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TESTING AS TEACHING


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TESTING AS TEACHING


International Congress of the International Federation of Associations of Anatomists

Kyoto, Japan

August, 2004



Completing a test or quiz can be a learning process in itself




- 1973. McKenzie
- 1978. Denton and Crowley
- 1979. Elton and Laurillard
- 1981. Fisher, Williams, and Roth
- 1989. Rudman
- 1991. Dempster
- 1994. Frederiksen
- 2000. Connor-Greene
- 2002. Haladyna, Downing, and Rodriguez
- 2002. Kennedy
- 2003. Halpern and Hakel

Online, preprogrammed testing tools



Online testing a powerful form of testing & teaching

- Automatic
- Accessible
- Images, including animations
- Immediate feedback
- Flexible
- Multiple repetitions



Case Study

- Anatomy & Physiology course
- Students
 - Undergraduate
 - Nursing
 - Health Information
 - Occupational therapy
 - Other health-related professions



St. Charles
COMMUNITY COLLEGE

Old way

- All paper tests
- 6 written tests
- Limited illustrations, photographs, other images

New way

- Both online & paper tests
- 9 online tests
2 online practice exams
2 written exams
- All types of images available



Online tests

- Images edited in Photoshop
 - Image/photo editing program
 - Images saved as .jpg or .gif files
- Tests created in Respondus
 - Test creation software
 - Uploads tests to online testing platform
- Tests administered in WebCT
 - Online testing platform
 - WebCT also creates tests but interface is less friendly than Respondus



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Image source: Scan images from your textbook

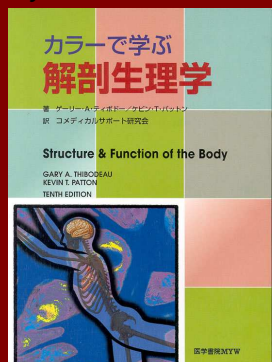
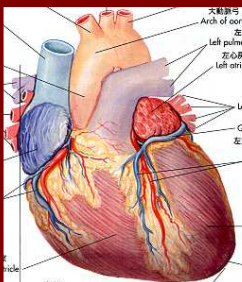
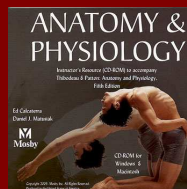
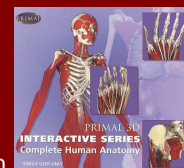


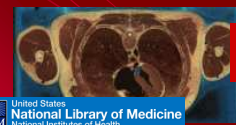
Image sources: Image collections



From your textbook/atlas publisher



Purchased collection



Online resources

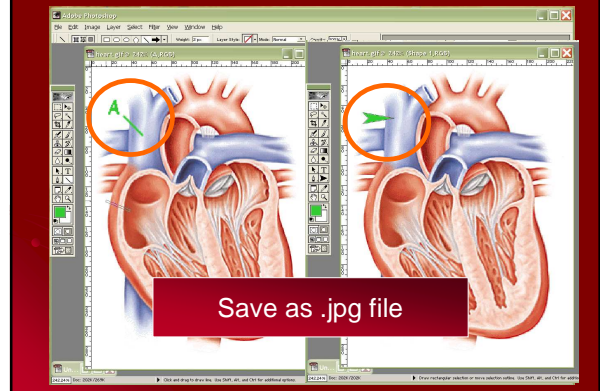
Image sources: your own

Photos you take yourself

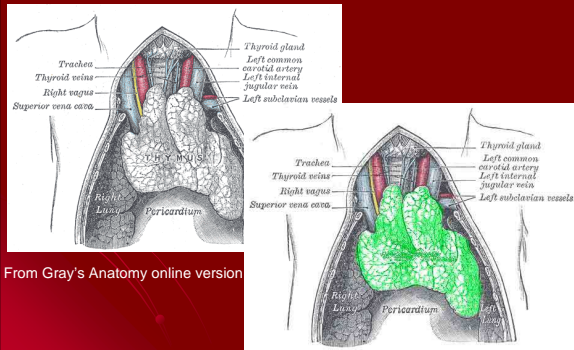


Medical images you acquire

Edit in Photoshop

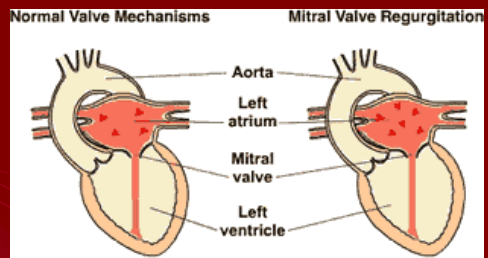


Advanced editing



From Gray's Anatomy online version

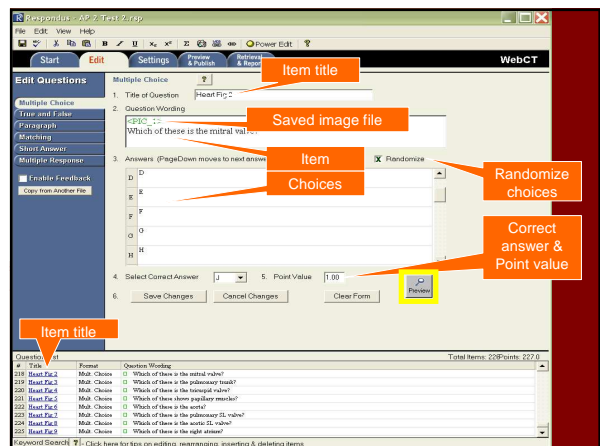
Animations



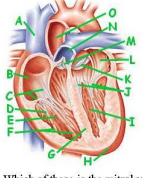
From <http://www.merck.com>

Online tests

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Item preview

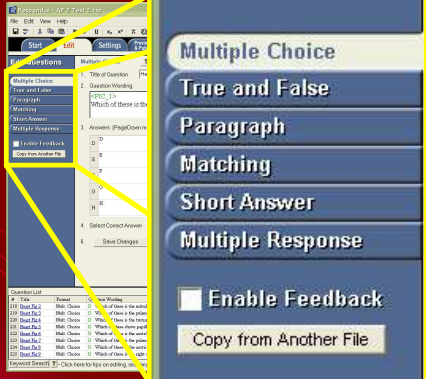


Which of these is the mitral valve?

- a. A
- b. B
- c. C
- d. D
- e. E
- f. F
- g. G
- h. H
- i. I
- j. J
- k. K
- l. L
- m. M
- n. N
- o. O



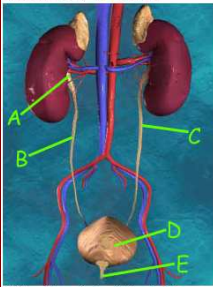
Item types



- Multiple Choice
- True and False
- Paragraph
- Matching
- Short Answer
- Multiple Response
- Enable Feedback
- Copy from Another File

Multiple choice

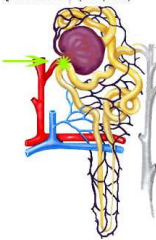
Question 11: (1.00 points)



Which of these is the right ureter?

- a. A
- b. B
- c. C
- d. D
- e. E

Question 14: (1.00 points)

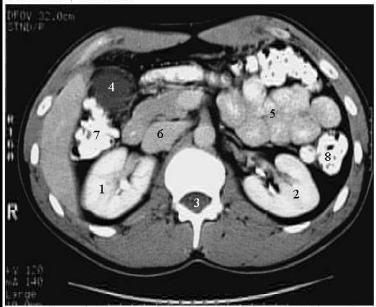


The location highlighted by starburst is where one could find the

- a. juxtamedullary nephron
- b. thick ascending limb of Henle
- c. juxtaglomerular apparatus
- d. thin ascending limb of Henle
- e. juxtaplaniburger

Simple identification (short answer style)

Question 35: (2.00 points)



You are a famous physician and a colleague has just handed you a medical image of a horizontal section of the abdomen. What organ is labeled as 2 in this image? (be specific)

Answer: kidney

Multiple Response

Question 15: (1.00 points)

The three layers of the filtration membrane in a nephron are __?__. (choose 3)

- a. hymen
- b. capillary wall of glomerulus
- c. visceral wall of Bowman's capsule
- d. peritoneum
- e. thick ascending limb
- f. basement membrane
- g. medullary membrane

Ordering (matching style)

Question 17: (9.00 points)



We all live in a yellow submarine. It's yellow because we travel through the urinary system. To conserve fuel, we follow the natural flow of fluids. The order in which fluid moves through the structures of the body as it is formed in the kidney, and then excreted from the body ordinarily goes like this:

Matching pairs:

- first — glomerulus
- second — Bowman's capsule
- third — proximal tubule
- fourth — loop of Henle
- fifth — distal tubule
- sixth — collecting duct
- seventh — ureter
- eighth — bladder
- ninth — urethra

Question 18: (3.00 points)



We've taken our yellow submarine out for a cruise through the blood supply. Put these in the correct order that blood passes through them in the kidney.


Matching pairs:

- first — renal artery
- second — Choose match
- third — efferent arteriole
- fourth — peritubular capillaries
- renal artery
- efferent arteriole
- renal capillaries

Case Study

(multiple choice or short answer or paragraph style)

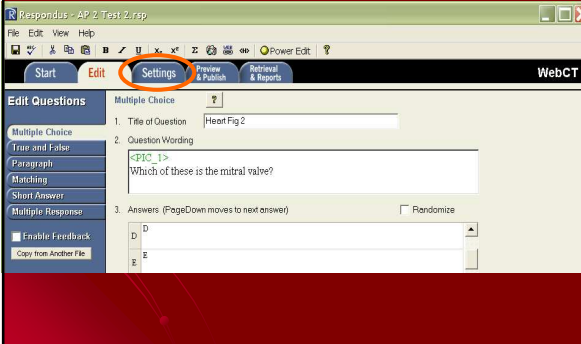
Question 33: (2.00 points)



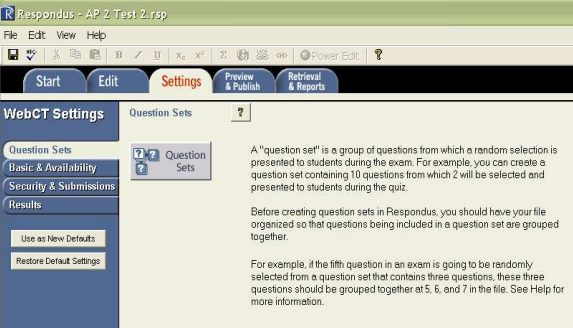
Aunt Lucy has a cardiovascular problem. Specifically, she has a blood pressure problem. Her doctor prescribes a diuretic drug. She is puzzled because she wonders how a drug that affects her kidneys can help her cardiovascular problem. You tell her that . . .

- the doctor is a quack and should be reported to the medical association
- the drug will increase her urine output, decreasing her blood volume, and thus decreasing her blood pressure to normal
- the drug will reduce her urine output, reducing her blood volume, and thus reducing her blood pressure to normal
- the drug will make her pee so much she won't care about her blood pressure anymore
- the drug will increase her urine output, increasing her blood volume, and thus increase her blood pressure to normal
- the drug will reduce her urine output, increasing her blood volume, and thus increasing her blood pressure to normal

Settings



Organize items into "question sets"



Question Sets

Before using this task, you should first place all questions in the desired order. See the online help for additional instructions and guidelines.

Total Items: 38 Points: 50.0

Add New Set Modify or Delete Existing Set

Enter the number of the FIRST question to be used in the set:

Enter the number of the LAST question to be used in the set:

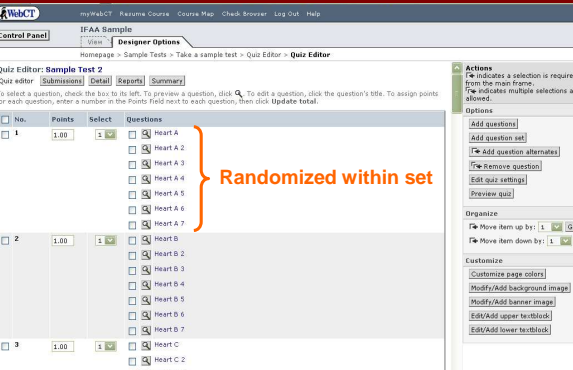
How many questions in this set should be randomly selected during the exam?
 All Select Number:

Enter the point value that should be used for questions in this set:

Save Changes Cancel Changes Delete Set Help

#	Set	Title	Format	Question Wording
1	A	Heart A	Short Answer	The human heart has two superior chambers called the <u> </u> and two inferior chambers.
2	A	Heart A.2	Short Answer	The human heart has two superior chambers. It also has two inferior chambers called <u> </u> .
3	A	Heart A.3	Short Answer	The human heart has a wider superior region called the <u> </u> and a lower pointed region.
4	A	Heart A.4	Short Answer	The human heart has a lower pointed region called the <u> </u> .
5	A	Heart A.5	Short Answer	The human heart has an interior dividing wall called the <u> </u> .
6	A	Heart A.6	Short Answer	The human heart is located in the <u> </u> (region) of the thoracic cavity.
7	A	Heart A.7	Short Answer	The human heart is normally located slightly <u> </u> (direction) of exact medial placement in th
8	B	Heart B	Multi-Choice	The interior lining of the heart's chambers is called the

Question sets in WebCT



Items must be answered one at a time

Basic & Availability

The quiz settings may be determined prior to publishing a file to WebCT Server (this step is optional). When a file is published to WebCT Server, the "Apply settings" option must be selected in order to implement the quiz settings.

Basic Settings

Question Titles: Show question titles (short names) when students view the quiz.

Question delivery: Deliver all the questions at once.
 Deliver questions one at a time, where questions can be revisited.

Quiz Duration: Disallow submission if time has expired.

Attempts Allowed: Separation, a minimum of

Each test may be taken 3 times

Randomization

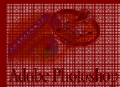
- Each item may have randomized choices
- Each question set may be randomized
- Each attempt by each student is different
- Each attempt by each student is unpredictable
- Literally thousands of different combinations!



Publish test to WebCT platform

Online tests

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Students view results online

- Immediate feedback
- Students may effectively prepare for their next attempt

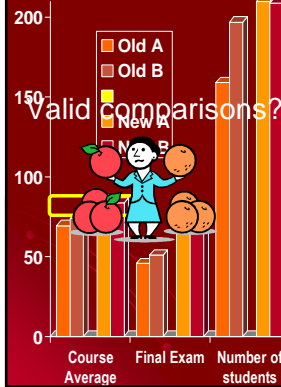
Automatic scoring may also be programmed to provide the correct answer or to provide additional feedback

Effectiveness

- What is the experience of the teacher?
- I found that the online approach is effective
 - Grades seemed to improve



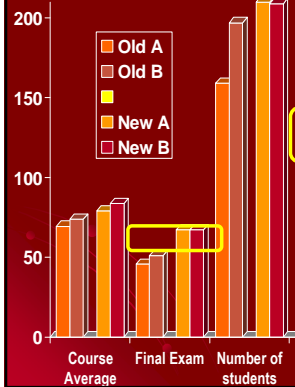
Grade improvement?



	Old way		New way	
Course Average	70	74	79	84
Final Exam	46	51	67	67
Number of students	159	197	210	209

Improvement in course average?

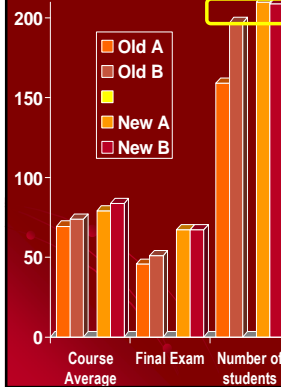
Grade improvement?



	Old way		New way	
Course Average	70	74	79	84
Final Exam	46	51	67	67
Number of students	159	197	210	209

Improvement in final exam scores?

Grade improvement?



	Old way		New way	
Course Average	70	74	79	84
Final Exam	46	51	67	67
Number of students	159	197	210	209

Improvement in student retention?

(all groups began each semester at 225)

Effectiveness

- What is the experience of the teacher?
- I found that the online approach is effective
 - Grades seemed to improve
 - Less class time spent on testing
- Less time grading tests

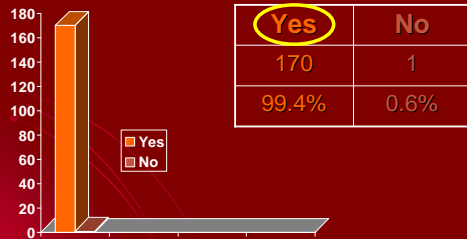


Effectiveness

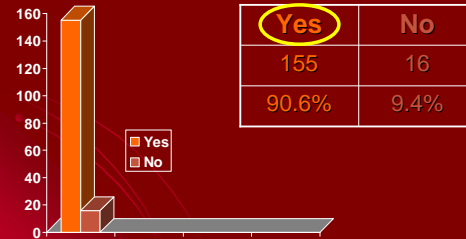
- What is the experience of students?
- Online survey of 171 students
- Found that the online approach is effective



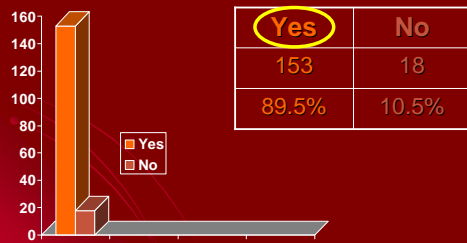
Do online tests make you better prepared for the exams?



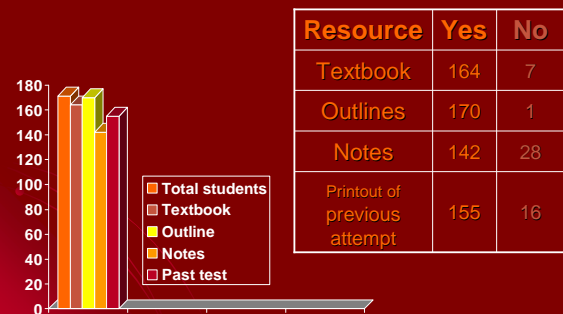
Do online tests help you learn the concepts of the course better?



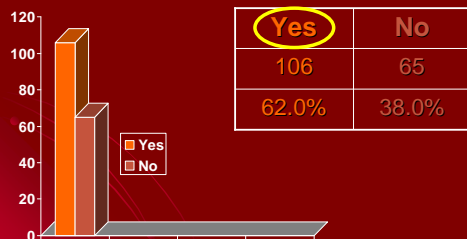
Do online tests help you prepare for practical exams in the lab?



What resources do you use while taking an online test?



Do online tests have a high level of difficulty?



Effective learning

- Students are challenged by online tests
- Students spend time exploring resources
 - Textbook/atlas
 - Course outlines
 - Class notes
 - Previous test attempts
- Students feel better prepared for exams
- Students feel they've learned more overall



Some practical points

- How do I apply this to an existing course?
 - Add online quizzes or tests?
 - Replace some in-class tests?
- Do I have an online testing platform & resources available?
 - SCC has Blackboard (WebCT) & Respondus
 - Your textbook publisher?
 - Do I need an add-on design program?

More practical points

- What software do I need?
 - Do I have an image editor?
 - Do I have a test design program? (Respondus)
- What skills do I need?
 - Can I edit an image?
 - Can I learn the testing software?
 - Can I manage the online platform?
 - What help is available to gain these skills and support them?

TESTING AS TEACHING

Part of the inhumanity of the computer is that, once it is competently programmed and working smoothly, it is completely honest.

Isaac Asimov

