Utilizing Collaborative Testing to Engage Nursing Students Improve Academic Achievement and Decrease Attrition

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Background of Problem

- **Predicted shortage in nursing**
  (U.S. Department of Labor, Bureau of Labor Statistics [USDOL, BOLS], 2013)

- **Nationwide attrition rates in nursing programs**
  - **First year attrition - 20% to 42%**
  - **Overall attrition   - 20% to 27%**

Background of Problem (Cont.)

- **Literature shows collaborative learning is linked to student engagement (SE) and**
  - **SE is linked to academic success**

(Hake, 1998; Johnson, Johnson, & Smith, 1998; Johnson et al., 2007; Kuh,2003; Prince, 2004; Redish, Saul, & Steinberg, 1997)

- **Nursing lacks evidenced based research to select teaching strategies**

(Popkess & McDaniel, 2011)

Purpose
Research Questions

Do nursing students who participate in a collaborative learning process:

1. Attain high levels of academic achievement?
2. Report high levels of student engagement?
3. Have low attrition rates?

Bandura's Triadic Reciprocal Model

Person

Behavior ⟷ **Environment**
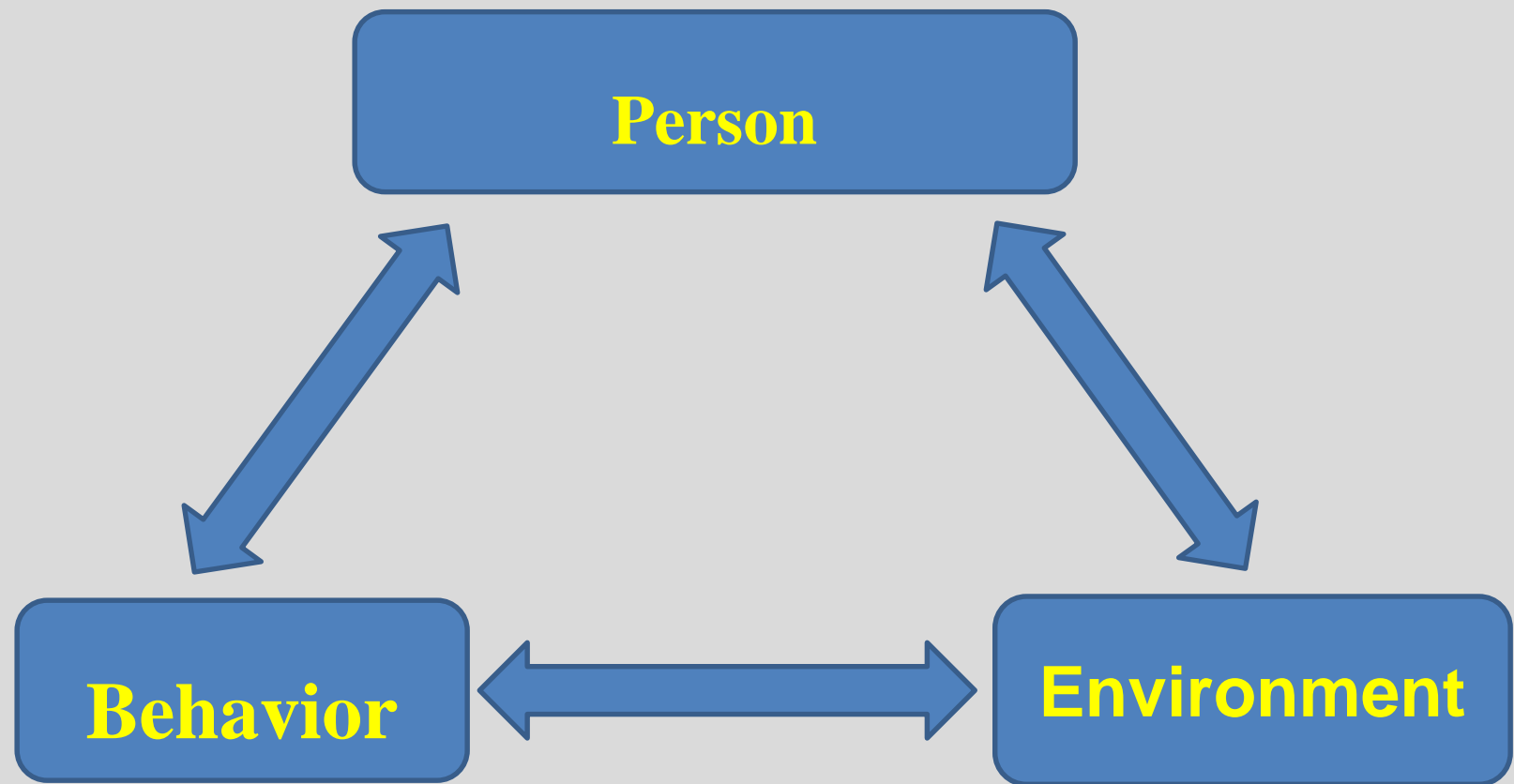
(Zimmerman, 1989)

Literature Review

- **Nursing Students**

- **Collaborative Learning**

- **Attrition**

- **Academic Achievement**

- **Student Engagement**

Methods

- **Research design**
  - **Quasi-experimental after-only nonequivalent control group design.**

- **IRB approval**

- **Setting**
  - **Appalachian region Southern Ohio**

Methods (Cont.)

- **Sampling plan**
  - **Non-probability convenience sampling**
  - **G*Power analysis to determine sample size**
    - **128 participants**

    (Faul, Erdfelder, Lang, & Buchner, 2007)

  - **Eligibility criteria**
    - **Inclusion**
    - **Exclusion**

Methods (Cont.)

- **Instrumentation used included:**
  - **Survey of Student Engagement (SSE)**
    (Ahlfeldt, Mehta, Sellnow, 2005)

  - **Health Education Systems Incorporated – Specialty Exams (HESI-SE)**
    - **Fundamentals**
      - **Fundamentals course**
    - **Psychiatric mental health** **(Zwighaft, 2013)**
      - **Behavioral health course**

Procedure

- **Data Collection**

  - **Control and experimental groups**
    - **Gender**
    - **Admission scores**
    - **Age**

Procedure (Cont.)

Control and experimental groups

- Students were enrolled in either a
  - Fundamentals
  - Behavioral Health

- 4 unit exams
  - HESI-SE
  - Survey of Student Engagement (SSE)

Procedure

- **Experimental groups**

  - **Permanent groups of five to six students**
  - **Four unit exams**
    - **Same exam time as the control group**
    - **Redistributed the exam time**
      - **75% individual**
      - **25% group**

Procedure (Cont.)

- **Experimental Group**
  - **Collaborative Testing Process**
- **Exam day**
  - **Individual exam**
  - **Recorded answers on Scantron® forms**
  - **Faculty collected Scantrons®**
  - **Student's gathered in their groups**
  - **Each group received one Scantron® form**
  - **Reviewed exam and answers**

Procedure (Cont.)

- **Experimental Group**
  - **Collaborative Testing Process (Cont.)**

- **Faculty graded**
  - **Individual exams**
  - **Group exam**

- **Based upon the group score**
  - **Five percentage points**

Demographics

Course	Control (Spring)	Experimental (Fall)	Percent in experimental Group
Totals (n=153)	83	70	45.8%
Fundamentals	37	43	53.8%
Behavioral health	46	27	37.0%

Demographics (Cont.)

Gender (n=153)		Percent		
	Female (n=120)	78.4%		
	Male (n=33)	21.6%		

Number per group using age classification		Traditional (under 25)	Non-Traditional (25 and older)	Percent Traditional
	Control	46	37	55.4%
	Experimental	49	21	70.0%

Research Hypothesis One

- **Nursing students who participate in a collaborative learning process during unit exams will attain higher academic achievement than nursing students who do not participate in the collaborative learning process.**
  - Analysis was performed
    - Rank un-pooled t-test
    - Logistic regression

Fundamentals or Behavioral Health HESI-SE

	Courses	Groups	Mean	Standard deviation	Test statistic	Probability-value (0.05)
Control			**777.38**	**143.87**		
Experi-mental			**795.33**	**138.68**	**-0.78**	**0.43**
Courses	Fundamentals					
		Control	**746.73**	**166.59**		
		Experi-mental	**801.35**	**156.65**	**-1.50**	**0.14**
	Behavioral Health					
		Control	**803.16**	**117.43**	**0.65**	**0.52**
		Experi-mental	**785.74**	**106.03**		

Fundamentals/Behavioral Health Groups

Fundamentals Variables	B	Wald (z-ratio)	Odds Ratio	p-value	95% CI Lower	95% CI Upper
Gender	-0.748	-1.094	0.473	0.274	0.111	1.701
Non-traditional control	2.561	2.682	12.959	0.007	2.292	109.972
Non-traditional experimental	2.448	2.485	12.001	0.013	1.875	102.110
Traditional experimental	1.614	1.924	5.023	0.054	1.137	35.591
Rank score	0.010	0.404	1.010	0.686	0.960	1.062
(Constant)	-2.572	-2.461	0.076	0.014	0.008	0.501

Behavioral health Variables	B	Wald (z-ratio)	Odds Ratio	p-value	95% CI Lower	95% CI Upper
Gender	-1.600	-1.945	0.202	0.052	0.029	0.850
Non-traditional Control	0.856	1.285	2.354	0.203	0.652	9.124
Traditional Experimental	0.076	0.103	1.079	0.918	0.246	4.619
Non-Traditional Experimental	0.184	0.213	1.202	0.832	0.200	6.449
(Constant)	-0.724	-1.454	0.485	0.146	0.169	1.240

Conclusion Research Hypothesis One

- **Review of the literature**

  - **No studies were found using HESI-SE to measure academic achievement when collaborative testing was used**

Conclusion Research Hypothesis One (Cont.)

- **Review of the literature (Cont.)**

    - **Non-traditional students are more successful in course work and program completion than traditional students** (Fraher, et al., 2008; Hadenfeldt et al.; Pitt, et al., 2012)

        - **This study non-traditional students were more likely to score 850 or higher on HESI-SE**

Research Hypothesis Two

- **Nursing students who participate in a collaborative learning process during unit exams will report higher levels of student engagement than nursing students who do not participate in the collaborative learning process.**

- **Analysis was performed**
  - **Wilcoxon rank sum test**
  - **Two-way analysis of variance**

Survey of Student Engagement Responses

Course	Total scores: Survey and scales	Control (n=32)	Experimental (n=42)	Test statistic, W (Z)	Probability-value (0.05)
Funda-mentals	Survey student Engagement	41.0 (20.0)	40.0 (18.0)	687.5 (1.85)	0.870
	Collaborative learning	14.0 (11.0)	15.0 (10.0)	642.0 (1.73)	0.744
	Cognitive complexity	9.0 (10.0)	9.5 (8.0)	621.5 (1.67)	0.582
	Personal skills	17.0 (18.0)	16.0 (10.0)	769.0 (2.07)	0.288

		Control (n=33)	Experimental (n=16)	Test Statistic (W)	p-value
Behavioral health	Survey student engagement	35.0 (23.0)	39.5 (27.0)	220.0 (1.09)	0.353
	Collaborative learning	12.0 (11.0)	14.0 (12.0)	240.0 (1.19)	0.614
	Cognitive complexity	10.0 (9.0)	10.0 (11.0)	175.0 (0.87)	0.056
	Personal skills	14.0 (15.0)	14.5 (15.0)	262.0 (1.30)	0.974

Conclusion Research Hypothesis Two

- **Literature indicated nursing students perceive themselves as less engaged in interactive or student-centered pedagogies**

  (Popkess & McDaniel, 2011)

  – **No statistical significance was found**
    - **Study supported findings in the literature**

Research Hypothesis Three

- **When controlling for age, first semester level one (fundamentals class) nursing students who participate in a collaborative learning process during unit exams will have lower levels of student attrition than level one nursing students who do not participate in the collaborative learning process.**

- **Analysis was performed**
  - **Chi-square**
  - **Logistic regression**

Fundamentals Courses
Pass Rates Across Groups and Age Groups

Course	Group	Pass	Fail	Percent passed	Percent failed (attrition)	Probability-value (0.05)
Totals (n=80)	Control Experimental	24 31	13 12	64.9% 72.1%	35.1% 27.9%	0.650
Traditional (n=56)	Control Experimental	14 22	9 11	60.9% 66.7%	39.1 33.3	0.871
Non-Traditional (n=24)	Control Experimental	10 9	4 1	71.4% 90.0%	28.6% 10.0%	0.55

Conclusion Research Hypothesis Three

- **Non-traditional students are more likely to pass nursing courses**

  (Fraher, et al., 2008; Hadenfeldt et al.; Pitt, et al., 2012)

  - **Control group**
    - **60.9% Traditional students passed**
    - **71% Non-traditional students passed**

  - **Experimental group**
    - **66% Traditional students passed**
    - **90% Non-traditional students passed**

  - **No statistical significance**

Conclusion Research Hypothesis Three (Cont.)

- **Nationwide first semester attrition rates 20-42%**

  (Fraher, Belsky, Gaul, & Carpenter, 2010; Peterson-Graziose, Bryer, & Nikolaidou, 2013)

  - **Control group 35%**
  - **Experimental group 28%**
  - **No statistical significance**

Conclusion Research Hypothesis Three (Cont.)

- **Collaborative testing results in an increase in students exam scores**

  (Centrella-Nigro, 2012; Eastridge, 2014; Molsbee, 2013; Peck, Stehle Werner, & Raleigh, 2013; Sandahl, 2009)

    – **Attributed to fact they received additional points**

Conclusion Research Hypothesis Three (Cont.)

- **Literature showed that students who pass a course based on points received when using collaborative testing**

  - **Typically complete the nursing program**

  - **Pass NCLEX-RN exam on first attempt** (Molsbee, 2013)

  - **Seven students passed**

  - **Plan to approach IRB and follow the students**

Significance

- **Nursing Education**

  - **Study provides a higher level of evidence based research**

  - **Nurse educators can use information to make informed decisions**

Significance (Cont.)

- **Nursing Practice**
  - **Gained experience**
    - **Working with teams and collaborating**

- **Nursing Research**
  - **Findings not statistically significant**
  - **Framework for future studies**

Significance (Cont.)

- **Public Policy**
  - **Research is costly and time consuming**
  - **Attrition is costly and time consuming**
    - **Universities loose fees**
    - **Students waste**
      - **Federal aid/loans/money**
      - **Time**

Significance (Cont.)

- **Public Policy (Cont.)**

  – **Policies need to be in place**
    - **Support faculty research related to attrition**

  – **State Boards of Nursing and accrediting bodies**
    - **Require that educational research be conducted in nursing programs**

The End

Questions?

THANK YOU!!!

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