

Assessment of Examination “Answer Changing” Behavior in Nursing Students

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Background

- Literature demonstrates benefit of changing answers on Multiple Choice exams
- Most of this literature is 10-20 years old.^{1,2,3}
 - Gathered by looking at eraser marks on scantrons or exams
- Health and Medicine studies
 - Shows improvement of 2-9% when a student changes answer after further reflection.⁴
 - 50-60% of time students change the answer from incorrect → correct.^{1,4,5,6}
 - 20-25% change answer from correct → incorrect



What influences answer changing?

- **Student characteristics^{2,6}**
 - **Anxiety**
 - Increase in prevalence in anxiety in college students over the last several years.
 - 63.4% have “overwhelming anxiety” as compared to 51.2% 10 years earlier.⁷
 - **Test preparation**
 - **Faculty and student beliefs about changing answers**
- **Test characteristics^{2,3}**
 - **Level of difficulty**
 - **Clarity of exam question writing**



Reason for the Study

- Literature 10-20 years old
- Computerized testing now allows us to more accurately track student test taking behavior
 - Prior studies used observational techniques (eraser marks)
- Anxiety increasing in college students. What is the effect of this on answer changing?
 - Students reporting anxiety as a factor in individual academic performance rose from 20% in 2011 to 27.4% in 2018.^{7,8}
- High stakes of standardized testing reveal a need to provide evidence-based recommendations to students.



Research Question, Aims

- **Purpose of the study is to assess test taking behaviors and their relationship to anxiety in nursing students taking computerized multiple choice examinations.**
 - **To evaluate test outcomes and results related to changing answers during multiple choice examinations**
 - **To examine test taking patterns of nursing students during multiple choice examinations**
 - **To assess faculty perceptions, beliefs, and recommendations made to students related to test taking strategies**



What are faculty telling students?

- Pilot data gathered from faculty at one school with a large nursing program

Advice given regarding Changing Answers	# of responses
Give no advice to students on this topic	4
Recommend students do not change their answer	5
Recommend students use own judgement when changing answers	5
Recommend students change their answer but only if certain	8

Source(s) used to base this recommendation or advice	# of responses
Do not use any source	7
Based on personal experience as a nurse educator	7
Use research, test strategy book, conference to base recommendation on	8



Innovative Assessment Technique

- **Retrospective review of student examinations**
 - Reviewed exams from Spring, 2019
 - Maternity (junior level-traditional; last semester-accelerated)
 - Pathophysiology (sophomore level- traditional)
- **Utilizing the “proctoring snapshot” reports available in ExamSoft.**
 - Enterprise portal
- **Details the student’s activities during the examination.**
 - Student movement through exam, answer choices and changes, time per question, number of times student viewed question(s).
- **IRB approval**
- **Data sheets randomly checked for accuracy**



Proctoring Snapshot

Snapshot - [REDACTED]

3360 Spring 2019 Exam 1 - *Randomized*

Uploaded on 02/05/2019 9:29AM CST

 [OPEN ORIGINAL LOG](#)

[CANCEL](#)

View

[Randomized](#)

[Original](#)

ACTIVITY # ▲	QUESTION # ▼	ID	QUESTION TYPE	ACTIVITY	TIMESTAMP
1	--	--	--	Assessment Opened	Feb 5, 2019 8:02:09 AM
2	--	--	--	Question Ordering	Feb 5, 2019 8:02:10 AM
3	--	--	--	Assessment Started	Feb 5, 2019 8:02:10 AM
4	1	119	MC	Question Entered	Feb 5, 2019 8:02:20 AM
5	1	119	MC	Choice: B	Feb 5, 2019 8:02:53 AM
6	1	119	MC	No Choices Selected	Feb 5, 2019 8:02:59 AM
7	1	119	MC	No Choices Selected	Feb 5, 2019 8:03:02 AM



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Proctoring Snapshot to PDF

1	--	--	--	Assessment Opened	Feb 5, 2019 ...
2	--	--	--	Question Ordering	Feb 5, 2019 ...
3	--	--	--	Assessment Started	Feb 5, 2019 ...
4	1	119	MC	Question Entered	Feb 5, 2019 ...
5	1	119	MC	Choice: B	Feb 5, 2019 ...
6	1	119	MC	No Choices Selected	Feb 5, 2019 ...
7	1	119	MC	No Choices Selected	Feb 5, 2019 ...



PDF to Excel Conversion

	A	B	C	D	E	F	G	H	I	J
1	1	--	--		--	Assessment Opened			Feb 5, 2019 ...	
2	2	--	--		--	Question Ordering			Feb 5, 2019 ...	
3	3	--	--		--	Assessment Started			Feb 5, 2019 ...	
4	4	1	119		MC	Question Entered			Feb 5, 2019 ...	
5	5	1	119		MC	Choice: B			Feb 5, 2019 ...	
6	6	1	119		MC	No Choices Selected			Feb 5, 2019 ...	
7	7	1	119		MC	No Choices Selected			Feb 5, 2019 ...	



Excel Data Analysis

Before using this workbook, you must download and prepare the exam snapshot data for an individual student.

1. To download exam data for a student, in ExamSoft, under Assessments, navigate to the exam you wish to capture data from.
2. Navigate to the Proctoring section and find the upload listing for the student. Click on the upload time to access the pop-up and click on the Snapshot icon.
3. Scroll all the way to the bottom of the snapshot data, and from the righthand side, select the data scrolling all the way to the top. You should have all data select, from the end all the way back to #1. Once all data is select, copy the data to the clipboard.
4. On your keyboard, hit Ctrl+P. In the print screen window, choose "Save as PDF" as your printer destination. Navigate to the More Settings option and check box next to "Selection only" and click print.
5. Once the Save As window appears, select the ExamSoft secure folder as your save location and save the file with the following name format: Course#_Exam#_StudentExamSoftID

IMPORTANT!

Please fill in the information below. This information will auto-populate throughout the workbook.

Student ExamSoft ID:	XXXX
Exam Number:	1
Semester:	Spring 19
Course Number:	NURS 3360-01

[Step 1](#)

[Step 2](#)

[Step 3](#)

[Step 4](#)

[Validation](#)

Once the data has been saved from the ExamSoft portal, you will need to convert the PDF to an Excel file. To convert the PDF, follow the steps below:

1. Open the file in Adobe Acrobat Pro.
2. Select Export PDF > Spreadsheet > Export and save file to the ExamSoft secure folder.

About this workbook:

Steps 1 through 3 of this workbook will help shape and format the data extracted from ExamSoft into a standardized form that can be correctly processed in **Step 4**, where you will be able to readily identify a student's initial and final response to each exam question, as well as any changes made to their answer.

Once you have downloaded the ExamSoft Snapshot data and converted it to an Excel file, proceed to **Step 1**.



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Excel Data Analysis

QID-Seq	QID	Keyed Answer	Activity Description	Response	Correct?	Change?	Submission?	Final Answer?	Change	Change Type
100-0319	100		Entered							
100-0320	100	C	Answer selected	C	Correct					
100-0321	100	C	Answer selected	C	Correct	No change	Answer Submitted		1	Initial
100-0322	100		Exited							
100-0381	100		Entered							
100-0382	100	C	Answer selected	C	Correct		Answer Submitted	Final	0	No Change
100-0383	100		Exited							
101-0231	101		Entered							

1	115-0097	115	Entered							
2	115-0098	115	n/a							
3	115-0099	115	Answer selected	D	Correct					
4	115-0100	115	Answer selected	C	Incorrect	Change				
5	115-0101	115	Answer selected	D	Correct	Change				
6	115-0102	115	Answer selected	D	Correct	No change	Answer Submitted		1	Initial
7	115-0103	115	Exited							
8	115-0597	115	Entered							
9	115-0598	115	Answer selected	D	Correct					
0	115-0599	115	Answer selected	C	Incorrect	Change				
1	115-0600	115	Answer selected	D	Correct	Change				
2	115-0601	115	Answer selected	C	Incorrect	Change				
3	115-0602	115	Answer selected	C	Incorrect	No change	Answer Submitted	Final	4	Correct to Incorrect
4	115-0603	115	Exited							



Excel Data Analysis

9	150-0226	150	Entered							
10	150-0227	150	A	Answer selected	B	Incorrect				
11	150-0228	150	A	Answer selected	D	Incorrect	Change			
12	150-0229	150	A	Answer selected	D	Incorrect	No change	Answer Submitted		1 Initial
13	150-0230	150		Exited						
14	150-0447	150		Entered						
15	150-0448	150	A	Answer selected	D	Incorrect				
16	150-0449	150	A	Answer selected	A	Correct	Change			
17	150-0450	150	A	Answer selected	A	Correct	No change	Answer Submitted	Final	2 Incorrect to Correct
18	150-0451	150		Exited						

240-0119	240	Entered								
240-0120	240	D	Answer selected	A	Incorrect					
240-0121	240	D	Answer selected	A	Incorrect	No change	Answer Submitted			1 Initial
240-0122	240		Exited							
240-0570	240		Entered							
240-0571	240	D	Answer selected	A	Incorrect		Answer Submitted			0 No Change
240-0572	240		Exited							
240-0579	240		Entered							
240-0580	240	D	Answer selected	B	Incorrect					
240-0581	240	D	Answer selected	B	Incorrect	No change	Answer Submitted			3 Incorrect to Incorrect
240-0582	240		Exited							
240-0586	240		Entered							
240-0587	240	D	Answer selected	B	Incorrect		Answer Submitted	Final		0 No Change
240-0588	240		Exited							



Excel Data Analysis

Final information for COPY+PASTE					
Assessment ID: 1				Student ID	
# Q w/ changes	% COR-INC	% INC-COR	% INC-INC	XXXX	
6	0.0000%	50.0000%	50.0000%		
ExamSoft ID:	XXXX			Semester:	Spring 19
Assessment ID:	1			Course:	NURS 3360-01
# of Questions:	60				
Student Performance					
Actual Student Performance:	86.67%	<i>Actual percentage of questions answered correctly</i>			
Adjusted Student Performance:	81.67%	<i>Percentage of questions answered correctly the first time</i>			
Raw Answers Summary					
Raw # answer changes:	9				
Correct to Incorrect:	1				
Incorrect to Correct:	4				
Incorrect to Incorrect:	4				
Final Answers Summary					
# Questions w/ Changed answers:	6	% Questions w/ Changed answers:	10.0000%		
Correct to Incorrect:	0	% changed from Correct to Incorrect	0.0000%		
Incorrect to Correct:	3	% changed from Incorrect to Correct	50.0000%		
Incorrect to Incorrect:	3	% changed from Incorrect to Incorrect	50.0000%		
Question ID	First Response	Final Response	Times Changed	Times attempted	
100	Correct	Correct	0	3	
101	Correct	Correct	0	3	
103	Correct	Correct	0	3	



Results of retrospective analysis

- **Spring, 2019 semester**
 - **Sophomore: Pathophysiology**
 - **Junior and Accelerated: Maternal/Neonatal Nursing**
- **228 students (114 sophomore; 66 Juniors; 48 Accelerated)**
 - **Each student took between 3-5 exams**
 - **Exams ranged from 50-60 questions**
- **892 Examinations were reviewed**
- **716 Examinations had changes on them**
- **3 students: made no changes on any of their exams**



Total Exams	Exams w/ Changes	%
892	716	80.27

Total Students	Students w/ Changes	%
228	225	98.68

Failing Grade	Total (%)	Pass to Fail	% of Exams w/ Changes	% of Total Exams
	178 (19.96%)	11	1.54%	1.23%
Passing Grade	Total (%)	Fail to Pass	% of Exams w/ Changes	% of Total Exams
	714 (80.04%)	39	5.45%	4.37%

Net Changes	
Total	2184
Average Change	2.45
Minimum Change	0
Median Change	2
Maximum Change	15

Attempts <i>per question per exam</i>		
Average Attempt		2.23
Minimum Attempt		0
Range	Low Median	2
	High Median	15
Maximum Attempt		22



	Total	Min	Median	Max
Net Change	2184	1	2	15
<i>Positive Change</i>	1107 (50.69%)	0	1	12
<i>Negative Change</i>	624 (28.57%)	0	0	5
<i>Neutral Change</i>	453 (20.74%)	0	0	6

Exams w/ Changes:	716	%	Average Impact
Positive Impact	394	55.03%	+3.34%
Negative Impact	169	23.60%	-2.54%
No Impact	153	21.37%	

Failing Grade	Total (%)	Pass to Fail	% of Exams w/ Changes	% of Total Exams
	178 (19.96%)	11	1.54%	1.23%
Passing Grade	Total (%)	Fail to Pass	% of Exams w/ Changes	% of Total Exams
	714 (80.04%)	39	5.45%	4.37%



Discussion

- **Process worked**
 - Very labor-intensive
- **Provided large amount of data for analysis**
 - Some of the most detailed information available
 - Large data set allows for strong analysis
- **Still analyzing data**
- **Results similar to literature**
 - Answer changing results consistent with literature



Next steps....next questions: Student

- The students who are changing their answers from right to wrong
 - They know the material, but the test is not accurately reflecting this.
 - Who are those students?
 - Is (or how is) answer changing related to:
 - Academic confidence?
 - Student anxiety?
- Thought process as they move through exam
 - Can almost feel the distress looking at the snapshots



Next steps...next questions: Faculty

- Analyze changes by class or exam
 - More changes on first exam vs. later exams?
- How can faculty identify students who could be negativity impacted?
- What can faculty do to support students' success?
 - What recommendations should faculty be giving to students?
- Backward navigation
 - Allow it? Helps students grades while they learn
 - Don't allow it? NCLEX does not allow



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 - **Saint Louis University School of Nursing uses ExamSoft for all nursing examinations**
 - **The authors have no financial interest or other affiliation with ExamSoft**
- **Contact information**
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