Use of Low Stakes Mastery Quizzing for First Aid Educational Competency Improves Testing Scores on First Aid Items Embedded in Unit Quizzes in an online Introductory Trauma Course









MASTERY QUIZZING IN AN ONLINE TRAUMA COURSE

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BACKGROUND LITERATURE BLOOM – MASTERY LEARNING

- 1970's
- Each unit of learning is evaluated prior to completing the next level
- Material is broken down to small units (quizzes given for assessment)
- In true mastery learning, quizzes can be taken over and over until competency is reached. <u>https://:study.com/academy/lesson/mastery-learning-model-definition-theory-approach.html</u>
- In the current study students are encouraged to work to mastery until 100% is reached on 12 First Aid Quizzes that are later embedded in Unit Quizzes and on the Exams.
- Undergraduate students have to learn material from two required texts so mastery quizzing assists in integrating the learning of this material. Graduate students have a third text.
- Information was gathered as part of program assessment of the curriculum.

BACKGROUND ON MASTERY QUIZZING.

Work Smart

Equivalent exam results between mastery sections and non-mastery sections – Scrima, 2009 – Student feedback – mastery quiz questions need to be similar to exam questions. Confounds – only half of the chapters had mastery quizzes; and only half of the students completed quizzes until they reached mastery.

LITERATURE - RESEARCH IN SUPPORT OF MASTERY QUIZZING

"Benefits of timely and effective feedback." Brothen, T., & Wambach, C. (2001). Effective student use of computerized quizzes. *Teaching o f Psychology*, 28, 292-29A.

"Improved testing effects are not limited to verbal material." Carpenter, S. K., & Pashler, H. (2007). Testing beyond words: Using tests to enhance visuospatial map learning. *Psychonomic Bulletin & Review*, 14(3), 414-418).



Can be used to build skills and competencies (Book, 2014).

USE MASTERY FOR OPTIMAL RESULTS



Fall 2017 Quiz and Final Exam Item Comparisons Online (N=14) vs. Hybrid (N=9) Overall N = 23

Question Text: You should always call 911 when a victim is ______.

A. bleeding

B. drowsy or dizzy

C. injured in any way

D. non responsive Correct

Results Fall Online Quiz - N = 14 – 92.86% Correct9 students in the top 75% ofscorers got this correct4 students in the bottom quartile got this correctFall Online Final Exam N = 13 – 84.2% Correct9 students in the top 75% ofscorers got this correct2 students in the bottom quartile got this correct* Note one student dropped by the time of the finalResults Fall Hybrid Qujiz – N = 9 – 88.89% Correct7 students in the top 50% ofscorers got this correct1 student in the bottom quartile got this correctFall Hybrid Final Exam N = 9 - 88.89% Correct5 students in the top 25% ofscorers got this correct3 students in the bottom quartile got this correct

* ON overall 88.53% HY overall 88.89%. Note sample size too small to run significance tests. Likely NS

STUDENT FEEDBACK ONLINE SECTION





STUDY DESIGN FALL 2016

Outcomes for mastery quizzing effects on exam scores were compared N= 21 before dropouts, Final N= 18, between a hybrid section N=9 and an online section N=9 who completed the final exam of the same course taught by the same instructor. Introduction to Trauma Studies. Note: the online class originally had 11 students but two dropped the class before the final and the hybrid had one early drop.

Participation was required for both classes in mastery quizzing of First Aid Material. Students could email results for extra credit.

Results Hybrid Online Participation to completion for extra credit 5/9 1/9

Participation to completion for extra credit Hybrid Online 55% 11%

Exam Score Average for 2 First Aid Items on the Final (scores are for the whole class) Hybrid N = 9 Online N= 9 75% 95%

MASTERY QUIZZING PARTICIPATION AND OUTCOMES Exam Score Averages for First Aid Items



FINAL EXAM (HYBRID) 2016 ON-1

Column Final (Exam II) 120 points (Exams) Overall Final Exam GRADE DISTRIBUTION

Greater than 1	00	0		
90 - 100	1			
80 - 89	0			
70 - 79	3			
60 - 69	4			
50 - 59	1			
40 - 49	0			
30 - 39	0			
20 - 29	0			
10 - 19	0			
0 - 9	0			
Less than 0	0			
Points Possibl	e120,	Count 9		

r units r ussible	120,	Count 9		
Minimum Value	62.65 - N	laximum	Value	
Average	82.86,	Median		
Variance	157.29			
STATUS DISTR	BUTION			
Null		1		
In Progress		0		
Needs Grading		0		
Exempt		0		

109.58.	Range	46.93
81.05	Standard Deviation	12.54

QUESTION # 22 ITEM ANALYSIS

0.22 Discrimination - Fair Discrimination = 0.1 to 0.3
290.05% Difficulty - Easy Difficulty > 80%
9 Graded Attempts -Total number of graded attempts for this question
2.91 Average - Score Average score earned on this question
1.57 Std Dev - Standard Deviation based on Graded Attempts
0.53 Std Error - Standard Error based on Graded Attempts, 0 Skipped
Number of students who skipped this question

Fill in Multiple Blanks: ShockQuestion: 22. Do not let a shock victim eat, drink or [1].Answer Options:Evaluation MethodCorrect Answers for: 1Case SensitivityExact MatchsmokeCorrect Total: 2 (22.23%)

QUESTION # 22 ITEM ATTEMPT STATISTICS

Question 22: Fill in Multiple Blanks

Average Score 2.90044 points

22. Do not let a shock victim eat, drink or [1]. Category Attempt Count Attempt Count as Percentage of Total Total Attempts Unanswered Attempts Correct Answer Partially Correct Answer

Attempt Count Attempt Count as

9

0

2

0

100%

0%

0%

22.222%

1

Variable Identifier/Correct Answers

Evaluation Method Correct - Exact Match

Percentage of Total

2 22.222% Correct Answer Case Sensitivity smoke

QUESTION # 12 ITEM ANALYSIS 0.3 Discrimination - Good Discrimination > 0.3

0.3 Discrimination - Good Discrimination > 0.3463.74% Difficulty - Easy Difficulty > 80%9 Graded Attempts - Total number of graded attempts for this question

4.64 Average Score - Average score earned on this question 1.74 Std Dev - Standard Deviation based on Graded Attempts 0.58 Std Error Standard Error based on Graded Attempts 0 Skipped - Number of students who skipped this question

Multiple Choice: First aid Question:

12. You should	always call	911 v	vhen	a victim	is
			Ansv	vers	Total
Total number of	[:] times a pai	rticula	ar ans	swer opti	on was chosen
	Top 25%	2 nd :	25%	3 rd 25%	Bottom 25%
Α.	bleeding				
0(0.0%)	0	0	0	(C
В.	drowsy or o	dizzy			
0(0.0%)	0	0	0	(C
C.	injured in a	iny w	ay		
1(11.12%)	0	0	0		1
Correct	D.		non	respons	sive
8(88.89%)	1	3	3		1

QUESTION # 12 ITEM ATTEMPT STATISTICS

Question 12: Multiple Choice

Average Score 4.63733 points

12. You should always call 911 when a victim is ______.

Correct	Percent Answered
bleeding	0%
drowsy or dizzy	0%
Injured in any way	11.111%
non responsive	88.889%
Unanswered	0%

FINAL EXAM (ONLINE) 2016 ON-2 Column Final (Exam II) 120 points (Exams) Points Possible 120

Count	11 enrolled – 9 completed the Final Exam
Minimum Value	0 - Maximum Value 112.95 Range 112.95
Average	77.46 (based on N =11)
Average	94.11 (based on N =9), Median 92.36, Standard Deviation 38.62, Variance 1491.76
STATUS DISTR	RIBUTION
Null	0
In Progress	0
Needs Grading	0
Exempt	0
GRADE DISTR	IBUTION
Greater than 10	0 0
90 - 100	2
80 - 89	3
70 - 79	2
60 - 69	1
50 - 59	1
40 - 49	0
30 - 39	0
20 - 29	0
10 - 19	0
0 - 9	2 Two students did not take the Final Exam
Less than 0	0

QUESTION # 22 ITEM ANALYSIS

Edit Test -0.09 Discrimination Poor Discrimination < 0.1 485.77% Difficulty Easy Difficulty > 80% **9 Graded Attempts** - Total number of graded attempts for this question

4.86 Average – Score Average score earned on this question for the 9 attempters

0.72 Std Dev - Standard Deviation based on Graded Attempts
0.24 Std Error - Standard Error based on Graded Attempts
0 Skipped - Number of students who skipped this question
Fill in Multiple Blanks: Shock Question:

22. Do not let a shock victim eat, drink or [1]. Answer Options:

Evaluation Method Exact Match smoke Correct Total: 5 (55.56%) Correct Answers for: 1

Case Sensitivity

QUESTION # 22 ITEM ATTEMPT STATISTICS

Question 22: Fill in Multiple Blanks

Average Score 4.278 points (divided by 11 total in the class)

22. Do not let a shock victim eat, drink or [1]. Attempt Count Attempt Count as Category Percentage of Total **Total Attempts** 100% 9 Unanswered Attempts 11,111% Correct Answer. 4 44.444% Partially Correct Answer 0 0%

Variable Identifier/Correct Answers Attempt Count Attempt Count as Percentage of Total 1 4 44.444% Evaluation Method Correct Answer Case Sensitivity Correct Exact Match smoke

QUESTION # 12 ITEM ANALYSIS

0.11 Discrimination - Fair Discrimination = 0.1 to 0.3463.74% Difficulty - Easy Difficulty > 80%9 Graded Attempts -Total number of graded attempts for this question

4.64 Average Score - Average score earned on this question for the 9 completers

1.74 Std Dev - Standard Deviation based on Graded Attempts0.58 Std Error - Standard Error based on Graded Attempts0 Skipped Number of students who skipped this question

Multiple Choice: First aid Question:

12. You should	always call 911	when a victim	is	·	
		Answers	Total		
	Top 2	5%	2 nd 25%	3 rd 25%	Bottom 25%
A. Bleeding	0(0.0%)	0	0	0	0
B. drowsy or di	zzy 0(0.0%)	0	0	0	0
C. injured in an	y way				
	1(11.12%)	0	1	0	0
Correct					
D.	non responsiv	е			
8(88.89%))	4	2	0	2

QUESTION # 12 ITEM ATTEMPT STATISTICS

Question 12: Multiple Choice

Average Score 4.05767 points (divided by N=11)

12. You should always call 911 when a victim is ______. Correct Percent Answered

Bleeding	0%
drowsy or dizzy	0%
injured in any way	11.111%
*non responsive	77.778% (based on N=11)
Unanswered	11.111%

SUMMARY OF FINDINGS & IDEAS FOR FUTURE RESEARCH AND APPLICATION

Final exam scores for First Aid Items were higher in the online mastery learning section compared to the hybrid mastery learning section in 2016 but equivalent in 2017. Students in the hybrid learning section participated in more extra credit options with the required mastery quizzing. Small sample size precludes significance testing.

Ideas for Future Research - Use mastery quizzing for more than one focus area

- Can learning outcomes be enhanced in more than one area of competency?
- Can success help students overcome fear of testing?
- Will mastery skills transfer from one area of learning to another?





- Increases exam outcomes
- Engages students
- Enhances transfer of learning from

mastery quizzes to exams.

KNOWLEDGE OF FIRST AID CAN BE LIFE SAVING

The course increases knowledge of First Aid so students know who to call, when to call in an emergency and under what circumstances they should call for emergency services. Meanwhile our students also know basic principles of Psychological First Aid to keep people emotionally stable, and can link them to appropriate services for the particular crisis they

face.

WE ARE DEDICATED TO MAINTAINING AN EMPOWERING, SAFE AND **STABLE** ENVIRONMENT FOR THOSE IN CRISIS...BY ENSURING INFORMATION ON BOTH PSYCHOLOGICAL AND MEDICAL FIRST AID IS TAUGHT TO FUTURE COUNSELORS.



In hopes that loss of life can be minimized until first responders arrive. Future studies should enroll larger numbers of students to see if results can be generalized. The present study is limited by small sample size. Note: Students have to complete formal First Aid Training to be certified.

REFERENCES

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"Thank you for listening

FUTURE STUDIES - MASTERY QUIZZING PARTICIPATION AND OUTCOMES ACROSS COHORTS Participation toward mastery; Mastery outcomes; Exam outcomes on First Aid Questions. Next study will look at cumulative findings over 4 yrs. Graph

below only for illustration purposes.



FirstAidMQParticipation Blue
MasteryQOutcomes
Exam Outcomes First Aid Items



5:56 PM	* 94% 💼
Session	
e Session	

Session Evaluations Contest

- Download and open OLC Conferences mobile app
- Navigate to specific session to evaluate
- Click "Evaluate Session" at the bottom of session details screen
- Complete session evaluation*

Each session evaluation completed (limited to one per session) = one contest entry **Five (5) \$25 gift cards** will be awarded to five (5) individuals Must submit evals using the OLC Conferences mobile app or website





