Evidence Based Study Strategies for USMLE Step 1
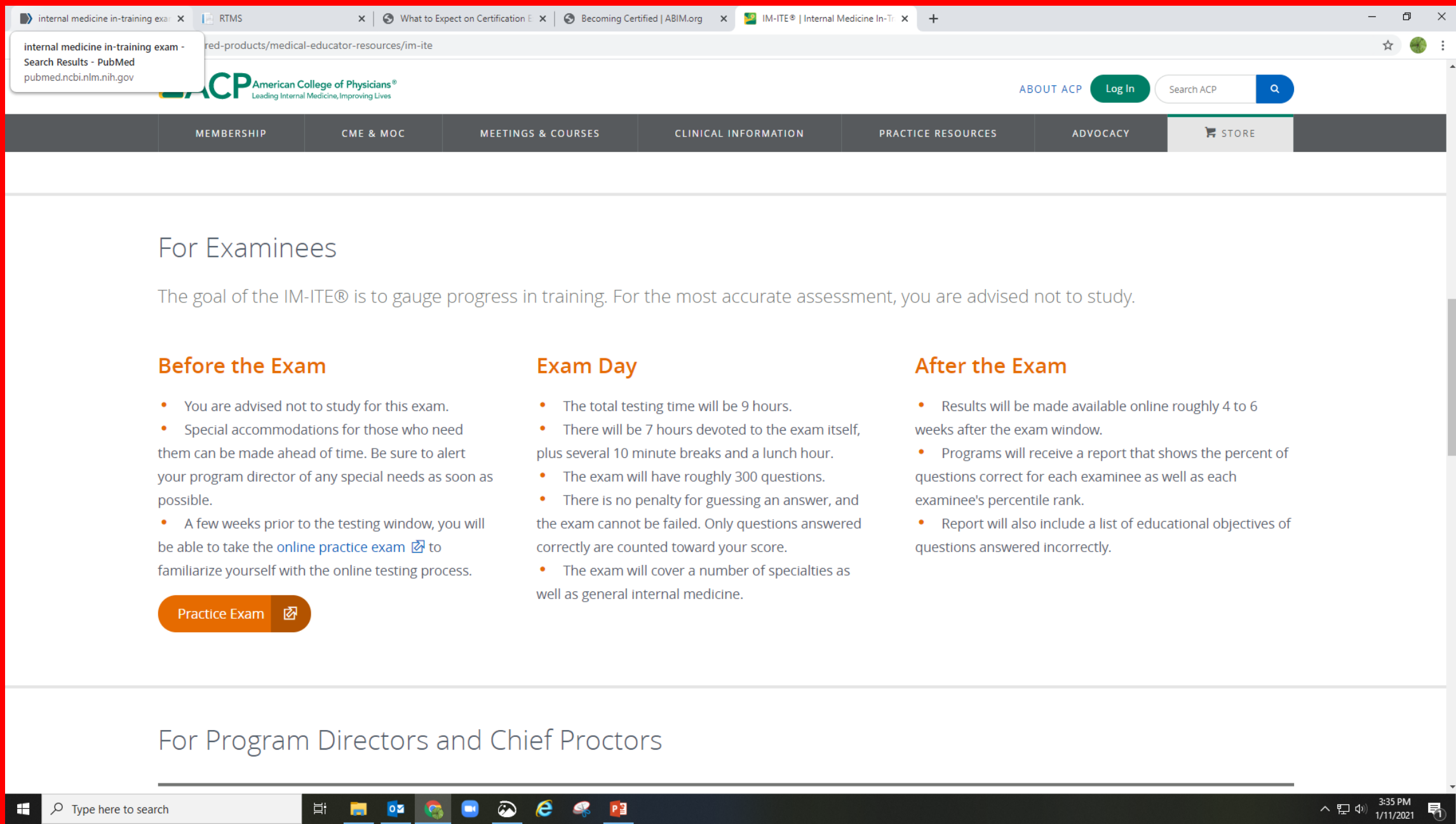
C. Turner

9.22.21

What you need to know …

Staged Exams	Traditional Exams
The ABA is transitioning to a new assessment program that will complement the movement of the Accreditation Council of Graduate Medical Education (ACGME) toward competency-based training and promotion. Candidates who began the four-year continuum of education in anesthesiology on or after July 2012 and will complete residency training on or after June 30, 2016, will take the staged exams. The BASIC Examination will be offered to residents at the end of their CA-1 year. After graduation from residency training, candidates will take the ADVANCED Examination. The traditional Part 2 (Oral) Examination will become the APPLIED Examination. Beginning in 2018, its content and format will change to include elements of Objective Structured Clinical Examinations (OSCEs) in addition to the traditional Standardized Oral Examination (SOE) questions.	Candidates who complete their residency training before June 30, 2016 will take the traditional Part 1 (Written) Examination and the Part 2 (Oral) Examination. The Part 1 Examination will be offered to candidates after they graduate from residency training. The Part 2 Examination will be administered several times each year at the new ABA Assessment Center in Raleigh, N.C. Even though the exams are offered multiple times throughout each year, candidates may only register for one Part 2 Examination per year.

AKT, mock ITE, real ITE, BASIC, ADVANCED, APPLIED

internal medicine in-training exa | RTMS | What to Expect on Certification E | Becoming Certified | ABIM.org | IM-ITE® | Internal Medicine In-Tr

internal medicine in-training exam - Search Results - PubMed
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ACP American College of Physicians®
Leading Internal Medicine, Improving Lives

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MEMBERSHIP   CME & MOC   MEETINGS & COURSES   CLINICAL INFORMATION   PRACTICE RESOURCES   ADVOCACY   STORE

For Examinees

The goal of the IM-ITE® is to gauge progress in training. For the most accurate assessment, you are advised not to study.

Before the Exam

- You are advised not to study for this exam.
- Special accommodations for those who need them can be made ahead of time. Be sure to alert your program director of any special needs as soon as possible.
- A few weeks prior to the testing window, you will be able to take the online practice exam ↗ to familiarize yourself with the online testing process.

Practice Exam ↗

Exam Day

- The total testing time will be 9 hours.
- There will be 7 hours devoted to the exam itself, plus several 10 minute breaks and a lunch hour.
- The exam will have roughly 300 questions.
- There is no penalty for guessing an answer, and the exam cannot be failed. Only questions answered correctly are counted toward your score.
- The exam will cover a number of specialties as well as general internal medicine.

After the Exam

- Results will be made available online roughly 4 to 6 weeks after the exam window.
- Programs will receive a report that shows the percent of questions correct for each examinee as well as each examinee's percentile rank.
- Report will also include a list of educational objectives of questions answered incorrectly.

For Program Directors and Chief Proctors

USMLE®

UNITED STATES MEDICAL LICENSING EXAMINATION®

Announcements

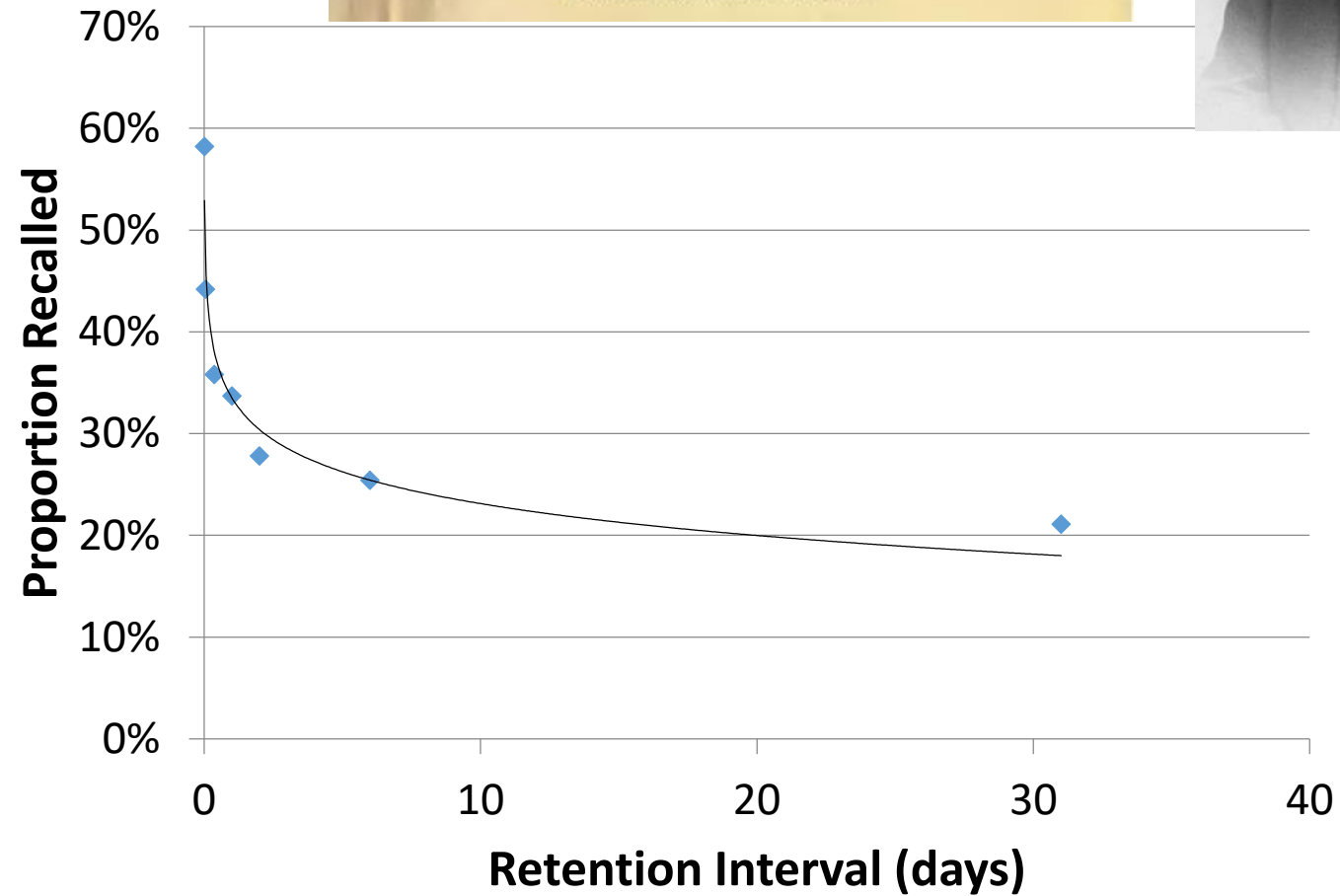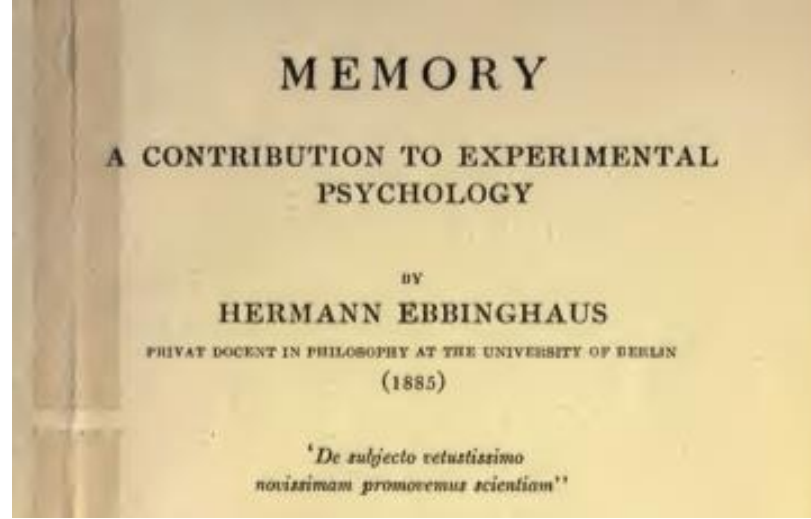🏠 › Announcements

Announcements 📶

USMLE Step 1 Transition to Pass/Fail Only Score Reporting Begins With Exams Taken on or after Jan. 26, 2022

Posted: September 15, 2021

USMLE Step 1 score reporting will transition from a numeric score and pass/fail outcome to pass/fail only for exams taken on or after January 26, 2022. The USMLE program views this change as an important first step toward facilitating broader, system-wide changes to improve the transition from undergraduate to graduate medical education.

Dates for USMLE Step 1 Transition to Pass/Fail Only		
Transition Begins with Exams Taken on or after January 26, 2022		
To receive a numeric score, examinees must take their exam on or before January 25, 2022*		
Step 1 Exams	**Test on or before Jan. 25, 2022** (Please schedule your appointment with Prometric well in advance of your desired test date)	**Test on or after Jan. 26, 2022** (Schedule your exam date for on or after Jan. 26, 2022)
Score Reports	Numeric score and pass/fail outcome	Pass/fail outcome only
Transcripts**	Numeric score and pass/fail outcome	Pass/fail outcome only

1885

MEMORY

A CONTRIBUTION TO EXPERIMENTAL PSYCHOLOGY

BY

HERMANN EBBINGHAUS

PRIVAT DOCENT IN PHILOSOPHY AT THE UNIVERSITY OF BERLIN

(1885)

'De subjecto vetustissimo novissimam promovemus scientiam''

Proportion Recalled vs **Retention Interval (days)**

The World Championships consist of ten different disciplines, where the competitors have to memorize as much as they can in a period of time:

1. One hour numbers (23712892....)
2. 5-minute numbers
3. Spoken numbers, read out one per second
4. 30-minute binary digits (011100110001001....)
5. One hour playing cards (as many decks of cards as possible)
6. 15-minute random lists of words (house, playing, orphan, encyclopedia....)
7. 15-minute names and faces
8. 5-minute historic dates (fictional events and historic years)
9. 15-minute abstract images (WMSC, black and white randomly generated spots) / 5-minute random images (IAM, concrete images)
10. Speed cards - Always the last discipline. Memorize the order of one shuffled deck of 52 playing cards as fast as possible.

https://www.youtube.com/watch?v=OApSOU7NIAw

World **MEMORY** Championships™

WUHAN CHINA 2019

520 Competitors   10 Disciplines
3 Days - One Champion

2019 第 28 届世界脑力锦标赛全球总决赛
THE 28th WORLD MEMORY CHAMPIONSHIPS 2019 GLOBAL FINALS

Overall Top 3
全场冠亚季军

OVERALL CHAMPION 全场总冠军	RYU SONG I
OVERALL SECOND PLACE 全场总亚军	Wei Qinru
OVERALL THIRD PLACE 全场总季军	JON YU JONG

2019 第 28 届世界脑力锦标赛全球总决赛
THE 28th WORLD MEMORY CHAMPIONSHIPS 2019 GLOBAL FINALS

Overall Top 3 Teams
团体总冠亚季军

Overall Team Champion 团体总冠军	Democratic People's Republic of Korea
Overall Team First Runner-up 团体总亚军	Mongolia
Overall Team Second Runner-up 团体总季军	China

The new World Memory Champion

Ryu Song I 19year old student from the Peoples Democratic Republic of Korea

THE NEW YORK TIMES BESTSELLER

MOONWALKING WITH EINSTEIN

The Art and Science of Remembering Everything

JOSHUA FOER
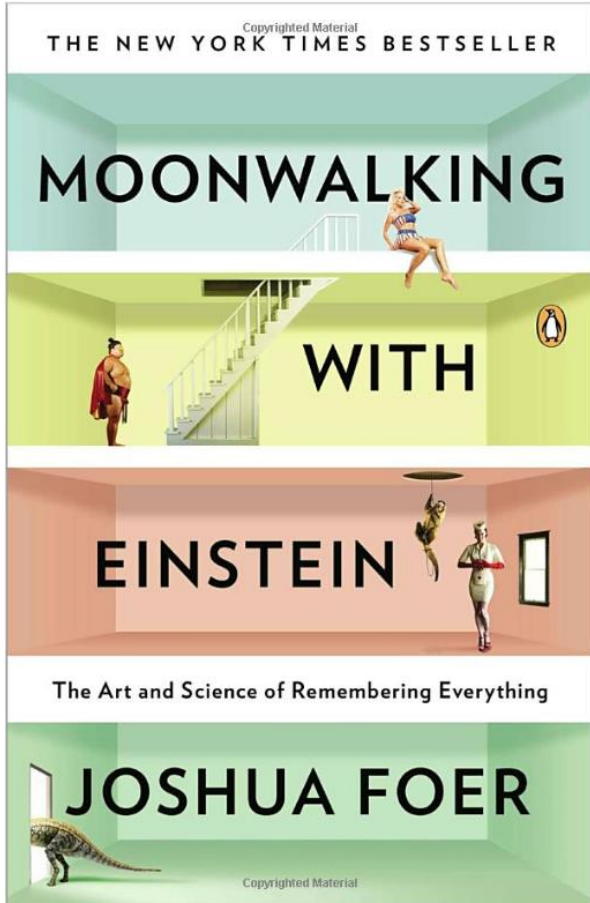
Memory ≠ Natural Talent

Memory = Technique + Practice

Summary

- Learning Theory

- USMLE Step 1 Resources

- USMLE Step 1 Studies
  - Randomized Control Trials
  - Large sample size
  - Small sample size

Name a high utility learning strategy.

Name a low utility learning strategy.

Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology

John Dunlosky[1], Katherine A. Rawson[1], Elizabeth J. Marsh[2], Mitchell J. Nathan[3], and Daniel T. Willingham[4]

[1]Department of Psychology, Kent State University; [2]Department of Psychology and Neuroscience, Duke University; [3]Department of Educational Psychology, Department of Curriculum & Instruction, and Department of Psychology, University of Wisconsin–Madison; and [4]Department of Psychology, University of Virginia

Table 1. Learning Techniques

Technique	Description
1. Elaborative interrogation	Generating an explanation for why an explicitly stated fact or concept is true
2. Self-explanation	Explaining how new information is related to known information, or explaining steps taken during problem solving
3. Summarization	Writing summaries (of various lengths) of to-be-learned texts
4. Highlighting/underlining	Marking potentially important portions of to-be-learned materials while reading
5. Keyword mnemonic	Using keywords and mental imagery to associate verbal materials
6. Imagery for text	Attempting to form mental images of text materials while reading or listening
7. Rereading	Restudying text material again after an initial reading
8. Practice testing	Self-testing or taking practice tests over to-be-learned material
9. Distributed practice	Implementing a schedule of practice that spreads out study activities over time
10. Interleaved practice	Implementing a schedule of practice that mixes different kinds of problems, or a schedule of study that mixes different kinds of material, within a single study session

Note. See text for a detailed description of each learning technique and relevant examples of their use.

Table 2. Examples of the Four Categories of Variables for Generalizability

Materials	Learning conditions	Student characteristics[a]	Criterion tasks
Vocabulary	Amount of practice (dosage)	Age	Cued recall
Translation equivalents	Open- vs. closed-book practice	Prior domain knowledge	Free recall
Lecture content	Reading vs. listening	Working memory capacity	Recognition
Science definitions	Incidental vs. intentional learning	Verbal ability	Problem solving
Narrative texts	Direct instruction	Interests	Argument development
Expository texts	Discovery learning	Fluid intelligence	Essay writing
Mathematical concepts	Rereading lags[b]	Motivation	Creation of portfolios
Maps	Kind of practice tests[c]	Prior achievement	Achievement tests
Diagrams	Group vs. individual learning	Self-efficacy	Classroom quizzes

Effective Learning Techniques

Technique	Utility	Materials	Learning Conditions	Student Characteristics	Criterion Task
Testing	High	++	++	+	++
Spacing	High	++	+	+	++
Elaborative Interrogation	Moderate	++		+	
Self-Explanation	Moderate	++		+	+
Interleaving	Moderate		+		+
Rereading	Low	++			
Summarization	Low	+			
Keyword Mnemonic	Low				
Imagery	Low				
Highlighting	Low		-		

"Testing Effect"
Gates, 1917

NONSENSE MATERIAL

Grade one

Method	Time of reading	Time of recitation	Per cent. reading	Per cent. recitation
1	5'	0'	100	0
2	4'	1'	80	20
3	3'	2'	60	40
4	2'	3'	40	60
5	1'	4'	20	80

Grades four, six, and eight

Method	Time of reading	Time of recitation	Per cent. reading	Per cent. recitation
1	9'	0	100	0
2	7'12"	1'48"	80	20
3	5'24"	3'36"	60	40
4	3'36"	5'24"	40	60
5	1'48"	7'12"	20	80

- 236 elementary school students
  - 14-16 nonsense syllables
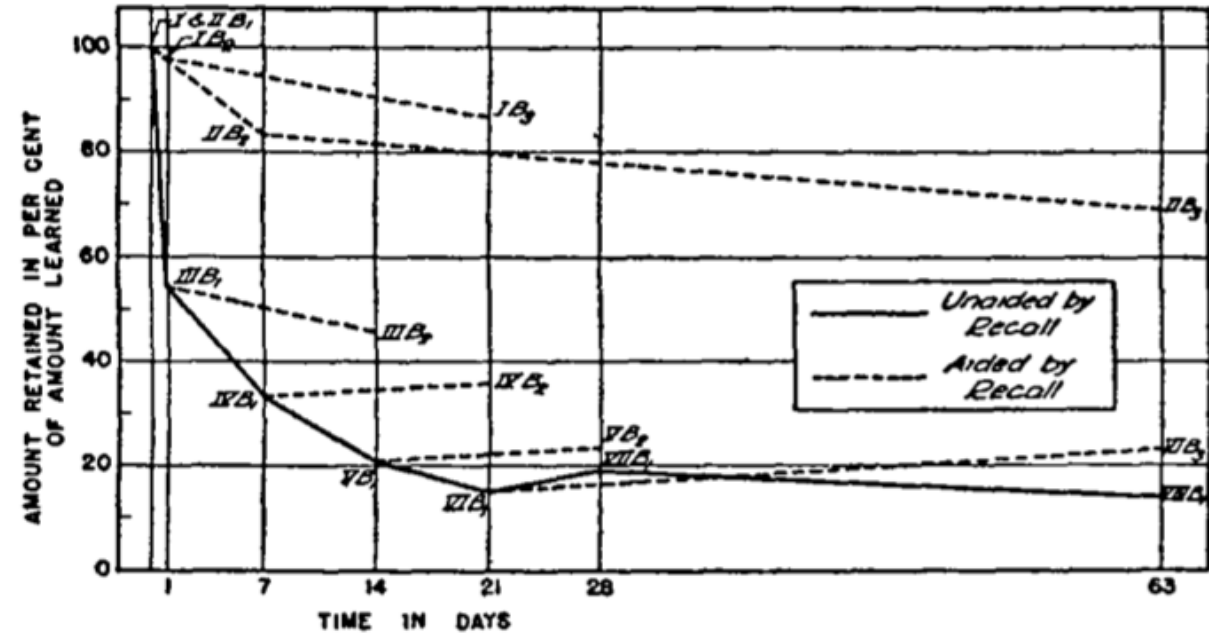

FIGURE 1

Based on the data of Tables XVIII and XIX
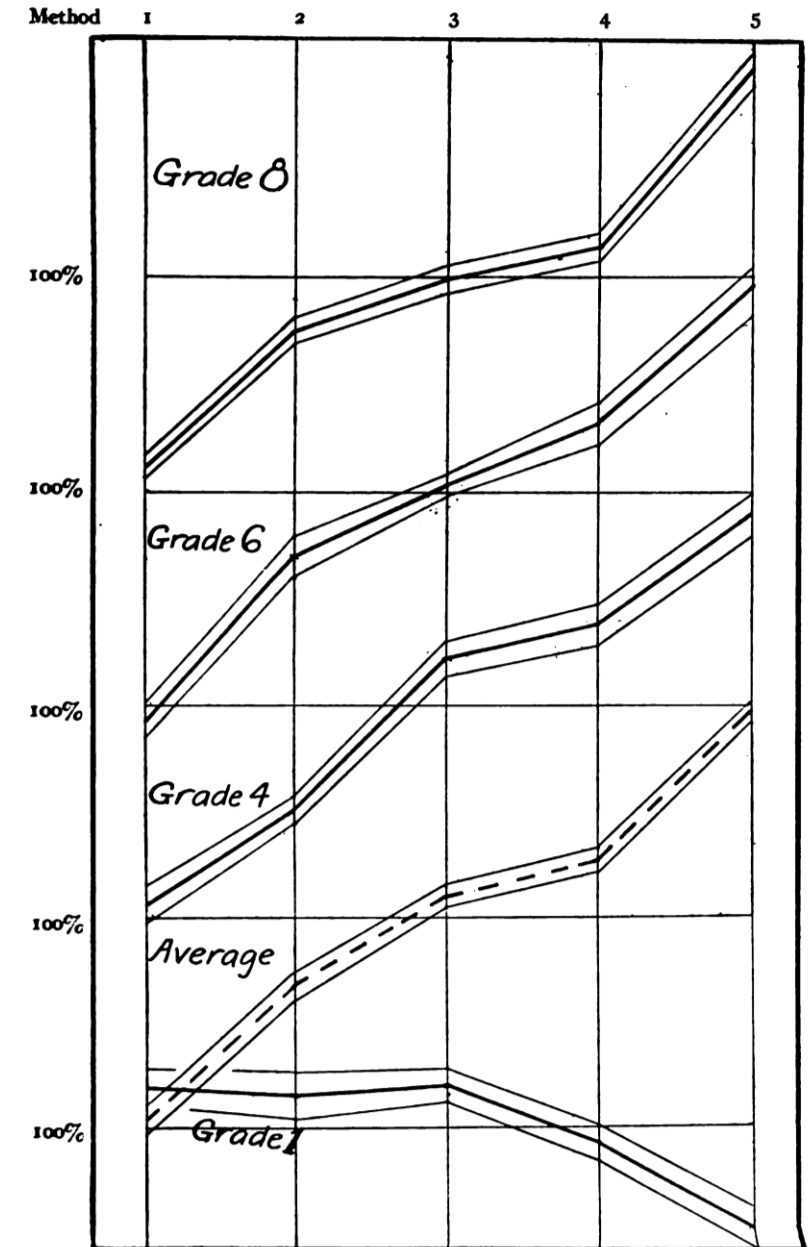
"Spacing Effect"
Spitzer, 1939

TABLE I.—DIAGRAM OF PROCEDURE

Time in days	0	1	7	14	21	28	63
Groups							
I	B_1	B_2	..	..	B_3		
II	B_1	..	B_2	..	..	..	B_3
III	..	B_1	..	B_2			
IV	..	..	B_1	..	B_2		
V	..	..	..	B_1	..	B_2	
VI	..	..	..	..	B_1	..	B_2
VII	..	..	..	..	..	B_1	B_2
VIII	..	..	..	..	..	..	B_1

- 3,605 6th grade students
- Six page article on bamboo

2006 Test-Enhanced Learning

Taking Memory Tests Improves Long-Term Retention

Henry L. Roediger, III, and Jeffrey D. Karpicke

- Undergraduates

- Reading comprehension TOEFL

- Randomized to three groups for four consecutive 5min sessions of study or test
  - Repeated study SSSS
  - Single test SSST
  - Repeated test STTT

- Test at 5min and 1wk

2006

Test-Enhanced Learning

Taking Memory Tests Improves Long-Term Retention

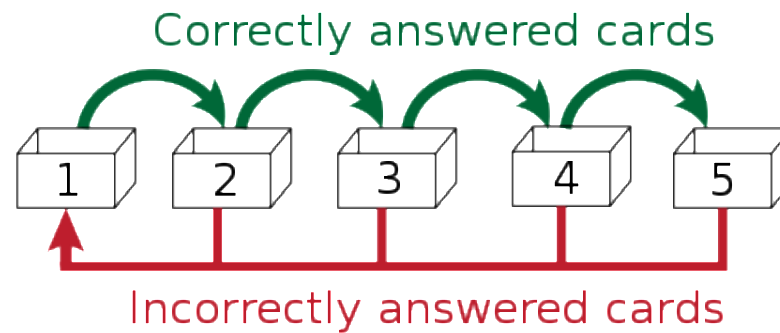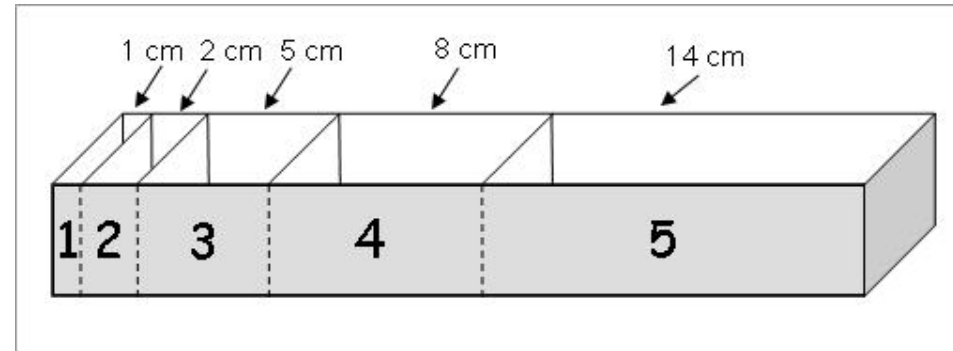Henry L. Roediger, III, and Jeffrey D. Karpicke
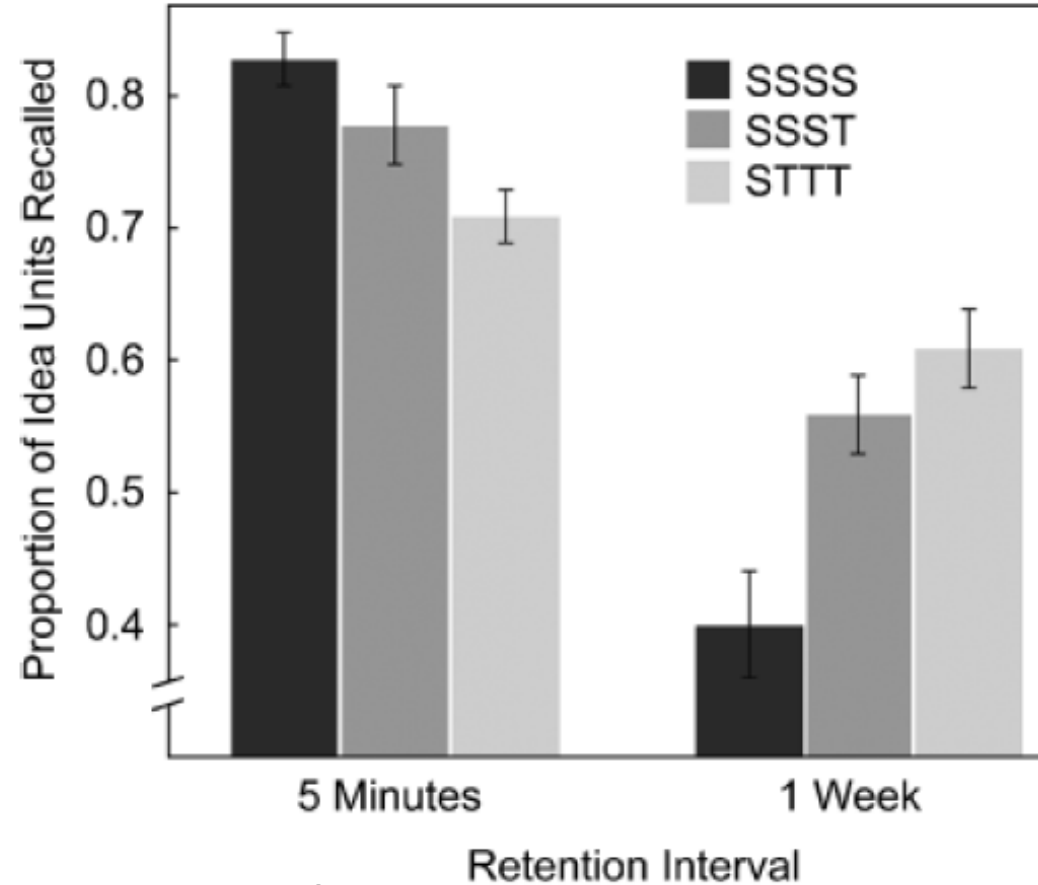
5min test favored repeated studying

1wk test favored number of tests given

STEP 1 Resources

- Books: Kaplan Lecture Notes, First Aid, Crush Step 1
- Courses: Kaplan, SMASH USMLE, Board Vitals, Lecturio, PASS Program, Achievable USMLE
- Flashcards: Anki, Firecracker

Sebastian Leitner 1970s

Piotr Wozniak 1980s

Powerful, intelligent flash cards.
Remembering things just became much easier.

Download

Remember Anything

From images to scientific markup, Anki has got you covered.

Remember Anywhere

Review on Windows, Mac, Linux, iOS, Android, and any device with a web browser.

Remember Efficiently

Only practice the material that you're about to forget.

About Anki

Anki is a program which makes remembering things easy. Because it's a lot more efficient than traditional study methods, you can either greatly decrease your time spent studying, or greatly increase the amount you learn.

Anyone who needs to remember things in their daily life can benefit from Anki. Since it is content-agnostic and supports images, audio, videos and scientific markup (via LaTeX), the possibilities are endless.
For example:

- Learning a language
- Studying for medical and law exams
- Memorizing people's names and faces
- Brushing up on geography
- Mastering long poems
- Even practicing guitar chords!

"The single biggest change that Anki brings about is that it means memory is no longer a haphazard event, to be left to chance. Rather, it guarantees I will remember something, with minimal effort. That is, *Anki makes memory a choice*."
— Michael A. Nielsen, "Augmenting Long-term Memory"

"No other application [...] comes remotely close to Anki in terms of the number and power of features, flexibility in study, or implementation of spaced repetition."
— K. M. Lawson, "Anki All the Way"

Features

Synchronization

Use the free AnkiWeb

Optimized

Anki will handle decks of 100,000+

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Thoughts, ideas, and resources from an Internal Medicine resident lost in his passion for medicine and medical education.

The flashcards that unexpectedly spread worldwide.

In the thick of medical school I shared my study aid and saw it gain worldwide attention from medical students and educators. Here it is in one place, for free.

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View COVID-19 Resources *from Wolters Kluwer*
FOR STUDENTS AND INSTRUCTORS

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"By sticking to my routine throughout the first two years, I was able to score a 268 using Firecracker!"

- Oliver, University of Florida

Step 1 Preparation
Randomized Control Trials

Step 1 Preparation
Large Sample Size

2019
N=45154

Examining Demographics, Prior Academic Performance, and United States Medical Licensing Examination Scores

Jonathan D. Rubright, PhD, Michael Jodoin, PhD, and Michael A. Barone, MD, MPH

Results for Predicting First-Time USMLE Step 1 Performance Using a Demographics-Only Model and Fully Adjusted Model, From a Study of Demographic Differences in USMLE Scores, 2010–2015[a]

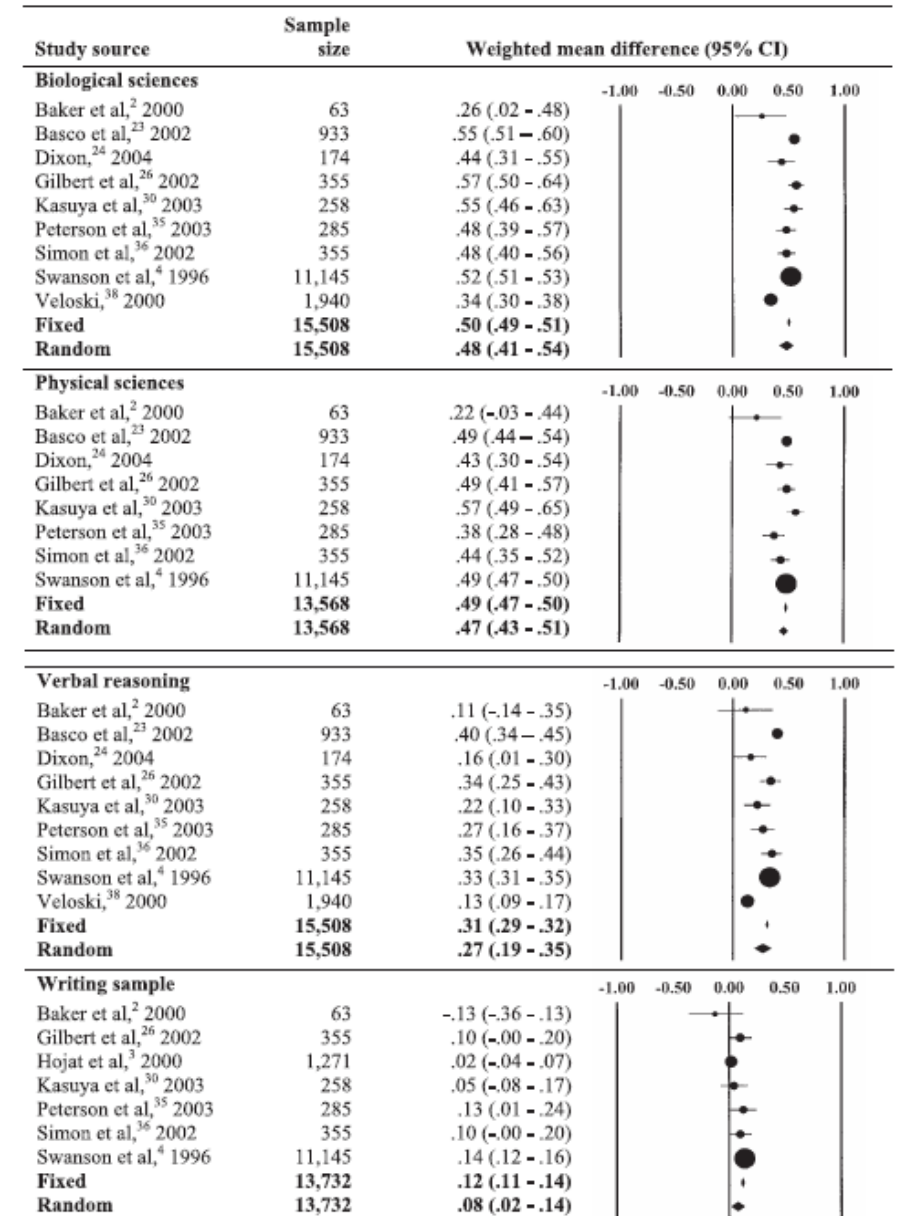| Characteristic	Demographics model			Covariates model		
	Coefficient	95% CI	Effect size[b]	Coefficient	95% CI	Effect size[b]
Intercept	233.17	232.06 to 234.28[c]	—	230.86	230.20 to 231.51[c]	—
Non-U.S. citizen	1.78	0.80 to 2.76[c]	0.09	−0.42	−1.34 to 0.50	−0.02
Asian	−4.45	−4.91 to −3.98[c]	−0.22	−3.96	−4.40 to −3.52[c]	−0.20
Black	−16.52	−17.32 to −15.72[c]	−0.83	−5.10	−5.90 to −4.29[c]	−0.26
Hispanic	−12.10	−12.90 to −11.29[c]	−0.61	−4.79	−5.57 to −4.01[c]	−0.24
ESL	−1.43	−2.16 to −0.71[c]	−0.07	−0.14	−0.82 to 0.55	−0.01
Female	−5.92	−6.27 to −5.57[c]	−0.30	−4.07	−4.40 to −3.73[c]	−0.20
Age at Step 1 attempt	−1.23	−1.29 to −1.16[c]	—	−0.58	−0.65 to −0.51[c]	—
Total GPA	—	—	—	11.91	11.16 to 12.66[c]	—
Total MCAT	—	—	—	1.49	1.44 to 1.53[c]	—

2007
23 Studies

The Predictive Validity of the MCAT for Medical School Performance and Medical Board Licensing Examinations: A Meta-Analysis of the Published Research

Tyrone Donnon, PhD, Elizabeth Oddone Paolucci, PhD, and Claudio Violato, PhD

Random and Fixed Effects Model Forrest Plots of the Correlations Between the Medical College Adminissions Test (MCAT) Subtests and the United States Medical Licensing Examination (USMLE) Step 1

Study source	Sample size	Weighted mean difference (95% CI)
Biological sciences		
Baker et al,[2] 2000	63	.26 (.02 – .48)
Basco et al,[23] 2002	933	.55 (.51 – .60)
Dixon,[24] 2004	174	.44 (.31 – .55)
Gilbert et al,[26] 2002	355	.57 (.50 – .64)
Kasuya et al,[30] 2003	258	.55 (.46 – .63)
Peterson et al,[35] 2003	285	.48 (.39 – .57)
Simon et al,[36] 2002	355	.48 (.40 – .56)
Swanson et al,[4] 1996	11,145	.52 (.51 – .53)
Veloski,[38] 2000	1,940	.34 (.30 – .38)
Fixed	**15,508**	**.50 (.49 – .51)**
Random	**15,508**	**.48 (.41 – .54)**
Physical sciences		
Baker et al,[2] 2000	63	.22 (–.03 – .44)
Basco et al,[23] 2002	933	.49 (.44 – .54)
Dixon,[24] 2004	174	.43 (.30 – .54)
Gilbert et al,[26] 2002	355	.49 (.41 – .57)
Kasuya et al,[30] 2003	258	.57 (.49 – .65)
Peterson et al,[35] 2003	285	.38 (.28 – .48)
Simon et al,[36] 2002	355	.44 (.35 – .52)
Swanson et al,[4] 1996	11,145	.49 (.47 – .50)
Fixed	**13,568**	**.49 (.47 – .50)**
Random	**13,568**	**.47 (.43 – .51)**
Verbal reasoning		
Baker et al,[2] 2000	63	.11 (–.14 – .35)
Basco et al,[23] 2002	933	.40 (.34 – .45)
Dixon,[24] 2004	174	.16 (.01 – .30)
Gilbert et al,[26] 2002	355	.34 (.25 – .43)
Kasuya et al,[30] 2003	258	.22 (.10 – .33)
Peterson et al,[35] 2003	285	.27 (.16 – .37)
Simon et al,[36] 2002	355	.35 (.26 – .44)
Swanson et al,[4] 1996	11,145	.33 (.31 – .35)
Veloski,[38] 2000	1,940	.13 (.09 – .17)
Fixed	**15,508**	**.31 (.29 – .32)**
Random	**15,508**	**.27 (.19 – .35)**
Writing sample		
Baker et al,[2] 2000	63	–.13 (–.36 – .13)
Gilbert et al,[26] 2002	355	.10 (–.00 – .20)
Hojat et al,[3] 2000	1,271	.02 (–.04 – .07)
Kasuya et al,[30] 2003	258	.05 (–.08 – .17)
Peterson et al,[35] 2003	285	.13 (.01 – .24)
Simon et al,[36] 2002	355	.10 (–.00 – .20)
Swanson et al,[4] 1996	11,145	.14 (.12 – .16)
Fixed	**13,732**	**.12 (.11 – .14)**
Random	**13,732**	**.08 (.02 – .14)**

The Cochran Q-test for heterogeneity shows significant overall heterogeneity between studies. (Biological sciences, $Q = 97.602$, 8 df, $p < .001$; physical sciences, $Q = 16.853$, 7 df, $p < .019$; verbal reasoning, $Q = 95.075$, 8 df, $p < .001$; writing sample, $Q = 36.415$, 6 df, $p < .001$).

Figure 1 Random- and fixed-effects model Forrest plots of the correlations between the MCAT subtests and the USMLE Step 1.

2019
89 Schools

Institutional differences in USMLE Step 1 and 2 CK performance: Cross-sectional study of 89 US allopathic medical schools

Table 2. Linear regression between various institutional characteristics and institutional USMLE performance, without and with control for average institutional GPA and MCAT.

USMLE Step 1	Pearson's r	Partial $\rho^{\dagger}$	USMLE Step 2 CK	Pearson's r	Partial $\rho^{\ddagger}$
Institutional GPA	.64**	–	Institutional GPA	.53**	–
Institutional MCAT	.84**	–	Institutional MCAT	.62**	–
USMLE Step 2 CK	.56**	.05	USMLE Step 1	.56**	.06
Minority Students	.46**	.16	Minority Students	.25*	-.03
Biological Science Majors	-.36**	-.07	Biological Science Majors	-.27*	-.12
Humanities Majors	.13	.07	Humanities Majors	.10	.11
Non-Traditional Students	.01	-.13	Non-Traditional Students	-.03	-.07
Acceptance Rate	-.30**	-.14	Acceptance Rate	-.17	-.05
Private Institution	.51**	.12	Private Institution	.30**	-.06
Faculty:Student Ratio	.44**	.01	Faculty:Student Ratio	.35**	.06
NIH Funding	.58**	-.13	NIH Funding	.47**	-.01
Primary Care Grads	-.31**	-.12	Primary Care Grads	-.10	.17

GPA, Undergraduate Grade Point Average; MCAT, Medical College Admission Test score; USMLE, US Medical Licensing Examination; CK, Clinical Knowledge; NIH, National Institutes of Health.

* $P < .05$

** $P < .01$

† Partial correlation controlling for GPA and MCAT (2010–12)

‡ Partial correlation controlling for GPA and MCAT (2008–10)

Step 1 Preparation
Small Sample Size

Institution	Date	N	Variables
Reddit	2020	466	MCAT*, NBME practice tests, Uworld practice tests*
U Michigan	2017	274	Gender, minority, MCAT*, preclinical scores*, score goal*, early study*, hours studied, study duration, review book completion*, questions completed*
Tulane	2015	256	% study time doing questions, questions completed*, hours studied, study duration*, % study time in groups
U Pittsburg	2019	170	Preclinical scores*, Uworld Qbank*, First Aid, NBME practice tests, Uworld practice tests, study duration
West Virginia U	2016	164	First Aid, Uworld Qbank*, Doctors in Training, Kaplan Qbank, BRS books, class rank*
Ohio State U	2010	134	Peer teaching*
Washington U	2015	72	Honors*, MCAT*, multiple choice questions*, Anki*, Firecracker, burnout, depression, test anxiety*
Mercer U	2020	47	Preclinical scores*, NBME practice tests*, questions completed*, % study time doing questions, hours studied, study duration

Study Behaviors and USMLE Step 1 Performance: Implications of a Student Self-Directed Parallel Curriculum

Bivariate Associations: Preclinical Scores and USMLE Step 1 Scores by Medical Student Demographic and Study Behavior, University of Michigan Medical School, 2014 and 2015 (n = 274)

Variables[b]	No. (%)	Preclinical score[a] Mean (SD)	P value[c]	Step 1 score[a] Mean (SD)	P value
Sex			NS		.02
Male	132 (48.2)	90.6 (4.2)		240.3 (17.0)	
Female	142 (51.8)	90.8 (4.1)		235.5 (15.9)	
URiM			NS		NS
No	241 (88.0)	90.9 (4.0)		238.0 (17.0)	
Yes	33 (12.0)	89.4 (4.9)		236.2 (13.5)	
MCAT score			< .001		< .001
≤ 32	60 (22.3)	89.7 (3.5)		227.1 (15.5)	
33–37	133 (49.4)	90.2 (3.8)		237.5 (14.7)	
≥ 37	76 (28.3)	92.2 (4.7)		247.0 (15.2)	
Preclinical score					< .001
≤ 88	73 (26.6)	—		227.2 (16.4)	
88–94	137 (50.0)	—		237.1 (14.6)	
≥ 94	64 (23.4)	—		251.4 (10.3)	
Score goal			< .001		< .001
≤ 230	75 (31.9)	89.4 (4.5)		228.3 (17.9)	
230–245	90 (38.3)	90.2 (3.6)		237.6 (13.5)	
≥ 245	70 (29.8)	92.3 (4.1)		248.8 (11.9)	
Early study[d]			NS		.03
No	63 (23.0)	91.3 (4.4)		233.8 (18.5)	
Yes	211 (77.0)	90.5 (4.0)		239.0 (15.8)	
Study period hours studied per day			NS		NS
≤ 10	92 (33.7)	90.4 (4.2)		237.7 (16.3)	
10–12	107 (39.2)	90.7 (4.1)		236.9 (17.7)	
≥ 12	74 (27.1)	91.2 (4.1)		239.4 (15.4)	
Study period duration			NS		NS
≤ 31 days	34 (12.4)	89.6 (3.4)		235.6 (18.4)	
32–36 days	162 (59.1)	91.2 (3.8)		238.1 (16.3)	
≥ 37 days	78 (28.5)	90.1 (4.8)		238.1 (16.6)	
Review book[32] complete passes			< .001		< .001
≤ 2 passes	157 (59.0)	89.9 (4.2)		233.2 (16.4)	
> 2 passes	109 (41.0)	91.7 (3.8)		245.1 (14.4)	
Unique practice questions completed			NS		< .001
0–2,400	67 (24.8)	90.2 (3.3)		230.5 (17.2)	
2,401–3,200	134 (49.6)	91.0 (4.4)		238.3 (15.3)	
> 3,200	69 (25.6)	90.5 (4.2)		244.8 (14.5)	
Repeated practice questions completed			NS		.01
0	132 (48.9)	90.6 (4.3)		235.2 (17.3)	
1–1,199	62 (23.0)	91.1 (4.2)		240.4 (16.1)	
≥ 1,200	76 (28.1)	90.5 (3.8)		240.9 (14.1)	

Master model[e]	225				
		(Constant)	−39.5 (−76.7, −2.2)		
		Female sex	−0.90 (−4.00, 2.19)	−0.03	NS
		MCAT score	1.10 (0.61, 1.60)	0.21	< .001
		Preclinical score	1.96 (1.59, 2.33)	0.49	< .001
		Score goal	0.18 (0.06, 0.30)	0.16	< .001
		Early study	4.23 (0.55, 7.91)	0.11	.03
		Review book[32] passes	2.29 (0.32, 4.26)	0.11	.02
		Unique questions[c]	0.35 (0.18, 0.52)	0.21	< .001
		Repeat questions[c]	0.01 (−0.17, 0.19)	0.01	NS

Preparing to take the USMLE Step 1: a survey on medical students' self-reported study habits

Table 3 Self-reported USMLE Step 1 scores by survey respondent characteristics
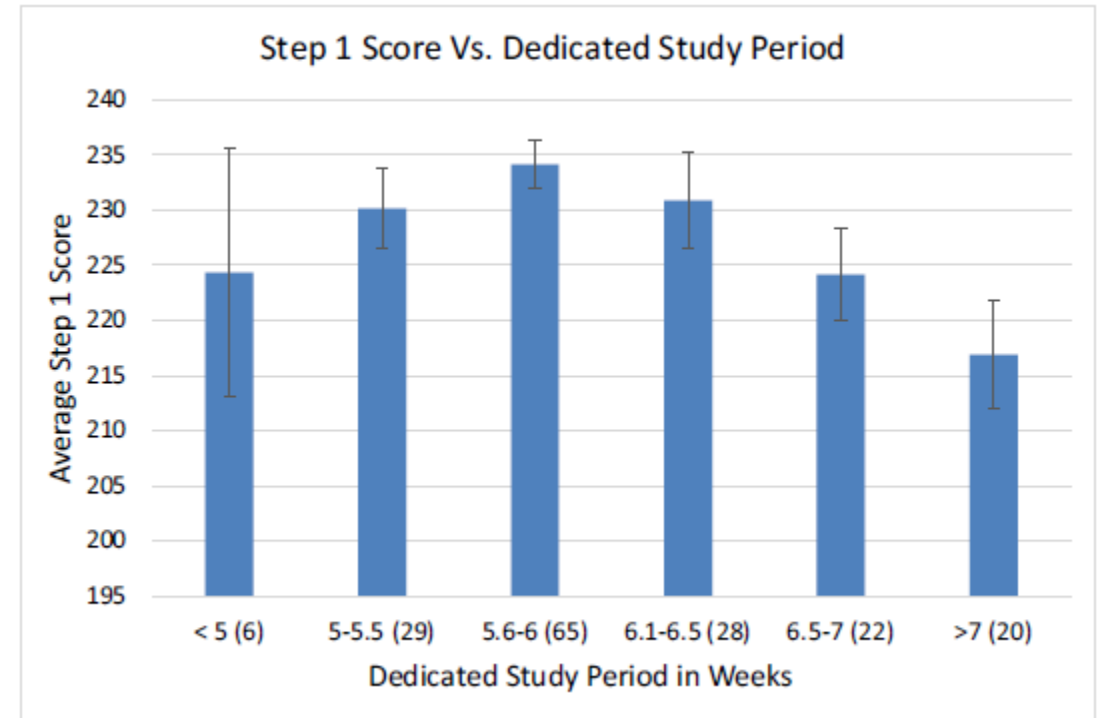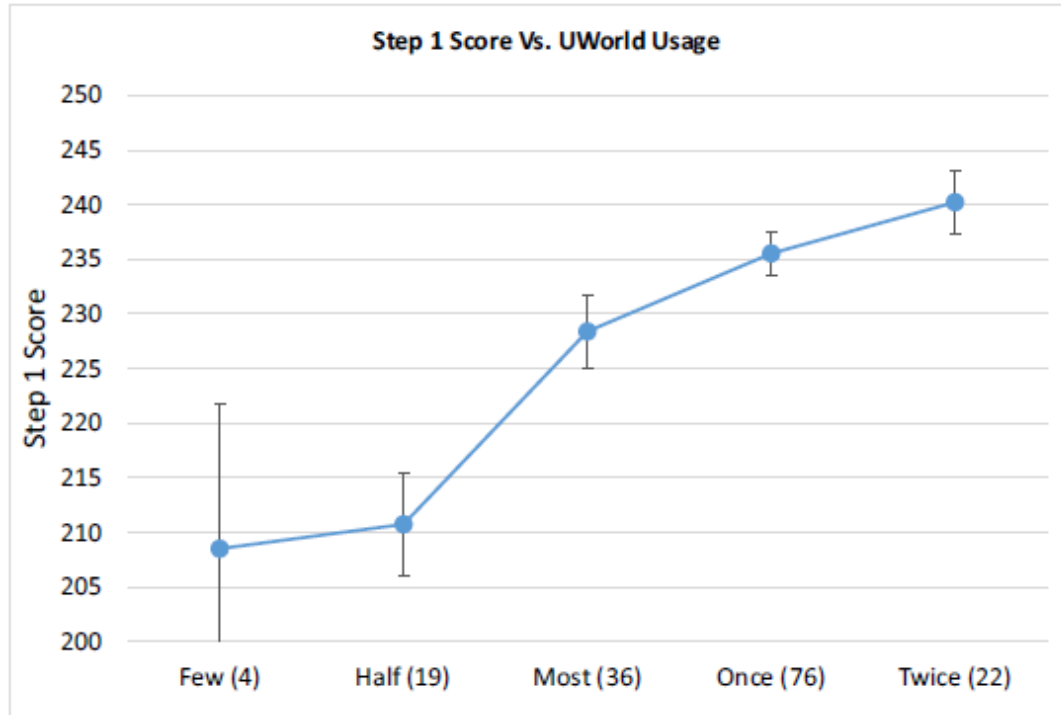
Variable	Overall N	Mean score (SD)	p Value	Point estimate (95% CI)	2009 N	Mean (SD)	2010 N	Mean (SD)	2011 N	Mean (SD)
Percentage of study time doing questions	247		0.41	−1.7 (−4.2 to 0.7)	84		88		75	
≤25	84	230.1 (22.6)			31	232.8 (21.7)	24	227.5 (20.8)	29	229.2 (25.2)
26–50	68	231.3 (19.1)			25	233.6 (20.8)	27	227.2 (19.3)	16	234.8 (15.7)
51–75	35	229.1 (25.4)			7	236.4 (22.8)	17	224.4 (30.0)	11	231.5 (19.1)
>75	60	224.9 (24.9)			21	216.5 (23.7)	20	224.1 (17.4)	19	234.8 (30.1)
No of questions completed	240		<0.0001	8.4 (4.9 to 12.0)	83		88		66	
≤2000	107	221.5 (24.8)			47	221.9 (23.2)	43	221.5 (22.7)	17	220.6 (34.1)
2001–4000	99	233.3 (20.4)			27	235.0 (20)	31	228.4 (20.6)	41	235.8 (20.4)
4001–6000	29	239.1 (18.3)			8	248.9 (12.8)	13	233.9 (20.7)	8	237.8 (16.8)
6001–8000	2	239.0 (9.9)			1	246 (–)	1	232.0 (–)	–	–
>8000	3	247.0 (7.6)			1	248 (–)	–	–	2	246.5 (10.6)
No of hours spent studying per day	256		0.12	3.1 (−0.2 to 6.4)	81		87		81	
0–3	11	216.1 (27.3)			4	214.0 (39.2)	3	196.0 (6.0)	4	233.3 (11.2)
4–7	42	224.1 (20.3)			17	225.7 (21.9)	18	217.6 (18.3)	7	237.3 (15.8)
8–11	124	231.6 (22.0)			38	230.0 (19.6)	44	232.3 (19.6)	42	232.3 (26.5)
12–15	72	229.4 (23.9)			22	233.8 (24.3)	22	220.8 (24.3)	28	232.8 (22.1)
16–19	7	233.3 (23.0)			3	227.3 (37.5)	4	237.8 (7.6)	–	–
No of preparation days	252		<0.0001	−8.9 (−12.3 to −5.6)	80		90		77	
≤20	35	236.2 (19.0)			1	240 (–)	13	232.0 (15.4)	21	238.6 (21.3)
21–40	146	231.5 (20.1)			41	233.7 (19.6)	59	226.8 (23.2)	46	235.8 (14.5)
41–60	63	224.4 (23.1)			37	225.9 (24.4)	18	219.2 (17.3)	8	229.1 (28.7)
61–80	3	195.0 (38.1)			1	173 (–)	–		2	206.0 (46.7)
>80	7	196.0 (38.3)			3	219.7 (27.2)	1	192 (–)	3	173.7 (24.3)
Percentage of study time in group	252		0.75	−0.6 (−2.6 to 1.4)	75		82		76	
0	147	230.6 (23.5)			47	230.6 (23.7)	46	227.5 (20.2)	54	233.1 (25.8)
≤20%	44	226.3 (22.2)			15	224.3 (21.1)	20	226.2 (26.7)	9	230.1 (12.7)
21–40%	30	226.5 (20.2)			11	221.9 (22.3)	10	218.0 (15.3)	9	241.7 (14.8)
41–60%	8	228.4 (25.3)			2	260.5 (4.9)	6	217.7 (18.5)	4	216.5 (34.1)
61–80%	12	223.7 (25.1)			4	222.0 (20.6)	4	232.5 (23.2)	1	235.0 (–)
81–100%	11	233.6 (21.5)			5	241.2 (16.1)	5	225.8 (27.4)	–	–

p Values are given for overall variability in score for each study habit. Point estimates represent a calculated change in score between each category variable (eg, the calculated change in score between studying 0–3 h vs 4–7 h).
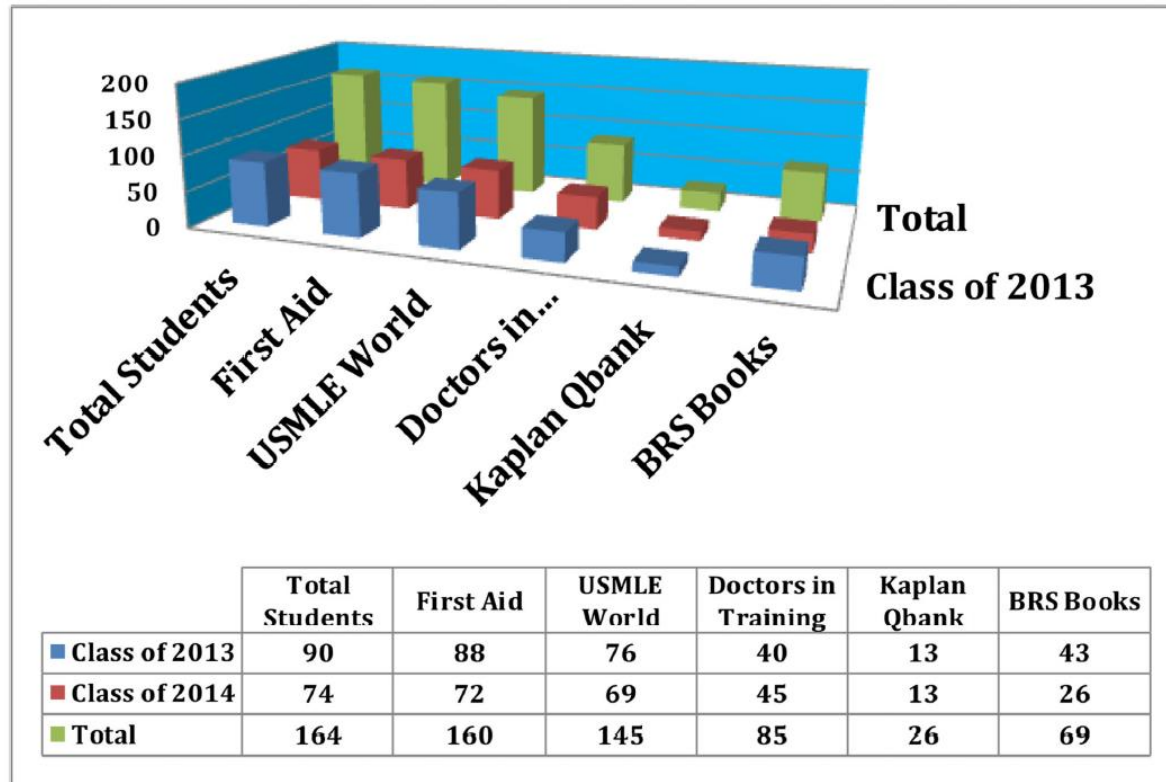USMLE, United States Medical Licensing Examination.

Factors Predictive of Performance on USMLE Step 1: Do Commercial Study Aids Improve Scores?

Step 1 Score Vs. UWorld Usage

Step 1 Score vs. UWorld Usage: Few (4), Half (19), Most (36), Once (76), Twice (22)

Step 1 Score Vs. Dedicated Study Period

Average Step 1 Score vs. Dedicated Study Period in Weeks: < 5 (6), 5-5.5 (29), 5.6-6 (65), 6.1-6.5 (28), 6.5-7 (22), >7 (20)

Investigating the Impact of Preparation Strategies on USMLE Step 1 Performance

	Total Students	First Aid	USMLE World	Doctors in Training	Kaplan Qbank	BRS Books
■ Class of 2013	90	88	76	40	13	43
■ Class of 2014	74	72	69	45	13	26
■ Total	164	160	145	85	26	69

First Aid		USMLE WORLD		Doctors in Training		Kaplan Q Bank		BRS Review Books	
Use (N=160)	No Use (N=4)	Use (N=145)	No Use (N=19)	Use (N=85)	No Use (N=79)	Use (N=26)	No Use (N=138)	Use (N=69)	No Use (N=95)
226.86 + 17.063	230.25 + 16.070	**228.48 + 16.231**	**215.21 + 18.582**	229.36 + 15.675	224.34 + 18.059	225.31 + 19.911	227.25 + 16.460	224.87 + 18.770	228.45 + 15.519

Student-directed retrieval practice is a predictor of medical licensing examination performance

Table 3 Coefficients for the multivariate linear regression model on Step 1 score

	B coefficient	95% CI	Standardized β	95% CI	*p*-value
Honours	**1.198**	(0.468, 1.93)	**0.347**	(0.136, 0.559)	0.002
MCAT	**1.078**	(0.374, 1.78)	**0.280**	(0.0973, 0.463)	0.003
MCQ[a]	**2.25×10^{-3}**	(1.05×10^{-3}, 3.44×10^{-3})	**0.298**	(0.139, 0.457)	<0.001
Anki[a]	**5.89×10^{-3}**	(8.00×10^{-5}, 1.10×10^{-3})	**0.195**	(0.0265, 0.3630)	0.024
FC[a]	7.95×10^{-5}	(-4.46×10^{-4}, 6.05×10^{-4})	0.0251	(−0.141, 0.191)	0.763
Burnout	−0.209	(−0.986, 0.568)	−0.0620	(0.292, 0.168)	0.592
Depression	0.233	(−0.667, 1.13)	0.0693	(−0.198, 0.337)	0.607
Test anxiety	**−1.99**	(−3.12, −0.857)	**−0.326**	(−0.512, −0.141)	<0.001

Bolded values differ from 0 with a significance <0.05, Goodness of fit: $R^2=0.672$, adjusted $R^2=0.625$. Analysis of variance of model: df =8, F = 14.340, $p<0.0001$.

[a]Number of flashcards or questions completed.

Prescription for Medical Students

- Maximize testing: finish Uworld

- Maximize spacing: repeat incorrect Uworld questions and use Anki cards

- Minimize summarization and rereading (cramming): consider these for difficult topics such as statistics, GI hormones, cancer staging

- Eliminate highlighting: throw your markers away

https://mullenmemory.com/