

Sigma Theta Tau International's 26th International Nursing Research Congress

Academic performance: The role of cognitive engagement among nursing students in a Jamaican community college

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Learner Objectives

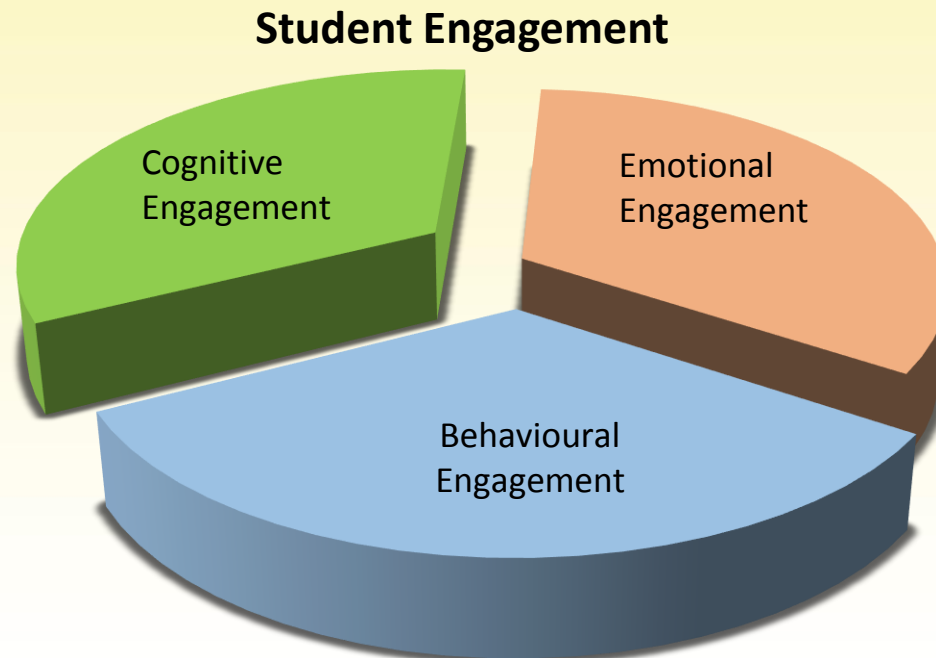


1. Explain concepts relating to cognitive engagement.
2. List at least 2 data analysis methods.
3. Determine the relationship of cognitive engagement to academic performance according to research evidence.
4. Outline recommendations to strengthen research evidence on cognitive engagement and academic performance

No sponsorship or commercial support was given to the researcher and the researcher has no conflict of interest.

Background

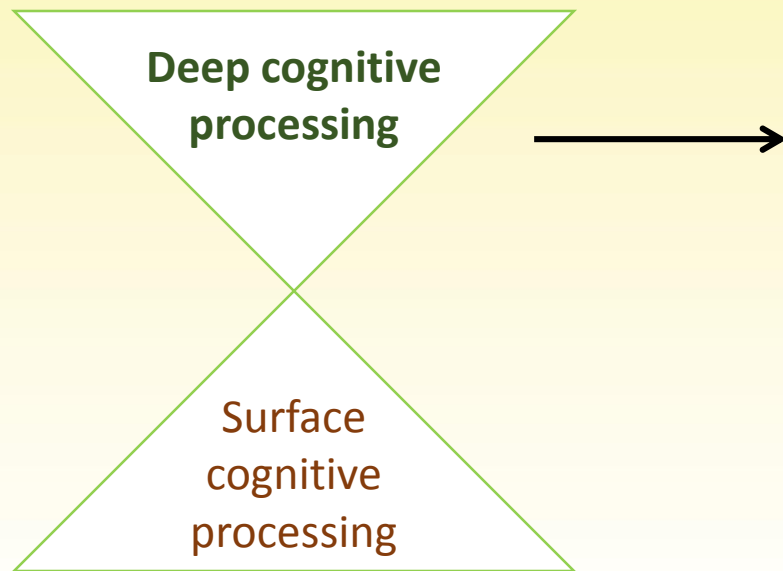
Educators have shown increased interest in the area of student engagement as studies show that it is intricately linked to their academic performance.



Background

Cognitive Engagement

Investing *energy*, thoughtfully and willingly, so that intricate ideas can be understood and complex skills can be mastered.



Key Concepts

- Seeking information
- Interpreting findings
- Analyzing data
- Summarizing information
- Critiquing
- Making decisions
- Reasoning through various opinions and arguments

Background

- Deep cognitive processing correlated positively to higher GPA scores at a significance of $p = .031$ (Mansouri et al., 2004)
- *Only two (2) studies* were found that related specifically to the use of deep and surface cognitive processing among nursing students (Mansouri, Slotani, Rahemi, Moosavi-Nasab, & Ayatollahi, 2004; Cowan, 1998).



Study Objectives were to:

- determine the extent to which nursing students used deep or surface processing in the teaching-learning process.
- describe the academic performance of nursing students.
- determine if there was a relationship between cognitive engagement and academic performance.

The Methodology

- **Research Design:** cross-sectional descriptive correlational design
- **Population & Setting:** Nursing students at a rural Jamaican Community College School of Nursing. Training was offered at the Baccalaureate and Assistant Nursing levels to 117 students.

Sample Size and Sample Selection

- Calculated using the formula $z^2 \cdot (p) \cdot (1-p) \div c^2$ with Z representing 1.96, $p = 0.5$ and $C = 0.05$. Total: **384 participants**
- Based on the small size of the accessible population, the total was further adjusted using the formula $ss \div 1 + (ss - 1 \div pop)$. Total: **90 participants**
- **census sampling** was used due to possibility of nonresponse.

Sampling Procedure

Inclusion Criteria

- Nursing students enrolled in the institution, who completed at least their first semester to access GPA

Exclusion Criteria

- Students on leave of absence

Data Collection Procedures

Instrumentation

- The Cognitive Engagement Survey (CES), a self-administered 34 item questionnaire, was given to students to determine their level of cognitive processing.
- The CES: combination of items from The College Student Report (NSSE, 2012), the Engagement in Academic Work tool (Greene & Miller, 1996) and supplemented demographic items.

Data Collection Procedures

Instrumentation

- The CES consisted of 3 sections:
 - Section 1: 4 demographic items
 - Section 2: 24 Likert scale items
 - Section 3: 1 dichotomous item & 6 closed ended items

Data Collection Procedures

Reliability and Validity Testing of Tools

- The College Student Report (NSSE, 2012): Cronbach's alpha analysis .70 to .99.
- Engagement in Academic Work Tool (Greene & Miller, 1996): Cronbach's alpha analysis .65 to .73 in 1996 and .86 in 2005 with further adjustments.

Data Collection Procedures

The CES was pretested in March 2013:

- using 12 students divided equally across BScN year 1 to year 3 classes at UWISON.
- took approximately 15 minutes to complete.

Item 32, *“About how many hours do you spend in a typical 7-day week working for pay?”* was interpreted by one student as asking if she was remunerated while working in the clinical area.

Reliability & Validity Testing of CES

Determining Internal Consistency

- Used Cronbach's alpha analysis.
- Deep and surface processing subscales were analyzed separately.
- Surface processing subscale Cronbach's alpha score was .71 after removing one item
- Deep processing subscale Cronbach's alpha score was .72 after removing 6 items

Reliability & Validity

On completing data collection, the Cronbach's alpha of all Likert items was .57. Analysis of subscales was .79 for deep processing items similar to Laird et al. (2005) and .68 for surface items similar to Greene and Miller (1996) (.65/.73).

Reliability & Validity

Statistically significant negative correlation ($r = -0.532$, $p = 0.000$) was observed between deep and surface processing subscales indicating that they dealt with opposing variables.

Content validity: **2** experienced nursing educators who agreed that questions appeared to adequately cover key concepts of the study.

Data Analysis Methods

- SPSS version 20 was used
- Descriptive statistics analyzed:
 - demographic & academic attributes
 - level of cognitive engagement and academic performance

Data Analysis Methods

- Crosstabulation: described GPA scores in relation to student groups and selected demographic and academic attributes.
- Spearman correlation coefficient: determined whether a relationship existed between GPA scores and student groups

Data Analysis Methods

- One-way analysis of variance (ANOVA) was used to:
 1. compare differences in mean scores for deep and surface cognitive engagement in relation to demographic and academic attributes.
 2. determine differences in the mean scores of cognitive engagement in relation to GPA scores.
 3. determine whether cognitive engagement was related to the performance of nursing students.

Data Analysis Methods

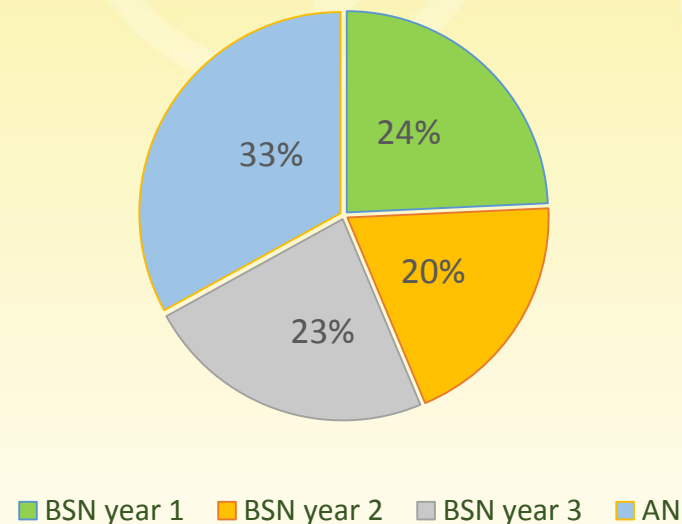
- Tukey post-hoc test was used when the ANOVA yielded statistically significant results, to determine the level of significance among the variables (Plichta & Garzon, 2009).

Results

Of 117 possible participants, 104 representing a response rate of 88%, consented to participate in the study. This was reduced to 103 (99%) respondents who met the inclusion criteria.

Figure 1. Distribution of Respondents According to Class (N = 103)

Distribution of Respondents According to Class



BSN- Bachelor of Science in Nursing

AN- Assistant Nursing

Demographic Attributes Across Classes



- The majority of respondents was female (96.1%) aged 22 years and older (67%), who were single (75.7%) and of Jamaican nationality (98.1%).
- The majority (63.1%) reported that they did not work to support themselves.
- Of those who reported working more than 16 hours for pay, 66.7% (8) were from the BSN year 1 group.

Academic Attributes Across Classes

- 75 (72.8%) indicated that they were taking 4 to 6 courses within the semester that the study was conducted.
- The majority of respondents (54.9%) indicated that they read for up to 10 hours during a 7-day week period.

Academic Attributes Across Classes

- Of those who reported reading for approximately 5 hours, the majority (32.1%) were from the BSN year 3 class.
- The majority of participants who reported reading for 16 hours or more (58.3%) were from the AN group.
- Approximately 60% (61) of respondents achieved passing grades, 23.3% (24) achieved above average scores while 17.5% (18) of respondents failed.

Objective 1: Level of deep or surface cognitive processing among respondents

Table 2. *Level of Cognitive Engagement by Student Groups (N = 103)*

Level of Cognitive Engagement	BSN Year 1 % (n)	BSN Year 2 % (n)	BSN Year 3 % (n)	AN % (n)	Total % (n)
Deep (69-92)	3.7 (1)	14.8 (4)	33.3 (9)	48.1 (13)	100 (27)
Surface (46-68)	31.6 (24)	21.1 (16)	19.7 (15)	27.6 (21)	100 (76)
Total	24.3 (25)	19.4 (20)	23.3 (24)	33 (34)	100 (103)

BSN- Bachelor of Science in Nursing

AN- Assistant Nursing

Objective 1: Level of deep or surface cognitive processing among respondents

Table 3. *Comparison of Deep and Surface Cognitive Engagement by Student Group (N = 103)*

Nursing Students by Groups	Surface Cognitive Engagement Scores Mean (SD)	Deep Cognitive Engagement Scores Mean (SD)
BSN year 1 (n = 25)	10.5 (3.2)	48.8 (6.9)
BSN year 2 (n = 20)	9.1 (2.6)	52.7 (5.7)
BSN year 3 (n = 24)	10.7 (2.6)	51.8 (7.4)
AN (n = 34)	10.0 (2.6)	53.6 (6.5)

Note. Surface cognitive engagement: $F(3, 99) = 1.47, p = .228$. Deep cognitive engagement: $F(3, 99) = 2.62, p = .055$

Objective 2: description of nursing students' academic performance

Table 4. *GPA of Respondents by Student Groups (N = 103)*

GPA	BSN Year 1 % (n)	BSN Year 2 % (n)	BSN Year 3 % (n)	AN % (n)	Total % (n)
Fail 1.0-1.99	5.6 (1)	16.7 (3)	55.6 (10)	22.2 (4)	100.0 (18)
Pass 2.0-2.99	14.8 (9)	24.6 (15)	19.7 (12)	41.0 (25)	100.0 (61)
Above avg. 3.0-3.59	62.5 (15)	0.0 (0)	8.3 (2)	20.8 (5)	100.0 (24)
Outstanding 3.6-4.0	0.0 (0)	8.3 (2)	0.0 (0)	0.0 (0)	100.0 (2)
Total	24.3 (25)	19.4 (20)	23.3 (24)	33.0 (34)	100.0 (103)

Note: $r = -.292$, $p = .003$

Objective 3: Relationship between cognitive engagement and academic performance



Table 5. GPA in Comparison to Cognitive Engagement Scores (N = 103)

GPA	Surface Cognitive Engagement Scores Mean (SD)	Deep Cognitive Engagement Scores Mean (SD)	Total Cognitive Engagement Scores (46-92) Mean (SD)
Fail 1.0-1.99	11.2 (2.5)	48.7 (8.6)*	62.8 (7.3)
Pass 2.0-2.99	9.9 (2.9)	53.1 (6.3)*	65.7 (5.5)
Above Average 3.0 and above	9.7 (2.5)	50.8 (6.1)	63.5 (5.2)

Note. Surface cognitive engagement: $F_{(2, 100)} = 2.09, p = .130. > .05$. Deep cognitive engagement: $F_{(2, 100)} = 3.35, p = .039 < .05$. Total cognitive engagement scores: $F_{(2, 100)} = 2.42, p = .094 > .05$. Tukey post hoc: * $p = .042$

Discussion

Deep & Surface Cognitive Engagement

- High mean scores for surface cognitive engagement was also reported by Cowan (1998) among nursing students in 1 of 4 nursing schools in Ireland.
- Surface cognitive engagement has been linked to several psychological & pedagogical factors (Cowman, 1998; Mansouri et al., 2004; Popkess & McDaniel, 2011; Mlambo, 2011).
- Assistant nursing students, who were in their 2nd year of study, achieved the highest mean score for deep cognitive engagement.

Discussion



Deep & Surface Cognitive Engagement

- Students who utilized surface cognitive processing spent less time interacting with course materials than those who were deeply engaged.
- The amount of time that students devoted to reading was below that which is required at the tertiary level for desired academic outcomes.

Academic Performance of Nursing Students and Its Relationship to Cognitive Engagement

- The majority of students scored passing grades for the institution and among BSN respondents, their GPA appeared to decline from year one to year three; a finding that differed from Mansouri et al. (2004).

Academic Performance of Nursing Students and Its Relationship to Cognitive Engagement

- The performance of year one students demonstrated that even though they reported the use of surface cognitive processing, this group achieved above average GPA.
- The relationship between cognitive engagement and academic performance was not found to be statistically significant in this study.

Academic Performance of Nursing Students and Its Relationship to Cognitive Engagement

- A pedagogically significant finding is that the majority of those who failed reported the use of surface cognitive processing than those who reported the use of deep cognitive processing.
- Deep cognitive engagement was significantly related to academic performance in this and other studies done internationally.

Limitations

- Findings are not generalizable to all nursing students in Jamaica due to small sample size.
- Gender comparisons could not be made due to an extremely low representation of males in this sample.
- A cross-sectional descriptive correlational research design was used which could not provide empirical evidence on trends seen in this study.

Recommendations

- Further studies using a longitudinal design to understand trends found in this study
- Addition of intervention and focus group components to help uncover causal factors and provide more precise determination of cognitive engagement characteristics among students

Recommendations

- Review of teaching methods commonly used and the level on Bloom's taxonomy at which examinations are set to determine whether they facilitate deep or surface cognitive engagement (Salamonson et al, 2013).

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Thanks for Listening



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