participate in the study. However, three students declined to participate, and six students were excluded due to incomplete attendance in the case-based learning sessions. Consequently, the study was completed with 48 students. Using G*Power 3.1.9.4 software, an a priori power analysis indicated that a minimum sample size of 34 participants was required for a paired samples t-test, assuming an effect size of 0.5, a significance level (α) of 0.05, and statistical power (1-β) of 0.80.[22] Therefore, the final sample of 48 participants included in this study was deemed sufficient.

Inclusion Criteria

- Enrollment as a first-year student in the Nursing Department,
- Registration in the Fundamentals of Nursing course,
- Participation in clinical practice activities,
- Citizenship of the Republic of Türkiye,
- Voluntary agreement to participate in the study.

Exclusion Criteria

- Being a foreign national,
- Refusal to sign the informed consent form.
- Missing one or more of the six case-based learning sessions,
- Failure to participate in either the pretest or posttest assessments.

Data Collection Instruments

Data were collected through an online survey consisting of three measurement tools used in the study. This survey was developed by integrating the Student Information Form, the Self-Regulated Learning Scale for Clinical Nursing Practice (SRLS-CNP), and the Clinical Self-Efficacy Perception Scale.

Student Information Form: Developed by the researchers based on relevant literature, this form includes questions regarding participants' demographic characteristics and clinical experiences. The form consists of six items covering variables such as age, gender, weighted grade point average, attitude toward the nursing profession (liking the profession), and self-perceived competence in hospital and laboratory practices.

Self-Regulated Learning Scale for Clinical Nursing Practice: The scale, originally created by Iyama and Maeda[23] in 2017 to measure students' SRL within clinical practice environments, was adapted into Turkish by Senol and Orgun[24] in 2018. The scale includes 16 items divided into two subscales: "Motivation" and "Learning Strategies." Each item is rated on a 5-point Likert scale from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Total scores range from 16 to 80, with no specific cutoff values. Higher scores reflect stronger use of SRL strategies.[24] The original study reported a Cronbach's alpha coefficient of 0.853,[23] while the Turkish adaptation demonstrated a reliability coefficient of 0.898.[24] In the present study, the Cronbach's alpha value of the scale at posttest was found to be 0.85.

Clinical Self-Efficacy Perception Scale: The scale, created by Cheraghi et al.[25] in 2009 to evaluate nursing students' self-efficacy perceptions related to their clinical performance, was adapted into Turkish and tested for validity and reliability by Zaybak[26] in 2016. This Likert-type scale contains 37 items with 11 response options ranging from 0%, 10%, 20%, ... up to 100%. The response option "0%" corresponds to "not sure," while "100%" corresponds to "completely sure." The scale comprises four subdimensions: Data Collection, Diagnosis and Planning, Implementation, and Evaluation. Scores for the total scale and its subdimensions are evaluated based on item mean scores. The scale does not have a cutoff point. The minimum possible item mean score is 0, and the maximum is 100. Higher scores reflect greater self-efficacy in clinical performance, whereas lower scores indicate reduced confidence in this area. The scale's Cronbach's alpha coefficient was reported as 0.98.26 In the present study, the Cronbach's alpha value at posttest was found to be 0.96.

Implementation Process

The research was conducted in three sequential phases: pretest (first phase), case discussion sessions (second phase), and posttest (third phase) (Fig. 1).

First Phase: Pretest

At the beginning of the study, participants completed three measurement tools: the Student Information Form, the Self-Regulated Learning Scale, and the Clinical Self-Efficacy Perception Scale. These instruments provided baseline data on students' demographic characteristics, SRL skills, and perceptions of CSE before the intervention.

Second Phase: Case-based Sessions

The case-based learning sessions were conducted in a classroom setting and the educational intervention was structured over six consecutive weeks, with one session held each week. Each session lasted approximately 40–50 minutes. A total of 48 students were organized into six groups of eight students each, based on voluntary participation. Each week, a different group presented a case while the remaining students participated in the case session.

Six multi-stage nursing cases covering respiratory, cardiovascular, gastrointestinal, infectious, neurological, and endocrine system care were used.[27] Each group

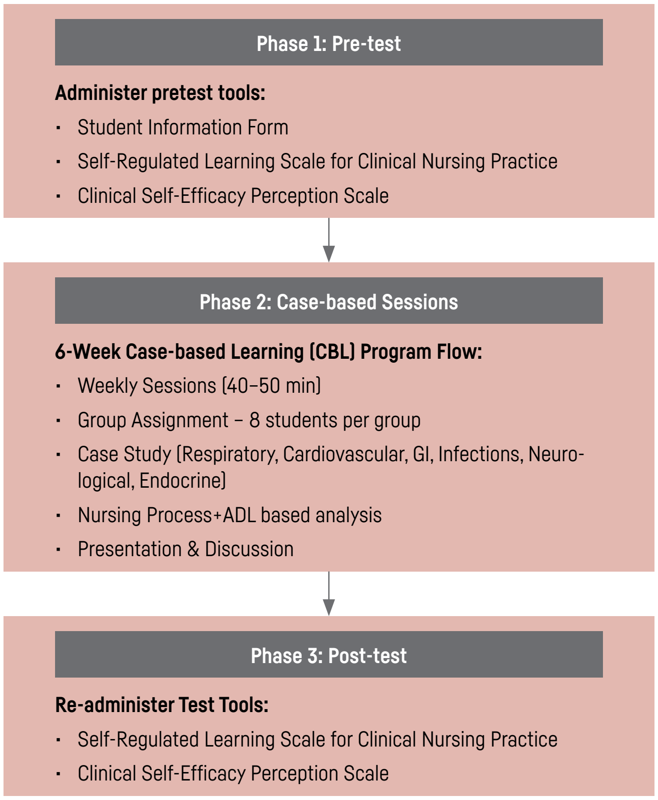

Figure 1. Flow chart.

ADL: Activities of Daily Living.

received standardized case data from the researcher and discussed the case according to the Nursing Process framework and the Activities of Daily Living (ADL) model. Students formulated nursing diagnoses, set goals, planned and implemented interventions, and developed a comprehensive care plan. The prepared care plans were presented to the entire class. Presentations were analyzed through instructor-guided question-and-answer sessions and group discussions, during which the instructor asked questions, answered students' queries, and facilitated class-wide discussion to deepen understanding and provide feedback.

Each session followed a standardized flow (opening and orientation: 5 minutes; case presentation: 10 minutes; group analysis and Nursing Process application: 15 minutes; care plan preparation: 10 minutes; presentation and instructor-guided question-and-answer/discussion: 5 minutes).

All sessions were facilitated by an instructor with expertise in nursing fundamentals, who had received prior training to ensure consistency.

Third Phase: Posttest

After the six-week intervention, the Self-Regulated Learning Scale and the Clinical Self-Efficacy Perception Scale were re-administered to assess changes in students' self-regulated learning skills and clinical self-efficacy perceptions (Fig. 1).

Data Analysis

Data analysis was performed using SPSS (version 22.0; IBM Corp., Armonk, NY, USA). Participants' descriptive data were presented using frequencies, percentages, means, and standard deviations. To evaluate the normality of the scale scores, skewness and kurtosis values were examined. For variables that satisfied the normality assumption, paired-samples t-tests were conducted to compare pretest and posttest scores. Furthermore, multiple and simple linear regression analyses were conducted to examine the relationships between the study variables. A p-value of less than 0.05 was considered statistically significant in all analyses.

Table 1. Descriptive characteristics of students (n=48)

Variable	n	%
Gender		
Female	31	64.6
Male	17	35.4
Do you like the nursing profession?		
Yes	41	85.4
No	7	14.6
Do you consider yourself competent in laboratory practices?		
Yes	30	62.5
Partly	17	35.4
No	1	2.1
Do you consider yourself competent in hospital practices?		
Yes	29	60.4
Partly	19	39.6
	Min-max	**Mean±SD**
Mean age (years)	18–39	20.29±2.98
CGPA	1.58–3.60	2.73±0.45

SD: Standard deviation, CGPA: Cumulative grade point average.

Ethical Considerations

Before initiating the study, approval was granted by the Ethics Committee of Siirt University (Approval Number: 136429, Date: 20.03.2025). Formal permission was also obtained from the institution where the research took place (19.03.2025/136195). At the start of the online questionnaire, participants were presented with an informed consent form outlining the study's purpose and details, and they were required to provide consent before proceeding. The entire research process was conducted in full compliance with ethical standards and the principles of the Declaration of Helsinki.

Results

Among the nursing students participating in the study, 64.6% were female. The majority of participants (85.4%) reported that they liked the nursing profession. The proportion of students who perceived themselves as competent in laboratory practices was 62.5%, while 60.4% felt competent in hospital-based clinical practices. The mean age of the participants was 20.29±2.98 years, and their cumulative grade point average (CGPA) was 2.73±0.45 (Table 1).

Multiple linear regression analyses were conducted to identify the factors predicting participants' CSE and self-regulated learning for clinical nursing practice (SRLS-CNP) scores. For CSE, the overall model was not statistically significant [$F(6,41)=0.749$, $p=0.613$], explaining approximately 9.9% of the variance ($R^2=0.099$, Adjusted $R^2=-0.033$). None of the independent variables—including mean age, CGPA, gender, liking the nursing profession, perceived competence in laboratory practices, or perceived competence in hospital practices—significantly predicted CSE ($p>0.05$) (Table 2).

In contrast, the model predicting self-regulated learning was statistically significant [$F(6,41)=2.549$, $p=0.034$], accounting for 27.2% of the variance ($R^2=0.272$, Adjusted $R^2=0.165$). Among the predictors, only CGPA was a significant positive predictor of SRLS-CNP scores ($B=5.433$, $\beta=0.367$, $p=0.016$, 95% CI [1.084, 9.783]). Other variables, including mean age, gender, liking the nursing profession, and perceived competence in laboratory or hospital practices—were not significant predictors ($p>0.05$) (Table 2).

Regarding the findings related to the SRLS-CNP, the mean total score of participants who underwent the case-based learning intervention was 62.72±5.32 in the pretest and 63.04±6.73 in the posttest. The difference between pretest and posttest scores was not statistically significant ($t=-0.404$, $p=0.688$; Cohen's $d=0.005$) (Table 3).

Table 2. Factors predicting CSES and SRLS-CNP (post-test)

Dependent variables	Model	Independent variables	B	SE	β	t	p	95% CI Lower	95% CI Upper
CSES	1	(Constant)	6.671	1.568		4.254	0.000	3.504	9.839
		Mean age (years)	-0.033	0.057	-0.088	-0.581	0.564	-0.149	0.082
		CGPA	0.065	0.402	0.026	0.162	0.872	-0.747	0.877
		Gender (Female=1)	0.607	0.388	0.260	1.567	0.125	-0.175	1.390
		Liking nursing profession (Yes=1)	0.165	0.486	0.052	0.340	0.735	-0.817	1.148
		Perceived competence in laboratory practices (Yes=1)	0.122	0.381	0.053	0.320	0.750	-0.648	0.892
		Perceived competence in hospital practices (Yes=1)	0.528	0.397	0.231	1.331	0.191	-0.274	1.330
		R=0.314	R^2=0.099						
		$F_{(6.41)}$=0.749	p=0.613						
SRLS-CNP	2	(Constant)	38.228	8.401		4.551	**0.000**	21.263	55.194
		Mean age (years)	0.114	0.307	0.051	0.373	0.711	-0.505	0.734
		CGPA	5.433	2.154	0.367	2.523	**0.016***	1.084	9.783
		Gender (Female=1)	3.100	2.076	0.222	1.493	0.143	-1.093	7.294
		Liking nursing profession (Yes=1)	3.522	2.605	0.186	1.352	0.184	-1.739	8.784
		Perceived competence in laboratory practices (Yes=1)	1.200	2.042	0.087	0.588	0.560	-2.924	5.324
		Perceived competence in hospital practices (Yes=1)	3.062	2.127	0.225	1.440	0.158	-1.234	7.357
		R=0.521	R^2=0.272						
		$F_{(6.41)}$=2.549	**p=0.034***						

*: Significance level p<0.05. CSES: Clinical Self-Efficacy Scale, SRLS-CNP: Self-Regulated Learning Scale in Clinical Nursing Practice, B: Unstandardized regression coefficient, SE: Standard error, β: Standardized regression coefficient, t: t-value, CI: Confidence interval, CGPA: Cumulative grade point average.

Table 3. Comparison of students' pre-test and post-test scores on the Self-regulated Learning Scale for Clinical Nursing Practice and subdimensions

	Pre-test mean±SD	Post-test mean±SD	t	p	Cohen's d
Self-regulated Learning Scale in Clinical Nursing Practice	62.72±5.32	63.04±6.73	-0.404	0.688	0.005
Subdimensions					
Motivation	27.62±2.87	27.75±3.36	-0.281	0.78	0.004
Learning strategies	35.10±3.31	35.29±3.93	-0.372	0.712	0.005

SD: Standard deviation.

Table 4. Comparison of students' pre-test and post-test scores on the Clinical Self-Efficacy Scale and its subdimensions

	Pre-test	Post-test	t	p	Cohen's d
Clinical Self-Efficacy Scale	65.92±1.23	71.03±1.13	-3.887	0.0	0.043
Subdimensions					
Data Collection	68.43±1.17	72.11±1.18	-2.980	0.005	0.031
Assessment	63.14±1.31	68.12±1.26	-2.948	0.005	0.039
Implementation	68.29±1.45	74.50±1.22	-3.584	0.001	0.046
Evaluation	61.11±1.52	67.46±1.52	-2.827	0.007	0.042

Examination of the Clinical Self-Efficacy Scale (CSES) results revealed that participants' mean total scores increased from 65.92±1.23 in the pretest to 71.03±1.13 in the posttest. This difference was statistically significant (t=-3.887, p<0.001; Cohen's d=0.043), indicating a small effect size (Table 4).

Regression analysis indicated that pretest scores on the Self-Regulated Learning Scale significantly predicted pretest scores on the CSES (B=0.078, β=0.335, t(46)=2.414, p=0.020, 95% CI [0.013–0.143]). The model explained 11.2% of the variance (R^2=0.112) and was statistically significant (F(1,46)=5.828, p=0.020). The Durbin-Watson statistic was 1.99, indicating no autocorrelation. At posttest, the predictive power of the Self-Regulated Learning Scale scores on CSES scores increased (B=0.068, β=0.403, t(46)=2.989, p=0.004, 95% CI [0.022–0.113]), with the model explaining 16.3% of the variance (R^2=0.163) and remaining significant (F(1,46)=8.934, p=0.004). The Durbin-Watson value was 2.196 (Table 5).

Discussion

The findings of this study revealed that students with higher grade point averages had higher self-regulated learning scores, indicating a positive and significant relationship between academic achievement and SRL. Similarly, previous

Table 5. Regression analysis results on the predictive effect of SRLS-CNP on CSES

Dependent variables	Model	Independent variables	B	SE	Standard (Beta)	t	p	95% CI	
								Lower	Upper
CSES (pre-test)	1	Constant	1.702	2.033	0.837	0.407	-2.391	5.794	
		SRLS-CNP (pre-test)	0.078	0.032	0.335	2.414	0.020	0.013	0.143
		R=0.335	R^2=0.112	F(1,46)=5.828		p=0.02*		Durbin-Watson: 1.99	
CSES (post-test)	2	Constant	2.836	1.436	1.976	0.054	-0.053	5.726	
		SRLS-CNP (post-test)	0.068	0.023 0.403	2.989	0.004	0.022	0.113	
		R=0.403	R^2=0.163	F (1,46)=8.934		p=0.004*		Durbin-Watson: 2.196	

*: Significance level p<0.05. SRLS-CNP: Self-Regulated Learning Scale for Clinical Nursing Practice, CSES: Clinical Self-Efficacy Scale, B: Unstandardized regression coefficient, SE: Standard error, β: Standardized regression coefficient, t: t-value, CI: Confidence interval.

research has reported that nursing students with higher academic achievement demonstrate more advanced SRL skills.[20,28] This suggests that successful students are more capable of consciously planning and managing their learning processes. Therefore, implementing instructional strategies aimed at strengthening SRL skills in nursing education may serve as an effective approach to enhance academic achievement.

In this study, no statistically significant difference was observed between the pretest and posttest total scores of the SRL Scale in Clinical Nursing Practice following the implementation of the case-based learning method. The absence of a significant difference suggests that the development of SRL skills may be limited in the short term. This finding aligns with the understanding that SRL is a complex and multidimensional process that requires long-term, repetitive, and continuous supportive educational approaches for effective development.[28,29] The effectiveness of SRL depends on students' ability to manage their learning processes, maintain motivation, and employ strategic behaviors, all of which take time to cultivate.[23,30] Additionally, perceived academic and social support in clinical settings has been shown to play a critical role in the development of students' SRL skills.[30] Therefore, it is recommended that the impact of case-based learning on SRL be reinforced through more comprehensive and long-term interventions.

In this study, a significant increase was observed in nursing students' perceived CSE following the implementation of case-based learning, with significant improvements across all subdomains, including data collection, diagnosis, implementation, and evaluation. These findings align with previous research demonstrating the effectiveness of case-based learning in enhancing both cognitive and practical competencies among nursing students. For instance, Kassabry et al. (2024)[31] emphasized that case-based learning strengthens critical thinking and clinical decision-making skills, which are fundamental to providing safe and effective patient care. Similarly, a comprehensive review by Yao et al. (2023)[2] reported that case-based learning interventions significantly improve academic achievement, critical thinking abilities, and clinical decision-making competencies in theoretical nursing courses. Liu et al.[32] in 2020 highlighted the effectiveness of case-based teaching in nursing skills education, noting marked improvements in students' clinical performance. Additionally, Choi et al.[33] in 2023 demonstrated that virtual clinical simulation combined with case-based clinical seminars effectively enhances nursing students' learning flow, self-efficacy, and satisfaction, underscoring that such student-centered and interactive approaches increase motivation and confidence in clinical skills. These findings suggest that realistic case-based education enhances problem-solving skills and clinical confidence. Overall, case-based learning is an effective, student-centered approach that improves CSE and prepares nursing students for complex clinical settings. Further research is needed to evaluate its integration alongside other supportive clinical factors.

In this study, regression analyses demonstrated that SRL skills in clinical practice significantly predicted CSE. The explanation of 11.2% of the variance in CSE scores by SRL scores at pretest, increasing to 16.3% at posttest, indicates that the case-based learning intervention positively influenced participants' abilities to regulate their learning processes, thereby enhancing their perceptions of clinical competence. These findings support the critical role of SRL in nursing education for improving clinical performance and professional self-confidence.[10,29] The literature similarly reports that high levels of SRL skills strengthen students' problem-solving abilities and contribute to more effective decision-making in clinical settings.[34,35] Moreover, self-efficacy is known to be effective in controlling the learning process and enhancing professional performance, showing a strong association with SRL.[11,20] Within this context, the case-based learning method is expected to foster students' responsibility for their learning, promoting development in both cognitive and affective domains.

Limitations

The study is limited to students from a single university, which restricts the generalizability of the findings. Additionally, the effects of the intervention were assessed only in the short term, and long-term impacts were not examined. Furthermore, the exclusive use of quantitative data in the research limited the opportunity to obtain more comprehensive insights into participants' experiences and perspectives. Another limitation is that concurrent learning experiences, such as clinical rotations or simulations, and variables such as weekly study or screen time were not monitored or controlled.

Conclusion

This study showed that case-based learning significantly enhances nursing students' CSE, while no notable short-term improvement was observed in SRL skills. Given the complex and long-term nature of developing self-regulation, extended follow-up is essential. The strong predictive role of SRL on CSE highlights the importance of fostering both skills together in nursing education. Overall, case-based learning stands out as an effective, student-centered strategy that supports both cognitive and practical competencies. Future studies should explore its long-term impact in varied educational contexts with larger samples.

Ethics Committee Approval: The study was approved by the Siirt University Ethics Committee (Approval Number: 136429, Date: 20.03.2025).

Informed Consent: Written informed consent was obtained from the participants.

Conflict of Interest: The authors have no conflicts of interest to declare.

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