Examining Nurses' Acceptance of LLM-RR Based Nursing Manual Search Engine Using a Combined TAM and UTAUT Model

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BACKGROUND

- Current nursing manual search systems have major limitations:
  - Separate searches for each manual
  - Frequent search failures with specific terms
  - No integrated search, fragmented documents
- These limitations increase nurses' cognitive burden, especially for new staff, and often delay clinical decision-making.
- Few studies have quantitatively assessed nurse-facing LLM systems.
- This study addresses that gap by evaluating a novel LLM-RR based search engine for nursing manuals.

OBJECTIVES

- We aimed to assess nurses' acceptance of the LLM-RR search engine and evaluate how positively they respond to this new system in clinical settings.
- Evaluate effects of performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) on:
  - Attitude toward use (ATT)
  - Intention to use (ITU)
- These constructs, derived from TAM and UTAUT, help explain why nurses adopt or reject new technologies.

METHODS

- **Participants**: 111 nurses (mean age 36.7 years, mean experience 10.6 years, 92% female) participated in the study.
- **System**: The LLM-RR engine supported natural language queries, integrated multiple manuals, and delivered context-aware re-ranked answers.
- **Framework**: A combined TAM and UTAUT model was used to explain acceptance and intention.
- **Measures**: PE, EE, SI, FC, ATT, and ITU were measured with multi-item Likert scales.
- **Analysis**: PLS-SEM with bootstrapping confirmed reliability (CR > 0.70), convergent validity (AVE > 0.50), and discriminant validity.

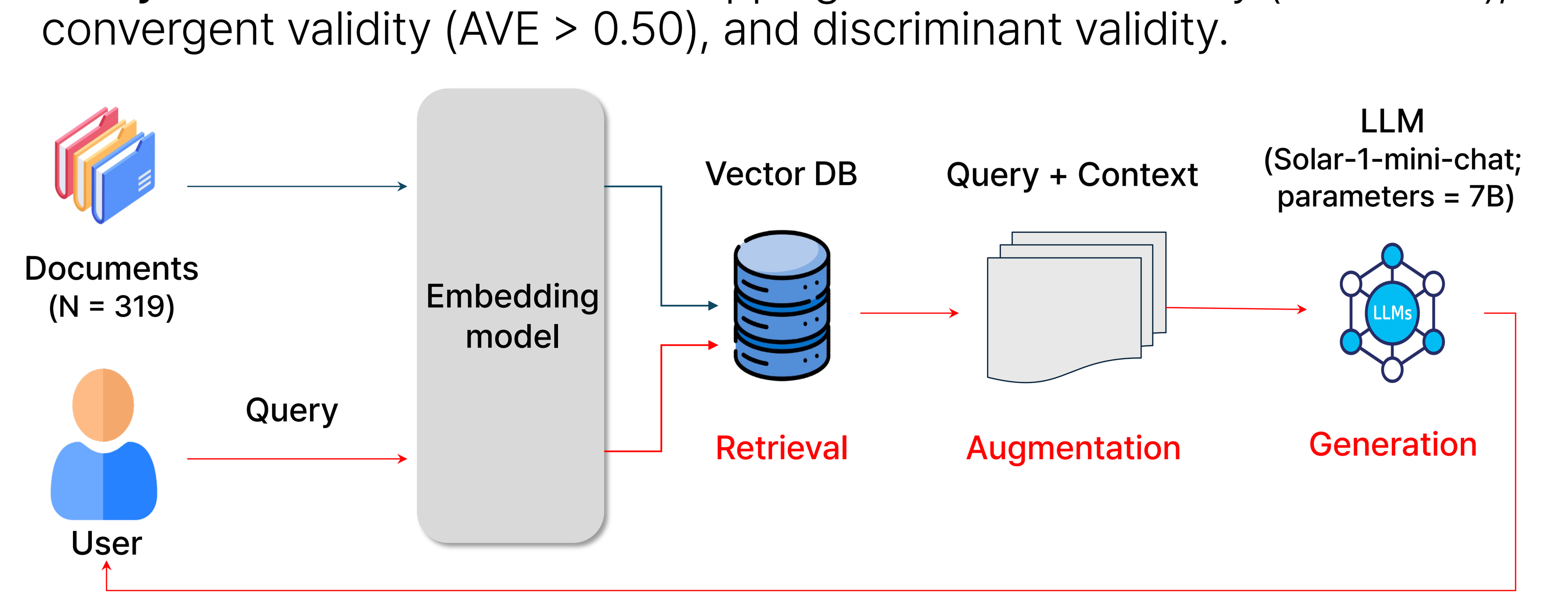


Fig 1. Workflow of the LLM-RR based nursing manual search engine

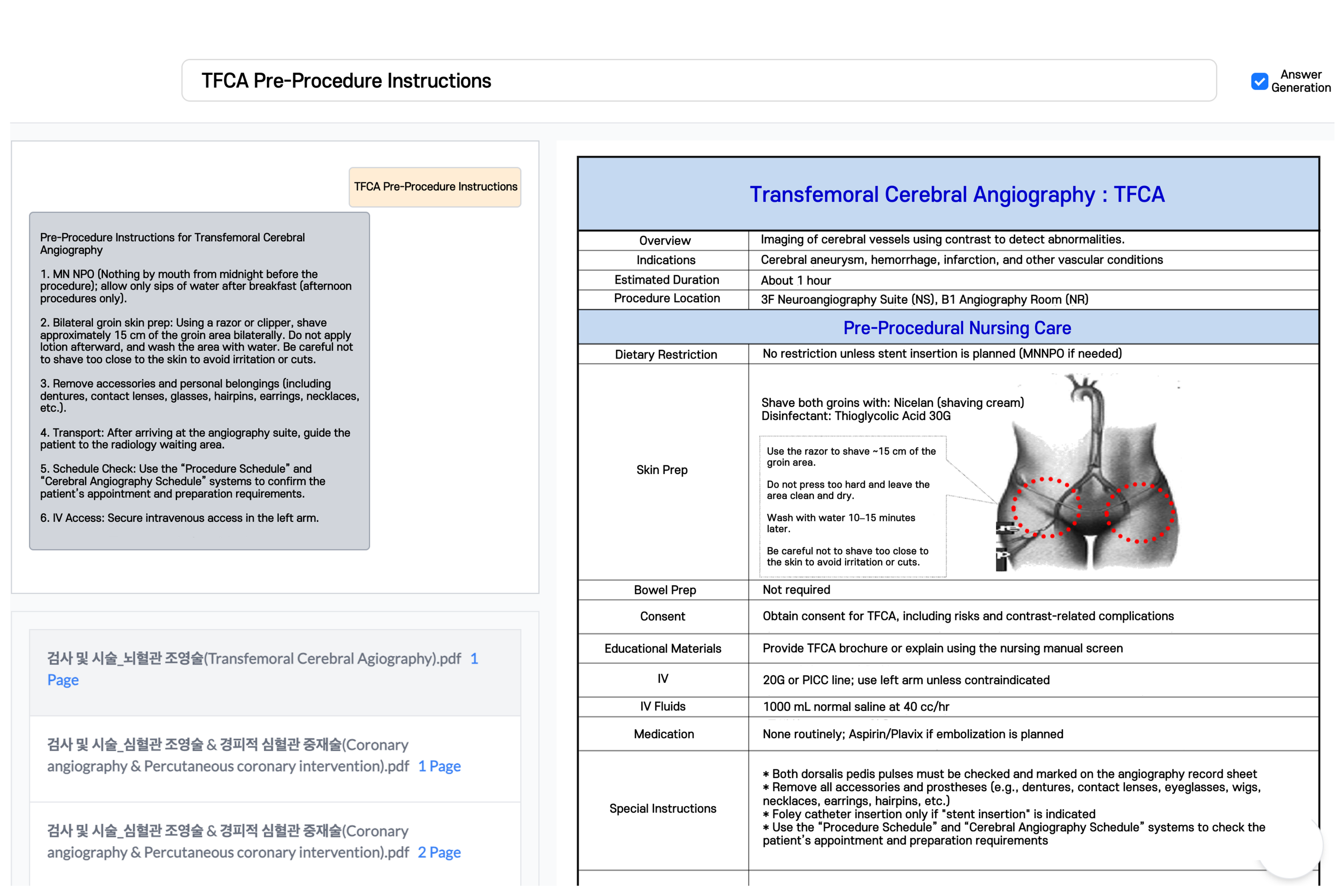


Fig 2. Example output from the LLM-RR search engine

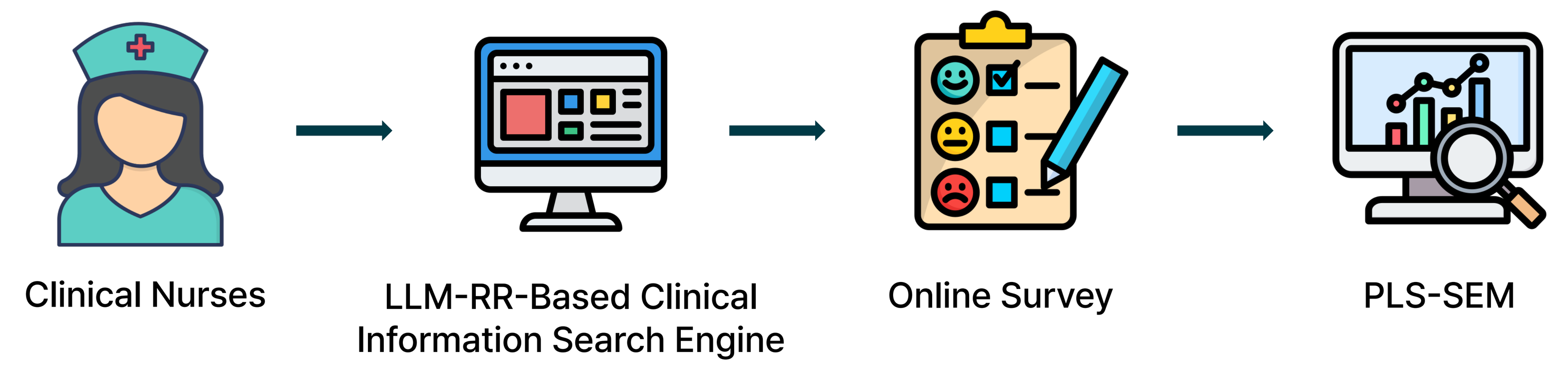
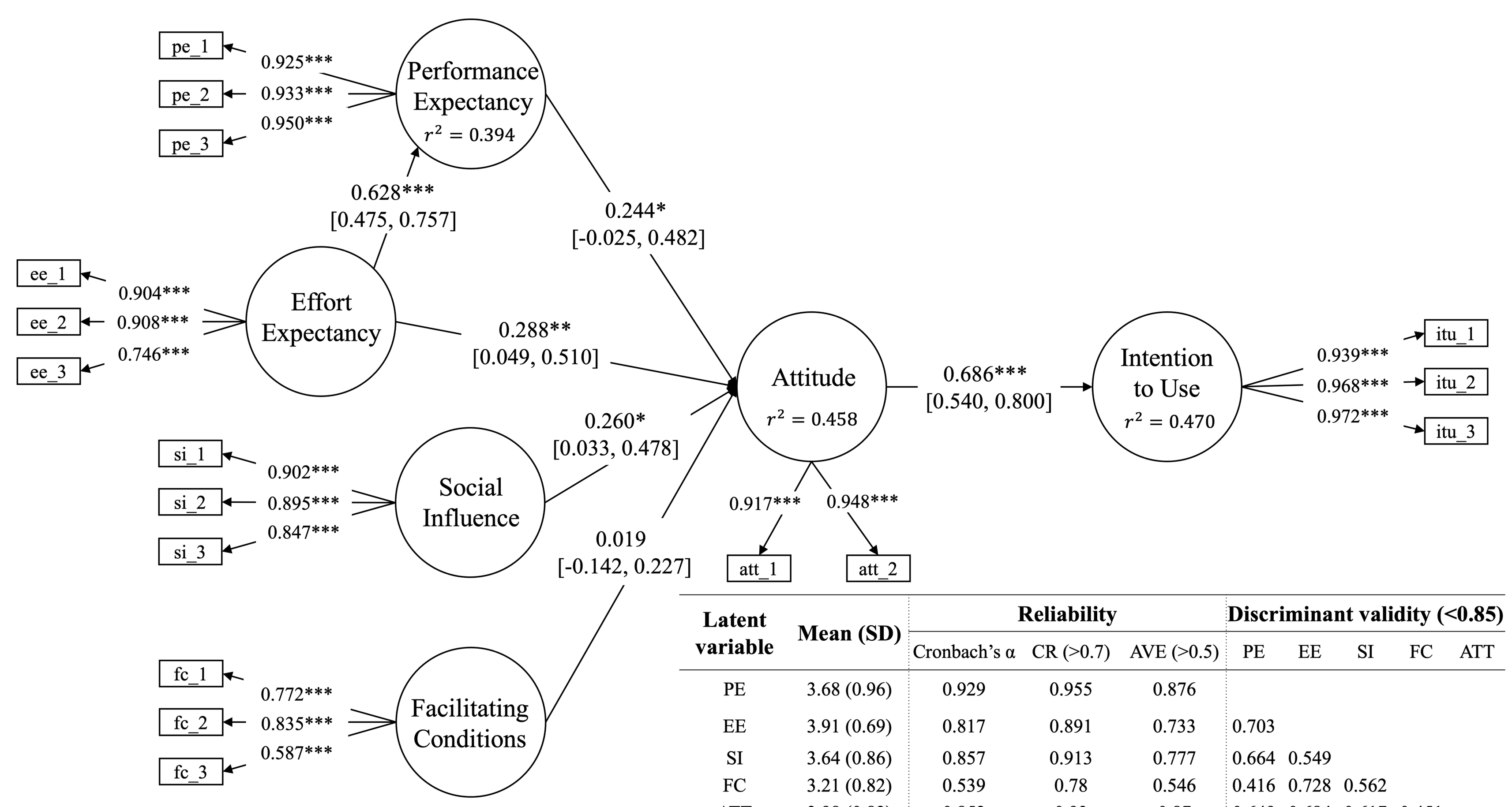


Fig 3. Workflow of the research

RESULTS

- **Measurement model**: Reliability and convergent validity were acceptable for most constructs, except for FC.
- **Structural model**: EE, PE, and SI significantly influenced ATT toward the system.
- Nurses' attitudes strongly predicted their intention to use the system.
- FC showed no significant association with attitude.
- **Key finding**: Effort expectancy (ease of use) emerged as the strongest predictor of intention to use.



Latent variable	Mean (SD)	Reliability			Discriminant validity (<0.85)				
		Cronbach's α	CR (>0.7)	AVE (>0.5)	PE	EE	SI	FC	ATT
PE	3.68 (0.96)	0.929	0.955	0.876					
EE	3.91 (0.69)	0.817	0.891	0.733	0.703				
SI	3.64 (0.86)	0.857	0.913	0.777	0.664	0.549			
FC	3.21 (0.82)	0.539	0.78	0.546	0.416	0.728	0.562		
ATT	3.98 (0.82)	0.852	0.93	0.87	0.649	0.684	0.617	0.451	
ITU	3.64 (0.96)	0.957	0.972	0.921	0.818	0.666	0.782	0.658	0.751

Fig 4. PLS-SEM results of the combined TAM and UTAUT model

CONCLUSIONS

- Nurses showed generally positive attitudes and acceptance toward the LLM-RR based manual search system.
- EE had the greatest impact, highlighting the importance of intuitive, user-centered system design.
- SI also played a meaningful role, suggesting that organizational support can promote adoption.
- FC did not significantly influence ATT, but may still matter during actual implementation.
- Despite limitations (single-site, self-reported data), this study offers practical insights into integrating LLM tools into clinical nursing workflows.

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