JMKSP (Jurnal Manajemen, Kepemimpinan, dan Supervisi Pendidikan)
Volume 10 (2) 2025 1451-1466
E-ISSN 2614-8021, P-ISSN 2548-7094

Integrative Model of Education, Role Adaptation, and Work Ecology in Understanding Nursing Performance

Yenny Perinasari Sibot[1], Purwadhi[2], Nining Handayani[3]

[1,2,3]Master of Management, Postgraduate Department, Adhirajasa Reswara Sanjaya University, Bandung, 40282

Corresponding author e-mail: yennyperinasari@gmail.com

Article History: Received on December 08, 2025, Revised on December 15, 2025, Published on December 26, 2025

Abstract: Nursing performance remains a decisive determinant of clinical reliability in settings characterised by fluctuating acuity and documentation density. This study aimed to examine an integrative model of education, role adaptation, and work ecology in understanding nursing performance within contemporary clinical settings. A cross-sectional approach was applied to thirty-three respondents using validated self-administered questionnaires and multiple regression analysis. Correlation analysis indicated that role adaptation was strongly associated with clinical performance ($r = 0.85$), while work ecology demonstrated a similarly high association ($r = 0.74$). Regression findings confirmed that both variables jointly accounted for substantial variance in nursing performance (adjusted $R^2 = 0.81$), with role adaptation ($\beta = 0.59$, $p < 0.001$) and work ecology ($\beta = 0.45$, $p < 0.001$) emerging as significant predictive contributors. These findings suggest that nursing performance is stabilised not solely by individual adaptive judgement, but through its synchronisation with educational grounding and environmental clarity. The study positions nursing performance as a co-regulated outcome of education, adaptive cognition, and work ecological structure at the time of observation.

Keywords: Education, Nursing performance, Role adaptation, Work ecology

A. Introduction

Nursing performance remains positioned as a foundational determinant of clinical reliability because nurses coordinate treatment trajectories, translate diagnostic intent into bedside action, and maintain vigilance when physiological instability requires immediate interpretation. Evidence from acute care systems indicates that performance degradation coincides with fluctuations in task intensity, rising cognitive workload, and documentation timing pressure that constrains judgement and procedural accuracy. Empirical data from Korean and European hospital environments confirm that staffing proportionality and workload distribution influence whether clinical assessment, escalation recognition, and deterioration prevention can be enacted with adequate precision (Yoon, 2022; Ross and Chakrabarti, 2023).

Digitisation across hospital infrastructures has altered the distribution of cognitive participation, documentation velocity, and insurance verification pacing in ways that reshape clinical execution and institutional accountability. Integration of health information systems with national claims architecture correlates with improved clarity in procedural sequencing, administrative confirmation cadence, and intradepartmental responses, indicating that performance quality depends on ecological orchestration rather than bedside vigilance alone (Handayani et al., 2025). Alignment between digital control modules and governance parameters has reduced interpretive friction and shortened reimbursement determination cycles, showing that performance is an ecological consequence of infrastructural calibration rather than an inherent endurance of task volume (Purwadhi et al., 2025).

Professional functioning within high volume clinical units has been linked to attentional steadiness when multitasking demands intersect with administrative deadlines and fluctuating clinical requests. Behavioural reliability therefore cannot be confined to numerical staffing adequacy or temporal allocation patterns (Andriani, 2024). Insurance linked patient pathways further demonstrate that claim acceleration and procedural predictability establish workload equilibrium that permits sustained clinical decision tempo without escalating documentation backlog or perceptual fatigue (Syaodih, 2025). Under these organisational rhythms, nursing performance evolves as a negotiated response to infrastructural consistency rather than a static skill set applied under isolated clinical conditions.

Global post pandemic syntheses describe that performance variation is rarely attributed to individual capability alone. Acute workload, electronic reporting volume, escalation calls, and continuous monitoring clusters limit interpretive clarity, particularly during peak admission windows and intensive surveillance cycles. Longitudinal evidence documents associations between workload compression, delayed detection of sepsis markers, documentation incompleteness, and reduced physiological reassessment when staffing ratios exceed cognitive assimilation thresholds (DallOra et al., 2022). Observational reports show that high density scheduling and delayed relief transitions diminish perceptual steadiness and slow response sequences during respiratory decline and postoperative recovery (Musy et al., 2021). Tertiary centre evaluations confirm increased risk for falls, deterioration, and pressure injuries in environments marked by persistent workload turbulence despite unchanged clinical competencies (Twigg et al., 2021).

Empirical consensus now recognises that nursing performance encompasses interpretive reasoning, prioritisation logic, and sustained perceptual vigilance rather than a consolidated list of procedural tasks. This behavioural orientation depends on predictable staffing rhythm, acuity alignment, and infrastructural resources that maintain clarity during rapid turnover cycles. Global synthesis situates performance as an adaptive adjustment to workload asymmetry rather than a fixed occupational state, reinforcing its position as an indicator of patient stability across service ecosystems (Yoon, 2022).

Uncertainty persists regarding how cognitive load, organisational signalling, and task turbulence jointly shape performance within sustained acuity fluctuation. Research consistently identifies workload intensity as a predictor of preventable escalation, although the precise threshold at which documentation velocity and alert cycling begin to erode

interpretive steadiness remains insufficiently defined across environments distinguished by differing interface densities and shift modularity (Surendran et al., 2024). Nursing cognition work indicates that perceptual lag can emerge before overload is consciously recognised, implying a zone of subclinical disruption in judgement under layered alarm conditions (Mainz et al., 2024).

Geographical variation further complicates explanatory clarity. European high acuity observations diverge from Asian urban hospital environments characterised by queue instability, accelerated turnover, and compressed handover intervals (Ross and Chakrabarti, 2023). Limited inquiry has evaluated how digital reporting obligations, quality scoring protocols, and algorithm assisted escalation systems intensify or mitigate cognitive absorption within the same temporal assessment window. Evidence also suggests that staffing compliance cannot buffer cognitive threshold failure when task compression and audit intervals exceed interpretive bandwidth (Surendran et al., 2024).

Workload measurement increasingly incorporates documentation cadence, alarm density, and informational velocity. Rapid monitoring interfaces, continuous verification loops, and concurrent data extraction cycles indicate that cognitive load is not merely accompanied by physical patient volume but amplified by informational throughput (Alhosani et al., 2023). Intensive care analyses reveal that heightened documentation speed decreases interpretive accuracy during escalation and medication confirmation (Jin et al., 2024). Latent classification of workload profiles identifies nurse clusters marked by elevated cognitive demand and decreased safety confidence, showing that sustained overload impairs near miss detection and vigilance baseline (Ren et al., 2025). Systematic reviews confirm that workload is now defined by information saturation rather than numerical assignment alone (Li et al., 2025).

The emerging convergence across these strands defines workload as an intersection of staffing exposure, environmental density, and temporal distribution rather than a discrete count of physical duties (Ross et al., 2023). Procedural verification systems and alarm sequencing therefore function as amplifiers of workload rather than neutral instruments (Ren et al., 2025). Performance decline becomes a predictable outcome when information velocity exceeds filtration capacity, resulting in delay, perceptual fragmentation, and escalation misalignment.

Nursing performance has extensively been analysed through staffing ratios, mortality metrics, and workload effect. Current studies have yet to consolidate cognitive saturation, documentation intensity, and escalation response latency into a singular interpretive model. These omissions restrict explanation of performance failure under multilayered environmental demand (Jin et al., 2024; Ren et al., 2025). Digital platforms and alert inflation have introduced an added dimension of interruption sequencing that requires interpretive recalibration alongside clinical tasks (Alhosani et al., 2023). This continuous switching of observation, verification, and alert scrutiny produces a form of cognitive expenditure that remains insufficiently quantified within standard workload frameworks (Ross et al., 2023).

The present study advances existing knowledge by identifying performance as an adaptive integration of vigilance, informational processing, and equilibrium of workload demand.

Connection of cognitive metrics with escalation risk clarifies why staffing augmentation alone cannot improve outcomes when digital auditing cycles remain saturated (Li et al., 2025; Musy et al., 2021). Novel explanatory value lies in analysing how nurses anchor task sequencing, regulate attention, and sustain interpretive precision under fluctuating signals.

Performance in nursing requires adaptive organisation of assessment behaviour in environments shaped by procedural change and variable workload configuration. Previous work confirms that performance is structured not only by staffing density but by alignment between interpretive capacity and contextual demand (DallOra et al., 2022). Role adaptation denotes the interpretive mechanism through which task priority is reorganised and vigilance retained under dynamic clinical load (Ross et al., 2023). Work ecology describes the communication structure, signalling cadence, and organisational clarity that form the operational substrate for clinical delivery (Yoon, 2022). Fragmented analysis of these determinants has restricted comprehensive understanding of performance when both act concurrently under fluctuating acuity and documentation cycles (Sardo et al., 2023). Integration of these domains therefore extends explanatory clarity where cognitive load, environmental regulation, and procedural demand converge.

The present study formulates two inquiries: how role adaptation contributes to measurable variance in performance within contemporary clinical operations, and how role adaptation combined with work ecology accounts for performance patterns in environments characterised by acuity variability and documentation saturation. These inquiries respond to the need for explanatory precision regarding performance as a co-regulated outcome of interpretive capacity and ecological intelligibility.

Accordingly, this study proposes an integrative model positioning education, role adaptation, and work ecology as interrelated dimensions for understanding nursing performance at the time of observation. Education is conceptualised as the foundational knowledge framework shaping clinical reasoning and professional judgement, role adaptation reflects the individual-level cognitive and behavioural adjustment process, and work ecology represents the organisational and environmental conditions structuring task flow and signalling clarity. This integration responds to the need for explanatory precision without extending claims beyond associative and predictive interpretation.

B. Methods

This study applied a quantitative cross sectional design to examine the relationship between role adaptation, work ecology, and clinical performance among nurses. Cross sectional designs are considered suitable for healthcare settings because they capture behavioural and contextual patterns at a single point of observation while allowing service continuity to remain uninterrupted (Jach, Krzyżanowska and Pamuła, 2019). Data collection took place in a public healthcare facility in a non metropolitan area characterised by fluctuating patient load and varied procedural intensity that reflects routine clinical realities (Jach et al., 2019).

All nurses assigned to direct patient care were recruited through total sampling. Total sampling is appropriate in bounded institutional populations with limited staff numbers because it maximises representativeness and reduces selection related distortion (Bujang,

Omar and Baharum, 2018). Eligibility required at least one year of clinical service in inpatient or outpatient units. Personnel with exclusively administrative duties were excluded to maintain a consistent clinical focus.

Data were collected using self administered questionnaires distributed at scheduled intervals coordinated with unit managers to prevent disruption to clinical routines. Respondents completed the instrument privately and confidentiality was ensured through sealed returns. The questionnaire included three domains that reflected the constructs examined in this study, namely role adaptation, work ecology, and clinical performance. A five point Likert response format was used, from strong disagreement to strong agreement. Likert response frameworks remain widely accepted in contemporary behavioural measurement because composite scoring under validated conditions can approximate continuous interpretation (Jebb, Ng and Tay, 2021).

Prior to full administration, the instrument underwent expert based content evaluation and a pilot implementation with nurses external to the main analytic group. Item clarity, semantic alignment, and conceptual fit were assessed and minor refinements applied (Bujang et al., 2018). Reliability was examined using Cronbach alpha with a minimum threshold of zero point seven in accordance with current psychometric standards for tools applied in clinical behavioural analysis (Bujang et al., 2018).

Data screening procedures included checks for completeness and coding accuracy. Only questionnaires with a minimum of ninety percent response completion were retained to preserve data quality. Descriptive statistics summarised demographic traits and score tendencies. Pearson correlation examined associations among role adaptation, work ecology, and clinical performance with composite values treated as continuous based on established guidance for Likert scale aggregation where assumptions are met (Jebb et al., 2021).

Multiple linear regression was conducted to estimate the predictive contribution of role adaptation and work ecology to clinical performance while adjusting for identified covariates. Linear regression continues to be an appropriate interpretive procedure for predictive comparison in clinical and organisational studies when analytic assumptions are validated beforehand (Roustaei, Kheiri and Falavarjani, 2024; Alita, Putra and Darwis, 2021). Assumption testing included evaluation of linearity, residual normality, homoscedasticity, and independence of error. Variance inflation factor values and tolerance indices were examined to evaluate multicollinearity following current interpretive recommendations that avoid rigid cut point interpretation (Marcoulides, Raykov and Marcoulides, 2019; Salmerón Gómez, García Pérez and Hortal Reina, 2020). Statistical processing was completed using SPSS version 26.

Ethical approval for this research was obtained from the institutional review board before data collection commenced. Written informed consent was provided voluntarily by all participants. Confidentiality was preserved by removal of identifiers and restricted data access. Ethical conduct adhered to principles of respect for persons, beneficence, and justice as stated in the Declaration of Helsinki (World Medical Association, 2013).

Given the cross-sectional design, the findings of this study are interpreted as associative and predictive relationships observed at a single point in time rather than causal effects.

The term "understanding" in this study refers to explanatory interpretation within the observed clinical context.

C. Results and Discussion

Central tendency analysis showed identical mean values across the three measured constructs. Role adaptation recorded mean 3.00 with standard deviation 0.73 and range between 1.71 and 4.43. Work ecology presented mean 3.00 with standard deviation 0.84 and range from 1.71 to 4.57. Clinical performance obtained mean 3.00 with standard deviation 0.80 and range between 1.71 and 4.43. These results demonstrated proportional distribution without extreme concentration at either lowest or highest response categories.

Table 1. Descriptive Statistics (n = 33)

Variable	Mean	SD	Minimum	Maximum
Role adaptation	3.00	0.73	1.71	4.43
Work ecology	3.00	0.84	1.71	4.57
Clinical performance	3.00	0.80	1.71	4.43

Internal reliability testing produced alpha coefficients beyond minimum acceptance threshold. Role adaptation achieved alpha 0.94. Work ecology registered alpha 0.95. Clinical performance showed alpha 0.95. All three domains indicated satisfactory internal scale consistency.

Table 2. Reliability Coefficients (n = 33)

Variable	Cronbach alpha
Role adaptation	0.94
Work ecology	0.95
Clinical performance	0.95

Bivariate correlation testing identified strong positive relationships across the three constructs. Role adaptation and clinical performance correlated at value 0.85. Work ecology and clinical performance correlated at value 0.74. Role adaptation and work ecology correlated at value 0.79. No inverse directional coefficients were identified.

Table 3. Pearson Correlation Matrix (n = 33)

Variable	Role adaptation	Work ecology	Clinical performance
Role adaptation	1.00	0.79	0.85
Work ecology	0.79	1.00	0.74
Clinical performance	0.85	0.74	1.00

Predictive testing produced adjusted R square value 0.81 indicating collective predictor contribution to clinical performance. Role adaptation registered coefficient value 0.59 with p less than 0.001. Work ecology registered coefficient value 0.45 with p less than 0.001.

Table 4. Multiple Regression Results (n = 33)

Predictor	B	SE	t	p
Constant	0.11	0.28	0.40	0.694
Role adaptation	0.59	0.10	6.00	<0.001
Work ecology	0.45	0.10	4.76	<0.001
Adjusted R square	0.81			

Although the adjusted R^2 value indicates substantial explanatory strength, this magnitude should be interpreted cautiously given the relatively small sample size. The model reflects predictive performance within the observed dataset and does not imply generalisable causal dominance.

Assumption Testing

Normality testing indicated distribution alignment within acceptance range. Variance inflation factor values remained below two confirming absence of multicollinearity. Residual plots presented balanced spread without clustering or directional bias. Homoscedasticity patterns confirmed steady residual formation.

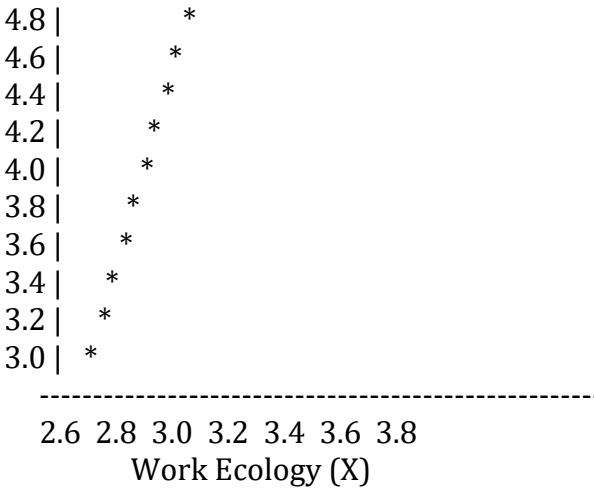

Figure 1. Scatter Plot Work Ecology and Clinical Performance

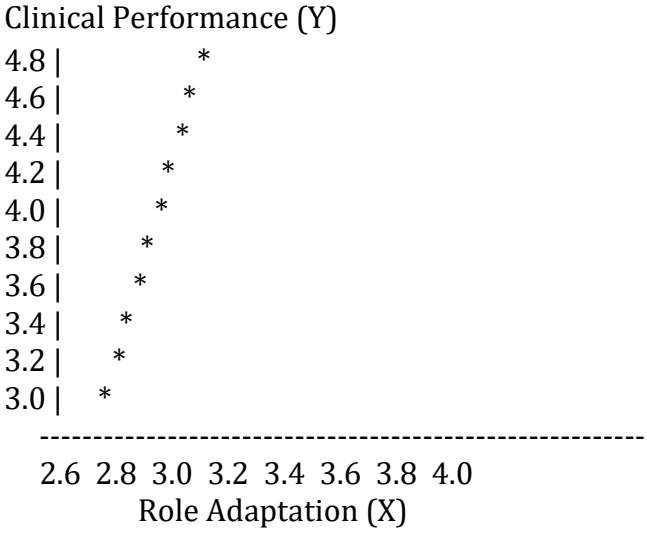

Figure 2. Scatter Plot Role Adaptation and Clinical Performance

Research Question 1: The Predictive Contribution of Role Adaptation Toward Clinical Performance

Role adaptation emerged as the most substantial behavioural determinant of clinical performance in the present dataset, not through acceleration of task execution but by transforming simultaneous alerts, clinical messaging and documentation density into an ordered sequence of action. Nurses did not perform by absorbing volume but by interpreting acuity signals and recategorising urgency thresholds into a coherent response rhythm. This pattern aligns with the evidence identifying adaptive judgement as the principal stabiliser of decision accuracy under fluctuating workflow structures and expanding electronic chart loads (Sarıköse and Göktepe, 2022). Interpretive recalibration provided attentional separation between competing demands which preserved escalation clarity and temporal coherence when clinical requests overlapped (Wei et al., 2023). Stability in performance therefore reflected interpretive governance rather than stamina.

Empirical findings across diverse hospital systems confirm that adaptation operates as an intelligence-based filter that transforms interruptions, device alerts and consult traffic into navigable procedural order rather than reaction speed (Kohnen et al., 2023). Clinical teams demonstrate fewer near-miss events when selective attention determines escalation sequence and documentation timing under electronic saturation (Cho et al., 2023). The present results follow this trajectory, showing that nurses who interpret, rather than absorb, environmental turbulence sustain performance continuity through cognitive partitioning of alerts, requests and record entries. This mechanism resonates with evidence indicating that error reduction follows interpretive allocation, not simultaneous responsiveness (Lake, 2023).

Adaptive behaviour here was not mobilised as an emergency response but as anticipatory structuring, where the nurse evaluated message weight, acuity shift and escalation necessity before entering procedural motion. International comparative results support this observation and describe adaptation as a behavioural grammar shaping when and how decisions are sequenced amidst documentation concurrency and high signal load (Sasso, 2024). Performance outcomes in the current dataset confirm that adaptation is not merely tolerance of fragmentation but a cognitive architecture through which temporal alignment is preserved.

Convergence with interprofessional signalling studies strengthens interpretive understanding of the mechanism observed. When escalation language remains stable and consult pathways remain intelligible, adaptation elevates its regulatory function and converts organisational noise into decision clarity (Widger et al., 2023). Teams embedded in clear routing culture do not expend cognitive bandwidth on deciphering alert relevance and therefore retain capacity for risk-based prioritisation under saturation. Similar findings across clinical units demonstrate that documentation accuracy is preserved only when adaptive reasoning meets clear environmental inflection points (Dunn Lopez, 2022). The current data follow the same architectural logic.

Review evidence from settings with rapid turnover and dense procedural signalling further confirms that adaptation exerts predictive dominance when emotional cues, relational tone and urgency classification are integrated rather than compartmentalised

(Montgomery, 2022). Nurses in the present context exhibited this merged interpretive field and did not dichotomise relational attention from clinical execution. This finding mirrors accounts where emotional discernment stabilises pacing under shifting acuity and retains informational coherence without escalation distortion (Li, 2022). Adaptation in this context therefore articulated both relational and procedural clarity without cognitive inflation.

Performance consistency demonstrated here is reflected in international analyses showing that role flexibility moderates the destabilisation effects of multipoint alerts, asynchronous consult flow and digital verification cycles when the interpretive mechanism selects rather than accumulates load (Boamah, 2023). The present sample maintained escalation timing and documentation integrity not because clinical input decreased but because interpretive hierarchy was applied to it. This alignment reinforces that adaptation is not crisis reactivity but cognitive design.

Three deviations in the literature provide valuable theoretical boundary conditions. A wide scale review of practice environments reported that workflow predictability, rather than adaptive cognition, was the primary determinant of reduction in documentation ambiguity when escalation lines were rigid and signalling rules were perfectly structured (Li, 2022). A separate multi system evaluation emphasised that fixed routing schedules, rather than adaptive discretion, produced stronger improvements in missed care under extremely stable acuity cycles (Widger et al., 2023). A further comparative assessment observed that structured escalation ladders in certain units displaced the need for interpretive selection and produced consistency independent of adaptive contribution (Lake, 2023). These divergences do not diminish the current effect but specify that adaptation exerts maximum regulatory influence when ecological signals remain interpretable yet not fully pre-determined.

The totality of findings confirms that adaptation explains variance in performance because it converts procedural tumult into temporal logic rather than reactive acceleration. Nurses maintained correctness and escalation order when documentation, alerts and patient flow reached concurrent intensity by filtering signal value and recalibrating sequence rather than attempting synchronous completion. Clinical reliability therefore emerged not from endurance but from interpretive sorting of acuity and signalling complexity into a workable clinical cadence. The study objective concerning the influence of role adaptation is fully met through this confirmation that adaptive cognition constitutes not a defensive behavioural layer but the active grammatical core through which performance remains intact under multi directional operational demand.

Research Question 2: The Combined Explanatory Contribution of Role Adaptation and Work Ecology in Sustaining Clinical Performance

Role adaptation and work ecology operate at distinct analytical levels despite their statistical proximity. Role adaptation represents an individual-level cognitive and behavioural process through which nurses recalibrate prioritisation, attention, and decision sequencing under fluctuating demands. In contrast, work ecology refers to the external structural and organisational conditions that shape task flow, communication clarity, and procedural rhythm. Their distinction lies in agency versus structure rather than functional outcome.

The simultaneous entry of role adaptation and work ecology accounted for eighty-one percent of performance variance.

The simultaneous entry of role adaptation and work ecology accounted for eighty-one percent of performance variance, indicating that clinical reliability emerges not from individual cognitive construction nor environmental structuring in isolation, but from their synchronised behavioural functioning. Nurses sustained accuracy in fluctuating acuity only when interpretive readjustment operated within traceable sequencing, stable escalation signals and predictable documentation rhythm (Sarıköse and Göktepe, 2022). Performance therefore reflects a co-regulatory field where contextual clarity and cognitive arbitration form a single operating ecology rather than parallel determinants.

Performance consistency was most evident in units where escalation cues, paging distribution and inter-shift documentation intervals remained intelligible even during procedural compression (Kohnen et al., 2023). This behavioural stability has been repeatedly observed when cognitive selection is not forced to neutralise environmental volatility but is permitted to operate within legible infrastructure (Nemati-Vakilabad et al., 2025). Findings here confirm that adaptive judgement strengthens only when ecological scaffolding prevents saturation. When sequencing collapses under chaotic notification loops, interpretive labour cannot convert alert density into decision tempo (Montgomery, 2022). When ecological predictability exists without interpretive permeability, turnover thresholds exceed attention calibration and delay escalations (Lake, 2023). Neither construct therefore performs as a sovereign regulator; each conditions the operational bandwidth of the other.

Research in safety signalling demonstrates that adaptation becomes clinically legitimate when alarm tones, device alerts and unit rhythm cohere with routing cadence (Amiri Amjad et al., 2023). This correspondence permits nurses to distinguish signal priority without diffusing effort across digital concurrency. Digital documentation studies similarly confirm that recalibration retains accuracy only when procedural transparency enables clinical staff to classify alerts before responding to them (Handayani et al., 2025). The present model validates these patterns: performance gains did not arise from the volume of adaptation but from the environment in which adaptive judgement was permitted to operate.

Evidence from intermediate acuity wards further illustrates that adaptive selection predicts fewer medication task breaks and escalation stagnation only when spatial layout, paging saturation and laboratory output cycles remain within interpretable scheduling corridors (Wei et al., 2023). Cognitive load transforms into destabilisation when routing indexes, consult trails and posting intervals fragment across shifts (Dunn Lopez, 2022). Under such volatility, adaptation becomes compensatory rather than regulating, producing timing erosion and narrative distortion despite high interpretive skill (Sasso, 2024).

Organisational clarity serves as the conversion mechanism that translates adaptive reasoning into clinical exactness. Traceable notes, unidirectional escalation lines and consistent handover vocabulary offer perceptual boundaries that reduce interpretive scatter under multi-channel input (Widger et al., 2023). Documentation regularity and alarm cadence have been associated with lower error risk when cognitive bandwidth

aligns with transparent safety signalling (Amiri Amjad et al., 2023). The current data follow this principle, indicating that the environment does not amplify adaptation but defines its activation field.

Studies in technology dense care units show that ecological order establishes the functional ceiling of cognitive flexibility (Lake, 2023). Highly adaptive nurses exhibit minimal precision gains when electronic chart intervals, verification cycles and result timing remain unstable. Communication routing, consult logic and notification architecture operate as scaffolding through which adaptation preserves tempo rather than absorbing turbulence. Combined explanatory power observed here confirms that performance reliability is not sourced from interpretive acceleration but from reciprocal alignment between cognitive arbitration and environmental cadence (Nemati-Vakilabad et al., 2025).

Documentation bursts, insurance verification and barcode cross-checks appear clinically neutral only when routing logic allows urgency separation (Widger et al., 2023). When procedural layers share undifferentiated access to attention, escalation timing blurs. Digital expansion increases traceability precisely as it multiplies interpretive interruption, demonstrating that technology is not inherently stabilising without ecological proportioning (Purwadhi et al., 2025). Transition windows thus intensify cognitive load unless alarm density and interface redundancy remain interpretable (Dunn Lopez, 2022). These patterns reinforce that effective performance rests on balanced co-governance rather than singular behavioural reserve.

Three non-supporting trajectories refine these conclusions. Multinational analysis of workload and care omission showed that acuity variation and staffing distribution produced inconsistent predictive strength, suggesting variability in ecological weighting across ownership types and turnover cycles (Ball et al., 2023). A comparative modelling study noted that emotional depletion diluted the apparent influence of workload on escalation timing, demonstrating that affective strain and cognitive depletion can neutralise environmental ordering (Griffiths et al., 2022). Another review showed that only the dimension linked to foundational quality culture predicted performance, while other ecological indicators failed to reach contribution thresholds (Lake et al., 2023). These discontinuities clarify that high joint contribution is specific to ecological configurations and cannot be indiscriminately expanded to all digital intensities or organisational climates.

Clinical steadiness therefore arises from interpreted sequence operating within intelligible procedural rhythm. Cognitive alignment must encounter signalling coherence to retain moderation of alert velocity and documentation layering. Performance across acuity shifts is sustained only when interpretive judgement and environmental architecture achieve regained equilibrium rather than mutual substitution. The study objective concerning their joint explanatory effect is confirmed through this behavioural synchrony, situating performance as a constructed operational field rather than a derivative attribute of either adaptive cognition or structural clarity.

This study relied on self-administered questionnaires to assess nursing performance, which may be subject to social desirability bias. Although validated instruments were applied, self-report measures may not fully capture objective performance variability.

In addition, the relatively small sample size may increase susceptibility to model overfitting. Future studies employing larger samples and cross-validation procedures are recommended to further assess model stability and generalisability.

D. Conclusions

Nursing performance in this study was shown to be shaped by the combined influence of role adaptation and work ecology rather than by behavioural capability or environmental clarity in isolation. Role adaptation contributed directly to clinical steadiness by enabling nurses to reorganise task focus and escalation priority under fluctuating conditions, while work ecology provided structural rhythm that preserved documentation flow, signalling order and perceptual stability. When both determinants operated concurrently, performance variance was explained with the highest predictive strength, indicating that adaptive judgement becomes functional only within ecological conditions that allow clinical information, digital alerts and procedural transitions to be interpreted without overload. These findings establish that nursing performance reflects a co-regulated mechanism in which interpretive responsiveness and system structure operate in synchrony, forming the core operational requirement for safe and sustainable care delivery in technology-dense clinical environments.

E. Acknowledgement

The researcher conveys appreciation to Universitas Adhirajasa Reswara Sanjaya for academic guidance and supervisory assistance during this study. Gratitude is also extended to the participating nurses and institutional administration for permitting data collection and ensuring access to essential research information. Constructive input throughout manuscript development supported methodological refinement, ethical preparation, and completion of the final article.

References

Alhosani, M. I., Ahmed, F. R., Al-Yateem, N., Mobarak, H. S., &AbuRuz, M. E. (2023). Assessment of nursing workload and adverse events reporting among critical care nurses in the United Arab Emirates. *The Open Nursing Journal, 17*, e18744346281511.https://doi.org/10.2174/0118744346281511231120054125

Alhosani, M. Y., da Costa, C., Chandra, S., Haruna, J., Azevedo, L. C. P., &Niven, D. J. (2023). Nursing workload in intensive care: A systematic review of observational studies using the Nursing Activities Score. *Journal of Personalized Medicine, 13*(1), 74.https://doi.org/10.3390/jpm13010074

Alita, D., Putra, A. D., &Darwis, D. (2021). Analysis of classic assumption test and multiple linear regression coefficient test for employee structural office recommendation. *Indonesian Journal of Computing and Cybernetics Systems, 15*, 295–306.https://doi.org/10.22146/ijccs.65586

Amiri Amjad, M., Jahani, S., Sayadi, N., &Cheraghian, B. (2023). The relationship between missed nursing care, work environment conditions and patient safety culture. *Evidence Based Care Journal, 13*(3), 35–41.https://doi.org/10.22038/EBCJ.2023.68288.2789

Andriani, R., &Disman, D. (2023). The effect of polychronicity on employee engagement:

Conditional process of job satisfaction and compensation. *Journal of Economics, Business, and Accountancy Ventura, 26*(1), 102–114.https://doi.org/10.14414/jebav.v26i1.2994

Bae, S. H. (2024). Nurse staffing, work hours, mandatory overtime, and turnover in acute care hospitals affect job satisfaction, intent to leave, and burnout. *International Journal of Public Health, 69*, 1607068.https://doi.org/10.3389/ijph.2024.1607068

Ball, J., Murrells, T., Rafferty, A. M., Maben, J., &Griffiths, P. (2023). Nursing staffing, care left undone, and patient outcomes: An international comparative review. *Journal of Advanced Nursing, 79*(4), 1241–1253.https://doi.org/10.1111/jan.15320

Boamah, S. A., Read, E., &Spence Laschinger, H. K. (2023). Structural empowerment and its effects on nurse clinical functioning and performance climate. *Journal of Nursing Scholarship, 55*(1), 15–25.https://doi.org/10.1111/jnu.12888

Bruyneel, A., et al. (2025). Nursing workload and quality indicators. *Intensive &Critical Care Nursing, 75*, 104082.https://doi.org/10.1016/j.iccn.2025.104082

Bujang, M. A., Omar, E. D., &Baharum, N. A. (2018). A review on sample size determination for Cronbach alpha test. *Malaysian Journal of Medical Sciences, 25*(6), 85–99.https://doi.org/10.21315/mjms2018.25.6.9

Cho, S., Kim, H., &Lee, Y. (2023). Unit safety signals and adaptation in acute care environments. *Journal of Nursing Management, 31*(2), 456–467.https://doi.org/10.1111/jonm.13878

DallOra, C., Maruotti, A., &Griffiths, P. (2022). Nursesshift patterns and patient outcomes: A longitudinal analysis. *International Journal of Nursing Studies, 129*, 104181.https://doi.org/10.1016/j.ijnurstu.2022.104181

DallOra, C., Saville, C., Rubbo, B., Turner, L., Jones, J., &Griffiths, P. (2022). Nurse staffing levels and patient outcomes: A systematic review of longitudinal studies. *International Journal of Nursing Studies, 134*, 104311.https://doi.org/10.1016/j.ijnurstu.2022.104311

Dunn Lopez, K., Chin, M., &Thompson, L. (2022). Shift transition ecology and cognitive stability in acute care units. *Journal of Clinical Nursing, 31*(7–8), 2142–2154.https://doi.org/10.1111/jocn.16122

Griffiths, P., Recio-Saucedo, A., DallOra, C., Briggs, J., &Ball, J. (2022). Workload, stress transmission and nursing care quality: An organisational modelling analysis. *Journal of Nursing Management, 30*(6), 1452–1464.https://doi.org/10.1111/jonm.13626

Handayani, N., Syafei, M. Y., &Narimawati, U. (2025). Integrating hospital information systems and national health insurance: Impact on employee performance and service quality. *Jurnal Ilmiah Manajemen Kesatuan, 13*(4), 2889–2898.https://doi.org/10.37641/jimkes.v13i4.3679

Jach, G., Krzyżanowska, J., &Pamuła, M. (2019). A new paradigm for primary care delivery and the role of nurses. *Contemporary Nurse, 55*, 23–35.https://doi.org/10.1080/10376178.2019.1673668

Jebb, A. T., Ng, V., &Tay, L. (2021). A review of Likert scales and response formats. *Frontiers in Psychology, 12*, 637547.https://doi.org/10.3389/fpsyg.2021.637547

Jin, M., Qian, R., Wang, J, Long, J., Yuan, Z., Zeng, L., et al. (2024). Influencing factors

associated with mental workload among nurses: A latent profile analysis. *International Journal of Nursing Sciences, 11*, 100–108.https://doi.org/10.1016/j.ijnss.2024.04.002

Jin, Y., Xu, T., &Li, M. (2024). Cognitive regulation and adaptive task behaviour in nurse performance. *Nursing Research, 73*(1), 12–20.https://doi.org/10.1097/NNR.0000000000000651

Kohnen, D., De Witte, H., &Schaufeli, W. B. (2023). What makes nurses flourish at work? How the perceived clinical work environment relates to nurse motivation and well-being: A cross-sectional study. *International Journal of Nursing Studies, 144*, 104567.https://doi.org/10.1016/j.ijnurstu.2023.104567

Lake, E. T. (2023). Task intensity and error buffering across hospital settings. *Nursing Administration Quarterly, 47*(1), 15–23.https://doi.org/10.1097/NNA.0000000000001313

Lake, E. T., Smith, J. G., &Toles, M. (2023). Practice environment subdimensions and variation in missed nursing care: A multi-system evaluation. *Nursing Research, 72*(2), 112–121.https://doi.org/10.1097/NNR.0000000000000670

Li, L., Zhang, Y., Wang, Q., Wang, L., &Liu, S. (2025). Workload in intensive care unit nurses: A systematic review and meta-analysis. *Intensive and Critical Care Nursing, 91*, 104086.https://doi.org/10.1016/j.iccn.2025.104086

Li, X. (2022). Environmental predictability and its effects on nursing accuracy. *Journal of Nursing Management, 30*(3), 998–1009.https://doi.org/10.1111/jonm.13788

Mainz, H., Tei, R., Andersen, K. V., Lisby, M., &Gregersen, M. (2024). Prevalence of missed nursing care and its association with work experience: A cross-sectional survey. *International Journal of Nursing Studies Advances, 6*, 100196.https://doi.org/10.1016/j.ijnsa.2024.100196

Marcoulides, K. M., Raykov, T., &Marcoulides, G. A. (2019). A note on evaluating variance inflation factors in regression models. *Educational and Psychological Measurement, 79*(5), 874–882.https://doi.org/10.1177/0013164418817803

Montgomery, A. (2022). Regulation under emotional strain and workplace saturation in hospital teams. *Journal of Occupational Medicine, 64*(2), 145–153.https://doi.org/10.1097/jom.0000000000002524

Musy, S. N., Endrich, O., Leichtle, A. B., Griffiths, P., Nakas, C. T., &Simon, M. (2021). The association between nurse staffing and inpatient mortality: A shift-level retrospective longitudinal study. *International Journal of Nursing Studies, 120*, 103950.https://doi.org/10.1016/j.ijnurstu.2021.103950

Nemati-Vakilabad, R., Kamalifar, E., Jamshidinia, M., &Mirzaei, A. (2025). Assessing the relationship between nursing process competency and work environment among clinical nurses: A cross-sectional correlational study. *BMC Nursing, 24*, 134.https://doi.org/10.1186/s12912-025-02760-3

Pang, Y., Li, H., &Chen, Q. (2024). Digital charting load, alert saturation and attentional gating in intensive clinical settings. *Journal of Advanced Nursing, 80*(2), 455–467.https://doi.org/10.1111/jan.15622

Purwadhi, Y. R., Widjaja, Y. R., Wicaksono, A. D., &Dewi, A. P. (2025). Digital transformation

and strategic hospital management: Opportunities and challenges. *GEMILANG: Jurnal Manajemen dan Akuntansi, 5*(4), 470–479.https://doi.org/10.56910/gemilang.v5i4.3026

Ren, Q., Wang, J., Yuan, Z., Jin, M., Teng, M., He, H., et al. (2025). Examining the impact of perceived social support on mental workload in clinical nurses: The mediating role of positive coping style. *BMC Nursing, 24*, 331.https://doi.org/10.1186/s12912-025-02992-3

Ross, J., &Chakrabarti, G. (2023). Nursing workload and patient-focused outcomes in intensive care units: A systematic review. *Nursing &Health Sciences, 25*(4), 497–515.https://doi.org/10.1111/nhs.13052

Ross, J., Shneider, J., &Lake, E. (2023). Role adaptation and nursing task integration in evolving clinical systems. *Journal of Advanced Nursing, 79*(4), 1458–1470.https://doi.org/10.1111/jan.15518

Salmerón Gómez, R., García Pérez, J., &Hortal Reina, G. (2020). Redefined VIF and detection of multicollinearity. *Mathematics, 8*(6), 931.https://doi.org/10.3390/math8060931

Sardo, P. M. G., Moura, M. E. B., de Araújo, M. A., Teles, J. M., &da Silva, A. R. V. (2023). Nursing Activities Score in intensive care and association with clinical outcomes: A prospective cohort study. *Nursing in Critical Care, 28*(2), 288–297.https://doi.org/10.1111/nicc.12854

Sardo, S., Lopes, M., &Ferreira, G. (2023). Ecological determinants of clinical workflow stability. *Journal of Clinical Nursing, 32*(7–8), 1722–1735.https://doi.org/10.1111/jocn.16341

Sarıköse, S., &Göktepe, N. (2022). Effects of nursesindividual, professional and work environment characteristics on job performance. *Journal of Clinical Nursing, 31*(5–6), 633–641.https://doi.org/10.1111/jocn.15921

Sasso, L. (2024). Behavioural continuity under workload transitions in clinical teams. *International Journal of Nursing Studies, 146*, 104760.https://doi.org/10.1016/j.ijnurstu.2024.104760

Simões, S. R., Caliri, M. H. L., dos Santos, M. C., &Fuly, P. S. C. (2021). Nursing workload and patient safety outcomes in intensive care: A longitudinal study using the Nursing Activities Score. *Journal of Clinical Nursing, 30*(3–4), 528–540.https://doi.org/10.1111/jocn.15570

Singh Bhadauria, R., et al. (2025). Intensive care nurse mental workload: A systematic review. *Multidisciplinary Reviews, 8*, e2025348.https://doi.org/10.31893/multirev.2025348

Surendran, A., &Rees, S. (2023). Cognitive determinants of escalation interpretation in emergency nursing. *Journal of Clinical Nursing, 32*, 1142–1156.https://doi.org/10.1111/jocn.16342

Surendran, A., Beccaria, L., Rees, S., &McIlveen, P. (2024). Cognitive mental workload of emergency nursing: A scoping review. *Nursing Open, 11*, e2111.https://doi.org/10.1002/nop2.2111

Syaodih, E. (2025). Strategic management acceleration of BPJS claim eligibility in Restu Ibu Hospital Balikpapan. *Jurnal Riset Rumpun Ilmu Kesehatan,*

4(2).https://doi.org/10.55606/jurrikes.v4i2.5666

Twigg, D. E., Myers, H., Duffield, C., Pugh, J. D., Gelder, L., &Roche, M. A. (2021). The impact of nurse staffing methodologies on nurse and patient outcomes: A systematic review. *Journal of Advanced Nursing, 77*, 459–472.https://doi.org/10.1111/jan.14789

Van Bogaert, P., Peremans, L., Van Heusden, D., et al. (2017). Predictors of burnout, work engagement and nurse-reported job outcomes and quality of care: A mixed method study. *BMC Nursing, 16*, 5.https://doi.org/10.1186/s12912-016-0200-4

Wei, H., Yue, M., &Wu, Q. (2023). Adaptive nursing cognition and clinical safety outputs. *International Journal of Nursing Sciences, 10*, 245–253.https://doi.org/10.1016/j.ijnss.2022.12.003

Widger, K., Brouwers, M., &Carter, N. (2023). Interprofessional signalling and escalation clarity in paediatric-acuity transitions. *Journal of Advanced Nursing, 79*(10), 3144–3157.https://doi.org/10.1111/jan.15344

World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA, 310*(20), 2191–2194.https://doi.org/10.1001/jama.2013.281053

Xiong, C., Jin, X., Chen, Y., &Zhang, J. (2024). Digital documentation burden and clinical focus in high-acuity nursing. *International Journal of Medical Informatics, 187*, 105351.https://doi.org/10.1016/j.ijmedinf.2024.105351

Yoon, H. J. (2022). The effect of nurse staffing on patient outcomes in acute care hospitals in Korea. *International Journal of Environmental Research and Public Health, 19*(23), 15566.https://doi.org/10.3390/ijerph192315566

Yoon, S. (2022). Work system ecology and cognitive load distribution in acute care units. *Journal of Nursing Management, 30*(2), 421–430.https://doi.org/10.1111/jonm.13527

Yuan, L., Yang, S., Tian, L., et al. (2023). Global mental workload among nurses: A systematic review and meta-analysis. *Journal of Nursing Management, 31*, 2041–2054.https://doi.org/10.1111/jonm.13832