

Are we in a PHOG in regards to Best Evidence Medical Education?

Jim Van Rhee, MS, PA-C
Eric Vangsnes, PhD, PA-C

Objectives

- Define best evidence medical education.
- Describe the criteria used to evaluate evidence in medical education.
- Utilize the criteria in the evaluation of 203 common questions in medical education.

Questions

- Should handouts be given to students to accompany lecture?
- What is the most appropriate background for a PBL tutor?

Are education decisions in a PHOG?

- What do we base education decisions on?
 - P- prejudices
 - H- hunches
 - O- opinions
 - G- guesses
- What should we be basing decisions on?

Why BEME?

- Peterson (BMJ 1999)
 - "the evidence base is as important in educating new doctors as it is in assessing a new chemotherapy"
- Van der Vleuten (1995)

Opinion-based Teaching

OR

Evidence-based Teaching

BEME- Sources of information?

- Are very few comprehensive sources dedicated to medical education
- Sources include:
 - Medline (National Library of Medicine)
 - Embase (Elsevier Science)
 - CINAHL (Cumulative Index to Nursing and Allied Health Literature)
 - ERIC (Education Resource Information Center)
 - TIMELIT (Topics in Medical Education)
 - Grey literature (academic papers, dissertations, etc)

BEME- The questions?

- Defining the search query
- Expand the essential concepts
- Set scope of the search

Question components	Topic
Participants	Who are they? (PA students, MD students, etc)
Educational aspects	Are SPs appropriate for measuring cultural issues?
Outcomes	Are exam results an accurate reflection of knowledge?

BEME- Evaluation of results?

- QUEST method

Quality	How good is the evidence?
Utility	To what extent can the method be transferred and adopted without modification?
Extent	What is the extent of the evidence?
Strength	How strong is the evidence?
Target	What is the target? What is being measured? How valid is the evidence?
Setting	How close does the context or setting approximate? How relevant is the evidence?

Now some examples?

PowerPoint: Good, bad or ugly

Confirmed: PowerPoint Is Evil

File this away for your next vendor briefing: Australian researchers have proven that PowerPoint actually makes it harder to absorb information during a presentation.

The group from the University of New South Wales started with the fairly obvious insight that the brain processes visual and auditory input differently. They tested this in a number of ways to measure the same performance through both systems – not, as a marketing firm would have a PowerPoint slide while displaying it on a screen.

Based on Prof. John Sweller's idea of the "cognitive load theory" and practices

The use of the PowerPoint presentation has been a disaster. It should be ditched... It is ineffective to speak to a diagram, because it presents information in a different form. But it is even ineffective to speak the same words that are written, because it puts too much load on the mind and decreases your ability to understand what is being presented.

Physician Assistant Student
Opinion of Electronic
Powerpoint® -Assisted Lectures

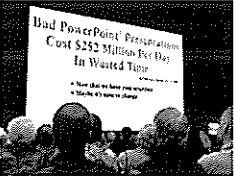
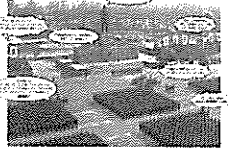
Howard S. Hilly, M.D., M.P.H., Ph.D., F.A.C.P., F.A.C.P.S. (PA)
Professor of Family and Preventive Medicine
University of North Carolina at Chapel Hill

Perspective on Physician Assistant Education, 8(2):99-100

The Question

Does the use of PowerPoint improve knowledge retention?

Carol R. Reynolds
The Cognitive Style of PowerPoint: Putting Out Cognitive Wires

The Search

- Terms
 - PowerPoint
 - Medical education
 - Lecture
- Location
 - PubMed
 - ERIC
 - CINAHL

The Articles

- Susskind JE. (2004). PowerPoint's power in the classroom: enhancing students' self-efficacy and attitudes. *Computer & Education*, 45:203-215.
- Ahmed, C. (1998). PowerPoint versus traditional overheads: Which is more effective for learning? Conference Proceedings from the South Dakota Association for Health, Physical education, and Recreation. Sioux Falls, SD.
- Apperson JM, Laws EL, & Scepanky JA. (2006). The impact of presentation graphics on students' experience in the classroom. *Computers & Education*, 47:116-126.
- Ricer RE, Falak AT, & Short J. (2005). Does a high tech (computerized, animated, PowerPoint) presentation increase retention of material compared to a low tech (black on clear overheads) presentation? *Teaching and Learning in Medicine*, 17(2):107-111.

Ricer, Falak & Short Article

- Methods
 - 3rd year IM clerkship
 - N= 150
 - Cancer prevention screening lecture
 - Given monthly to 12-14 students
 - Same lecturer, one month PowerPoint (19 slides) then one month using overheads (14)
 - Overhead content same as PowerPoint
 - Posttest (13 items) after presentation and 1-year later

Ricer, Falak & Short Article

- Results
 - 120 students completed project
 - No significant difference in rating of the presentations
 - PowerPoint 4.60 (SD=0.56)
 - Overheads 4.55 (SD=0.58)
 - Immediate posttest
 - PowerPoint 10.91 correct, Overheads 11.01 (t test 0.7)
 - 1-year posttest
 - PowerPoint 8.21 correct, Overheads 7.87 (t test 0.25)

Ricer, Falak & Short Article

	Computer (N=67)	Overhead (n=72)	Computer (N=62)	Computer (N=62)
% Correct	83.9	84.7	63.2	60.5
SD	1.81	1.29	1.75	1.54
Standardized mean differences	-0.07	ns	0.21	ns

Limits:
No pretest was done
Presenter scored very high in both groups, may lead to no difference in scores

Ricer, Falak & Short Article

- Discussion
 - T test not significant for either immediate or 1-year posttest
 - Was a drop off in both groups in retention but was not significant (t test 0.01)

Ricer, Falak & Short Article

No significant impact on medical student retention of material using PowerPoint versus overheads.

Decision to use computer-assisted presentation needs to be based on factors other than its effects on learning.



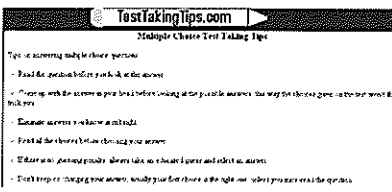

People will pay more to be entertained than educated.

Johnny Carson

Multiple Choice Tests- Tips

Preparing To Take A Multiple-Choice Test
(Utah State Office of Education. *Test Taking Tips and Strategies.*)

Do not change answers
On multiple-choice tests, do not change your answers unless you are very uncertain about your first thought. Your first guess is usually right unless you are sure you have answered incorrectly.

The Question

Does changing test answers improve students test score?

The Search

- ◆ Terms
 - Answering multiple choice questions
 - Medical education
- ◆ Location
 - PubMed
 - ERIC
 - CINAHL

The Articles

- ◆ Friedman-Erickson, S. *To Change or Not to Change: The Multiple-Choice Dilemma.* 1st APS Annual Institute on Teaching in Psychology, Washington, DC, June, 1994.
- ◆ Fischer, MR, Herrmann S, & Kopp V. (2005). Answering multiple-choice questions in high-stakes medical examination. *Medical Education*, 39:890-894.
- ◆ Bauer D, Kopp V, & Ficher, MR. (2007). Answer Changing in Multiple choice assessment: Change that answer when in doubt – spread the word! *BMC Medical Education*, 7:28.

Friedman-Erickson Study

	UCS		UCV		UCV		UCV	
	N	%	N	%	N	%	N	%
Intro Psych	882	4	518	59	190	22	174	20
Child Develop	433	3	221	51	123	28	89	21
Adult Develop	40	7	21	53	9	23	10	25
All Courses	1365	3	760	56	322	24	273	20

Bauer Study- Methods

- ◆ University of Munich
- ◆ 79 3rd year medical students
- ◆ Given or not given instruction on the benefits of changing answers
- ◆ Review of test booklets
- ◆ 6162 items reviewed, 323 items changed once (5.2%)
- ◆ 39 (10.8%) of the changed items were removed from analysis due to unclear changes

Bauer Study- Results

Table 1: Number and effects of first and second/additional answer changes

Answer change	n of students	M (SD) of changes (%)	M (SD) of changes WR (%)	M (SD) of changes RW (%)	M (SD) of changes WW (%)	M (SD) of point increase
First	72	4.5 (3.0)	2.3 (2.0)	0.9 (1.0)	1.3 (1.3)	1.4 (2.2)
		5.2%	48.2% (30.3)	21.6% (22.3)	30.2% (27.6)	2.5% (4.2)
Second and additional	19	1.4 (0.96)	0.21 (0.42)	0.11 (.32)	1.1 (0.94)	0.11 (0.46)
		0.44%	18.4% (38.0)	3.7% (12.1)	77.9% (41.6)	0.19% (0.99)

M, mean; SD, standard deviation.

First change increased rate of wrong to right answers and therefore overall score, second and additional changes increased wrong to wrong and lowered overall score.

Bauer Study- Results

Table 2: Answer changes and point increase in GI vs. GNI

	GI	GNI	
M (SD) of changes	4.8 (3.6)	3.3 (2.5)	$p < .05$
M (SD) point increase	1.8 (2.5)	0.91 (1.9)	<i>n.s.</i>
% point increase	2.3%	1.2%	

M, mean; SD, standard deviation

Students involved of the benefits of changing answers, changed more answers. Also students informed of the benefits of changing answers had a significant increase in test score compared to the students not informed of the benefits.

Fischer Study- Methods

- 36 medical students from Universities in Freiburg, Heidelberg, Ulm, and Munich
- 580 MCQ National Medical Board Examination
- Asked to describe concerns or doubt about original answers in exam booklets
- Aggregate sample was 20,880 questions
 - 846 answer changes
- Students in study group performed better than overall student population (460.7 to 435.0)

Fischer Study- Results

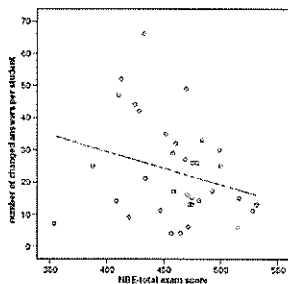
Table 1: Number and effects of first and second per answer changes

Answer	Students #	Changed answers (percent) Mean (SD)	Changes false → correct (percent) Mean (SD)	Changes correct → false (percent) Mean (SD)	Changes false → false (percent) Mean (SD)	Point increase in the NBE (percent) Mean (SD)
First	36	22.8 (13.4) 59% (26.6)	12.5 (8.3) 52% (15.8)	3.8 (4.6) 25% (11.4)	1.8 (3.0) 29% (13.0)	6.5 (5.9) 11% (4.0)
Second or more	11	1.8 (1.3) 0.4 (0.2)	0.6 (0.9) 3% (13.2)	0.8 (0.8) 41% (19.0)	0.6 (0.7) 33% (10.9)	-0.2 (1.3) -7.9% (7.5)

SD = Standard deviation

Out of the entire set of changes, 55% went from wrong to right, 25% from right to wrong, and 20% from wrong to wrong. With this the students had a 6.5 point increase on their test scores or 1.1%.

Fischer Study- Results



Test scores and Number of Answers Changed

Overall test score decreased with increased number of changed answers per student.

Summary

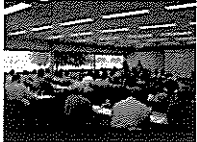
Question: Does changing test answers improve students test score?

More students will change from wrong to right answers and increase test score, but more than one change per question will lead to more wrong answers and lower test score.

So change answers, but only once.


Review Courses- Do they help?

**Physician Assistant
Certification & Recertification
Exam Review**



AAPA American Academy of
Physician Assistants

The Programs approved for Category I credit



The Question

Do board review courses increase student scores on standardized exams?

- ### The Search
- ◆ Terms
 - Review courses
 - Coaching
 - MCAT
 - Graduate record examination (GRE)
 - PANCE
 - ◆ Location
 - PubMed
 - ERIC
 - CINAHL

The Articles

- ◆ Jones RF. (1986). The effect of commercial coaching courses on performance on the MCAT. *Journal of Medical Education*, 61(4):273-284.
- ◆ Constance E. (1994). Coaching students who fail and identifying students at risk for failing the national board of medical examiners medicine subject test. *Academic Medicine*, 69(10 suppl):S69.
- ◆ Werner LS & Bull BS. 92003). The effect of three commercial coaching courses on step one USMLE performance. *Medical Education*, 37:527-531.
- ◆ Thadani RA, Swanson DB, & Galbraith RM. (2000). A preliminary analysis of different approaches to preparing for the USMLE step 1. *Academic Medicine*, 75(10 suppl):S40-S42.
- ◆ Zhang, C. (2004). Student USMLE Step One Preparation and Performance. *Advances in Health Sciences Education*, 9:291-297.

- ### Thadani Study- Methods
- ◆ Random first time USMLE Step 1 test takers
 - ◆ Surveyed on study habits, types of materials, coaching courses
 - ◆ Sample of 3958, 1650 responded, 1217 had complete results and included in analysis

Thadani- Results

	Commercial: Books about USMLE			Coaching Courses		
	Mean Score	No. of students	SD	Mean score	No. of students	SD
Approach Used	222.22	1188	18.43	217.38	279	19.83
Approach Not Used	213.28	29	23.57	223.38	938	18.05

p value .010 p value <.001

Zhang Study- Methods

- ✳ University of Miami school of Medicine
- ✳ Survey of 148 Junior medical students
 - After USMLE but before results known
 - Demographics, factors influencing decision of prep course, assessment of medical school curriculum, and prep methods
- ✳ 100 students responded to survey
- ✳ 43 students took part in prep course
 - Prep course participants had lower GPA and class rank
- ✳ Mean score same as national average

Zhang Study- Results

	Participants	Non-Participants
Mean	206.0	218.7
SD	18.5	21.4

p value <0.05

Adjusted for difference in GPA between participants and non-participants. ANCOVA performed with 2nd year GPA as a covariate. No statistically significant $p=0.71$.

Zhang Study- Summary

- ✳ Students see review courses as a benefit
 - Rated high the parts of review course that they perceived their medical curriculum to be weak in
- ✳ Review course has no effect on test scores

Summary

- ✳ Best evidence medical education can be used to answer many of the questions we have in medical education
 - But education is not the soft sister of clinical research.
- ✳ Should base decisions on the evidence that is available
 - But not all questions in education are not amenable to experimental design
 - Educational research rarely comes down to a single answer
- ✳ Avoid prejudices, hunches, opinions, and guesses

References

- ✳ Harden, RM & Lilley, PM. (2000). Best evidence medical education: The simple truth. *Medical Teacher*. 22(2):117-119.
- ✳ Norman, GR. (2000). Reflections on BEME. *Medical Teacher*. 22(2):141-144.
- ✳ Harden, RM, Grant, J, Buckley, G, & Hart, IR. (1999). BEME guide no. 1: Best evidence medical education. *Medical Teacher*. 21(6):553-562.
- ✳ Peterson, S. (1999). Time for evidence based medical education. *BMJ*. 318:1223-1224.

"We now accept the fact that learning is a lifelong process of keeping abreast of change. And the most pressing task is to teach people how to learn.

Peter F. Drucker

Questions?