Impact of Artificial Intelligence Generated Immersive Virtual Reality Simulation for Skill Mastery

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Introduction/Background

- Nursing education faces a critical shortage of clinical site availability due to healthcare staffing issues and faculty deficits.
- Limited access to clinical sites negatively impacts student development in:
  - Critical thinking
  - Clinical decision-making
  - Nursing skill proficiency levels
- Artificial Intelligence (AI)- generated Immersive Virtual Reality (IVR) simulation offers a forward-thinking solution to these challenges.
- AI IVR provides:
  - Safe and diverse clinical practice opportunities.
  - Larger faculty to student ratios.
  - Individually adaptive to learner performance.
  - Real-time AI driven feedback.
- This project evaluated how AI IVR simulation impacted nursing students' learning outcomes.
- Results demonstrated statistically significant improvements and high student satisfaction.

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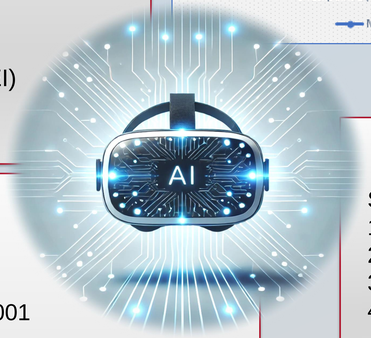
Methods

42 junior-level nursing students completed two AI-generated IVR simulations: **IV insertion** and **medication administration**. Outcomes were measured across three checkpoints:

•**Checkpoint 1:** Physical Skill simulation (C-CEI evaluation)
•**Checkpoint 2:** First AI IVR attempt (C-CEI and AI analytics)
•**Checkpoint 3:** Second AI IVR attempt (C-CEI, AI analytics, and SET-M)

Assessments included:
•Creighton Competency Evaluation Instrument (C-CEI)
•AI-generated performance scores
•Simulation Effectiveness Tool–Modified (SET-M)

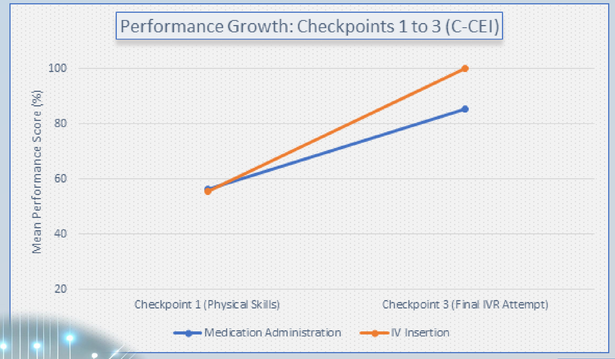


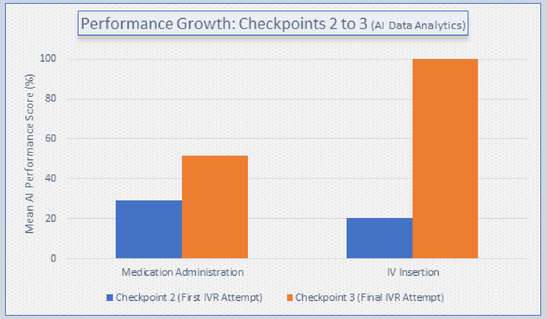
Results

C-CEI Scores
Repeated Measures ANOVA:
•*Medication Administration:* $F(2, 123) = 329.78$, $p < .001$
•*IV Insertion:* $F(2, 123) = 2408.40$, $p < .001$
•Avg. increase: **33.62%** (meds), **48.12%** (IV)

AI-Generated Scores
Paired t-tests:
•*Medication Administration:* $t(41) = -12.55$, $p < .001$
  •Avg. increase: **33.62 percentage points** (from 18.45% to 52.07%)
•*IV Insertion:* $t(41) = -63.86$, $p < .001$
  •Avg. increase: **48.76 percentage points** (from 14.12% to 62.88%)

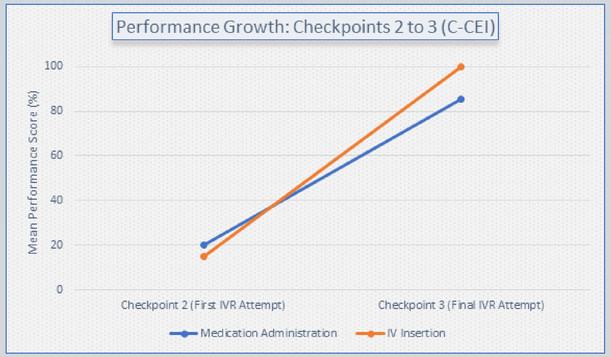
SET-M Satisfaction Survey
•Overall mean: **2.79 / 3.00**
•Highest agreement: confidence, prioritization, safety
•Standard deviations indicated strong consensus among students





Key Outcomes

Significantly Improved:
1. Critical Thinking
2. Clinical Decision-Making
3. Nursing Skill Proficiency
4. High Student Satisfaction



Conclusions

AI-generated IVR simulation significantly improved nursing students' clinical decision-making, critical thinking, and nursing skill proficiency. Students reported high satisfaction with the experience. These results support the use of AI IVR simulation as a scalable, high-quality tool to enhance learning outcomes, supplement traditional clinical training, and prepare students for professional practice.