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Information Systems Use Among Ohio Registered Nurses: Testing Validity and Reliability of Nursing Informatics Measurements

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Background

- Approximately 4.6 % of the health care budget is spent on Information Technology (IT).

- Nurses are the largest member group in the hospital workforce and they are continually urged to use information technologies to improve patient safety and quality.

- Little is known about human factors such as perceived benefits and satisfaction that are key to IT implementation success.

Background

- Nurses are utilizing information systems (IS) to accomplish nursing tasks as a part of their work.

- Using IS can achieve many interrelated benefits, such as facilitating interdisciplinary coordination and collaboration, enhancing continuity of patient care, saving nurses' time, and improving nurses' productivity.

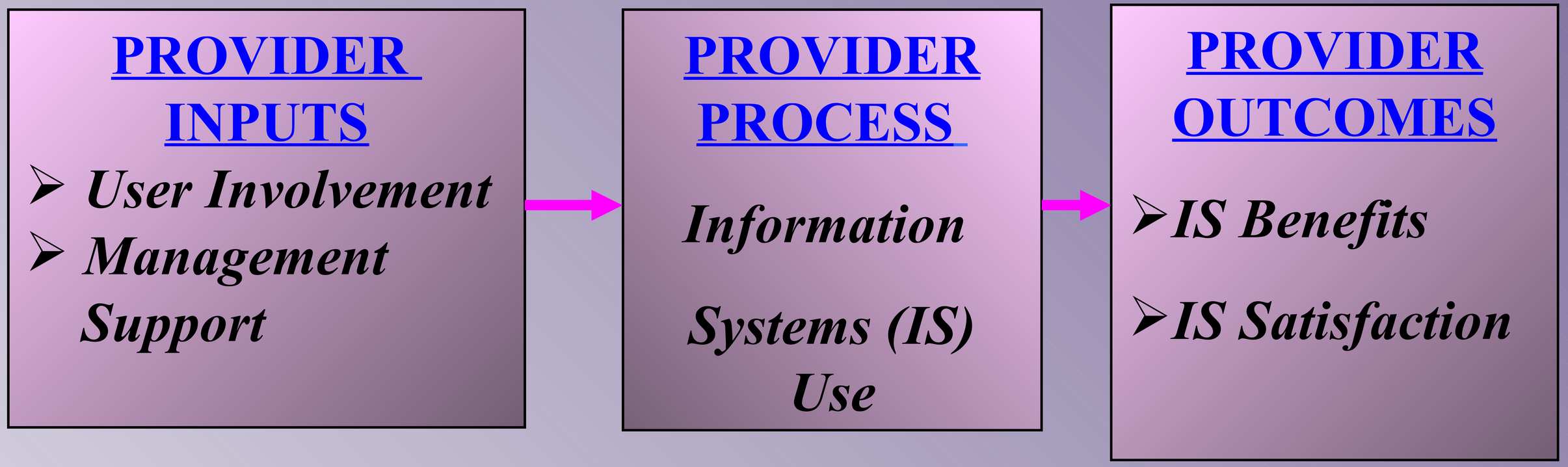
- Lack of nursing specific measurement tools to evaluate the use and benefits of IT in nursing.

Purpose

- The purpose of this pilot study is to assess the psychometric properties of IT measurement tools that used in IT field and others that are developed by the investigator for use among nurses.

Theoretical Framework

- Input-Process-Outcome Based on Donabedian's Quality Assessment Model and Holzemer and the Reilly Outcomes Model for Health Care Research.



Methods

- Design: A descriptive correlational cross-sectional.

- Sample:

A convenience sample of 62 nurses working in hospitals and enrolled in advanced nursing courses

Inclusion criteria:

- Spend at least 50 % of their time providing direct patient care.

- Uses at least one information system in their work.

Data Collection

- The Institutional Review Board of Human Subjects of Case Western Reserve University approval was obtained for data collection procedure.
- Nurses were asked to voluntarily participate in the study. Questionnaires were distributed during the class break time.
- Nurses were instructed not to put their names on the questionnaire and returned the questionnaires back to a return box placed in a convenient place.

Instruments

Variable	Empirical Indicators	# of Items	Scale
User Involvement	User Involvement Scale (Doll & Torkzadch, 1990) (Adapted)	8	likert scale ranging from (1) Not at all to (5) a great deal
Management Support	Management Support Scale (Igbaria, 1990) (Adapted)	6	Likert scale ranging from (1) strongly disagree to (5) strongly agree
IS Use	IS Use Scale (Investigator developed)	7	likert scale ranging from (0) never/almost never to (4) always/almost always
IS Benefits	Benefit Scale (Investigator developed)	56	Likert scale ranging from (1) strongly disagree to (5) strongly agree
IS Satisfaction	Satisfaction Scale (Calisir & Calisir, 2004) (Adapted)	1	Likert scale ranging from (1) very dissatisfied to (5) very satisfied

Results: Sample Characteristics

Sample Characteristics	N	%
Gender		
Male	11	17.7
Female	51	82.3
Race		
African American	4	6.5
White	52	83.9
Asian	6	9.7
Work Status		
Full-time	41	66.1
Part-time	13	21
Other	8	12.9

Sample Characteristics	N	%
Informatics Courses	38	62.3
Informatics Training	48	77.4
Level of Education		
Associate degree	1	1.6
Diploma degree	5	8.1
BSN	45	72.6
Practice doctorate	1	1.6
MSN	7	11.3
Other	3	4.8

Results: Sample Characteristics

Sample Characteristics	M	SD
Age (Years)	30.14	8.90
Percentage of time spent providing patient care	92.41	7.53
Years of experience in nursing	4.03	3.39
Years of experience working in the hospital	5.7	4.77
Hours of work/week	32.71	12.68

Results: Reliability

Variable	Cronbach' Alpha
User Involvement	0.92
Management Support	0.90
IS Use	0.85
IS Benefits	0.97

Cronbach' Alpha referred to a measure of internal consistency based on average correlation among items and require a single questionnaire administration (Carmines, & Zeller, 1979). Knapp & Brown (1995) recommend that Cronbach' Alpha for a new instrument should be at least .70

Results: Validity

- Validity was assessed by testing hypothesized relationships.

- The study hypotheses include (based on the theoretical framework):

4. User involvement in implementation and management support (inputs) will have a direct relationship with nurses' IS use (process).

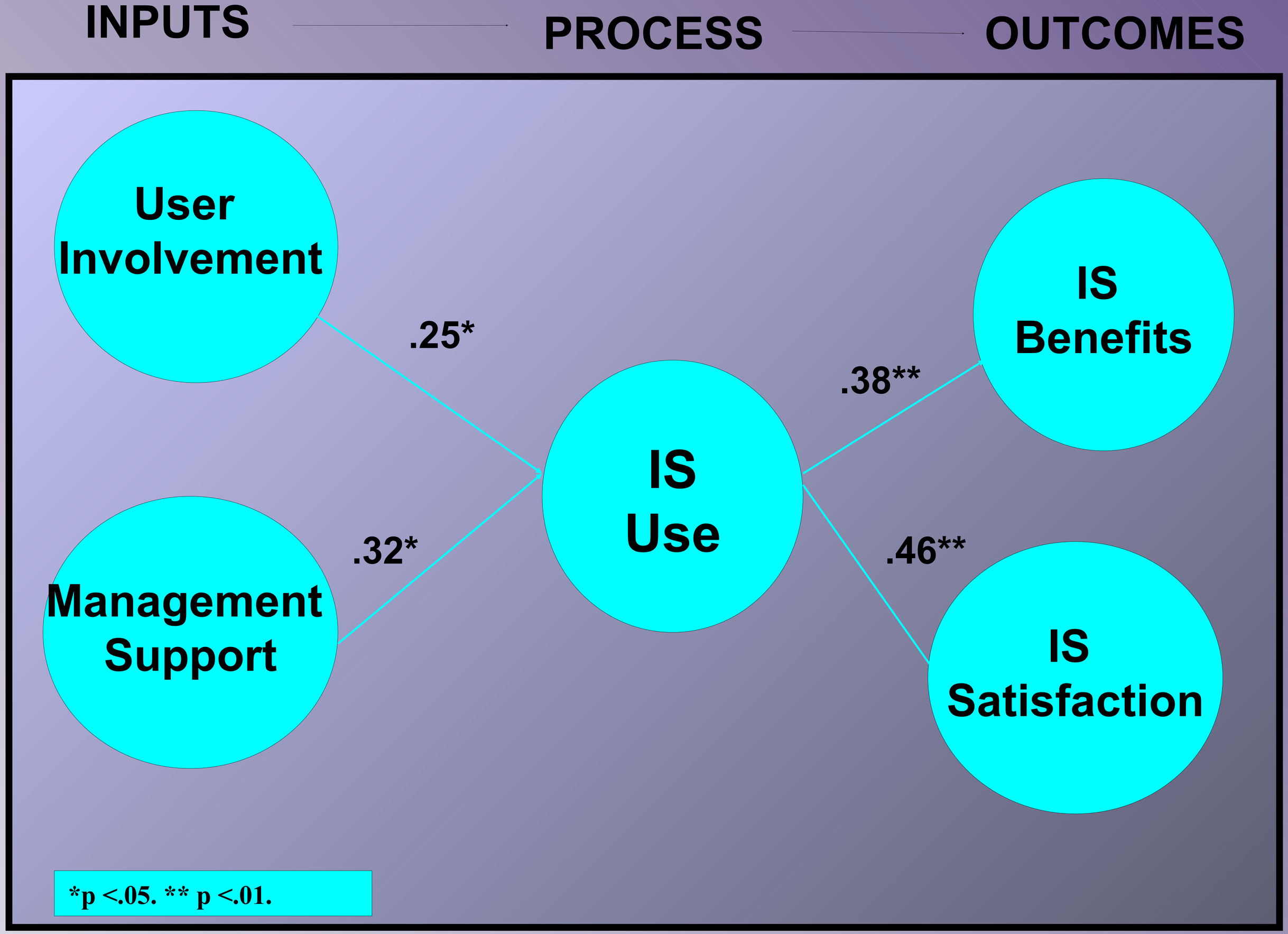
6. Nurses' IS use (process) have a direct relationship with their benefits and satisfaction from IS use (outcomes).

Results: Validity

- As hypothesized, there were positive significant correlations between inputs (user involvement, management support) and process (IS use); and process (IS use) and outcomes (benefits, satisfaction) which match the study model.

- The direction of the relationship determined by the sign of the correlation coefficient. Strength of correlations represents the proportion of variability in the dependent variable that can be explained by, or that is associated with the independent variable. It is represented by $r^{2.}$

Correlations (r) among the Study Variables (Validity)



Conclusions

- Findings indicated that for this preliminary study in nursing informatics, some instruments showed strong psychometric evidence, while others demonstrated low to moderate correlations (validity) such as user involvement and management support. However, these results are sample specific.

- Testing among other nurses samples is required to affirm their validity among nurses. Furthermore, continued refinement of these instruments and measures will be useful in investigating IS use, benefits and satisfaction.