

Collaborative Group Quizzes as a Novel Formative Assessment

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Why do we give quizzes?

- For students: frequent checking of their understanding
- For instructor: feedback to identify difficult concepts
- Formative assessment (but low stakes)
- Keep students on track (accountability)
- Other advantages of quizzes
 - ✓ reduce test anxiety
 - ✓ encourage regular studying
 - ✓ build knowledge gradually
 - ✓ help with long-term retention
 - ✓ quiz can be graded quickly; more immediate feedback



Problems with quizzes . . .

- **Students hate quizzes**
- **Source of anxiety for students**
- **Delayed posting of quiz solutions**
- **Grades are returned even later than that!**
- **Students do not view this as a learning experience**
 - ✓ **it's just another way to lose valuable grade points**



IF-AT

Immediate Feedback Assessment Technique



Epstein
Educational Enterprises

www.epsteineducation.com



CognaLearn

www.cognalearn.com/ifat

IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT®)

Name _____ Test # _____

Subject _____ Total _____

SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score
1.					
2.					
3.					
4.					
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SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score
1.			★		2
2.		★			4
3.	★				4
4.				★	2
5.		★			1
6.			★		4
7.	★				2
8.			★		4
9.			★		4
10.				★	2

unique code
for each form
for answer key

IF-AT Forms

IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT®)

Name Team #3 Test # 2

Subject _____ Total _____

SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score
1.				★	4
2.		★			2
3.	★				4
4.		★			1
5.					
6.					
7.					
8.					
9.					
10.					

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● Form# D008

IFAT – if at first you don't succeed... try, try again

By Professor David DiBattista
Department of Psychology

Although I have often used multiple-choice questions in my courses, it has always been a source of great concern to me that most students never take the time to review the multiple-choice items after they have received their graded exams. As a consequence, they never obtain confirmation that their correct answers were indeed correct, nor do they learn the correct answers for the items that they got wrong on the exam.

Recently however, I have introduced into my courses a new technique for multiple-choice testing that has some tremendous advantages. The Immediate Feedback Assessment Technique (IFAT) was developed by Professor Michael Epstein, of Rider University, in New Jersey.

The IFAT form is similar to the more well-known Scantron form that is used in multiple-choice testing. However, on the IFAT form, each of the four alternatives is covered by a waxy opaque coating similar to the coating that is used on scratch-and-win lottery tickets. For each question, the student selects the answer believed to be correct and scratches off the coating. If the choice is correct, a star appears in the box and the student goes on to the next item. If the student's choice is incorrect, a blank space appears. The student then reconsiders the options that remain and continues scratching boxes until the star is found. The

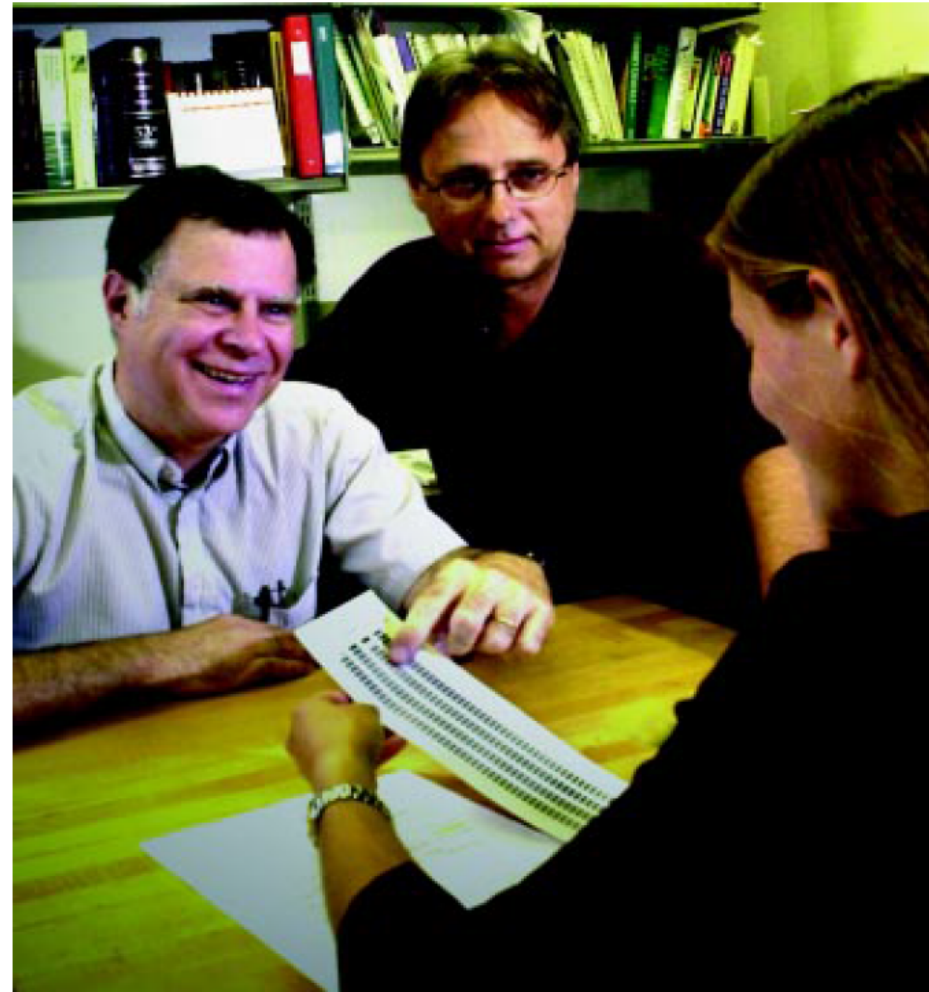
student's final choice is always the correct answer.

Students earn full marks for answering correctly on the first attempt, and progressively fewer marks for answering correctly on later attempts.

From a pedagogical perspective, the IFAT has several advantages over standard multiple-choice testing procedures. First, it provides immediate rather than delayed feedback for the test items. Second, this feedback is corrective, allowing students to learn the correct answer to every item before they leave the test situation. Third, because students can still earn marks even if their first attempt is not correct, they are rewarded for their proximate knowledge of the correct answer. Fourth, because students can determine their own test mark, they receive immediate feedback on their overall performance before leaving the test situation.

To determine whether students like the IFAT, Professor John Mitterer and I had students complete a brief questionnaire after using the IFAT on an examination. We found that the students strongly prefer the IFAT to the more commonly used Scantron form, with 83 per cent saying that they would like to be able to use the IFAT in all of their courses.

Students' responses indicate that they like IFAT for a variety of reasons, including the following: it is easy to use; it makes the multiple-choice portion of the test feel a bit like a game; it lets



Professors David DiBattista, left, and John Mitterer explain IFAT.

them know the right answer to every question; it allows them to learn more than the Scantron form; it allows them to get part marks on multiple-choice questions; and it lets them figure out their marks on the multiple-choice portion of the test.

Mike Epstein has recently

demonstrated that students do actually learn more when they use the IFAT instead of the Scantron on their multiple-choice tests. So students not only prefer the IFAT, but they also learn more when they use it — a winning combination!

IFAT – if at first you

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student's final correct answer.

Students earn points for each attempt, and progress for answering attempts.

From a pedagogical perspective, IFAT has several advantages over standard multiple-choice procedures. First, it allows students to review their answers rather than delay the test. Second, it allows students to correct their answers immediately, rather than waiting until the test is graded. Third, it allows students to learn from their mistakes even if their first answer is incorrect. Fourth, it allows students to be rewarded for their knowledge of the correct answer. Finally, it allows students to take their own test immediately, rather than waiting for the test to be graded.

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Mike

Delivering Group Quizzes

- quiz consists of 10 multiple-choice questions (5 pts each)
- **part 1** – students work on quiz individually (50 pts)
- **part 2** – rework quiz in groups using scratch-off (50 pts)
 - ◆ decreasing point values (5,3,1) for multiple attempts
- each part is about 10-15 minutes

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Subject _____ Total _____

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	A	B	C	D	Score
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2.		★			3
3.					
4.					
5.					
6.					
7.					
8.					

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Subject _____ Total _____

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1.				★	5
2.		★			3
3.	★				5
4.			★		5
5.	★				0
6.				★	3
7.		★			5
8.				★	1

Hints for creating effective quizzes

- Ask for **more than simple recall** of information
 - ✓ students must have something to think about and argue!
- Include distractors that **reflect common misconceptions**
 - ✓ this promotes rich discussions among group members
- Avoid domination of the group by one person
- Emphasize the **fun aspect** of the quiz
 - ✓ helps reduce stress



This Collaborative Learning stuff
is great when you have Alex
in your group!

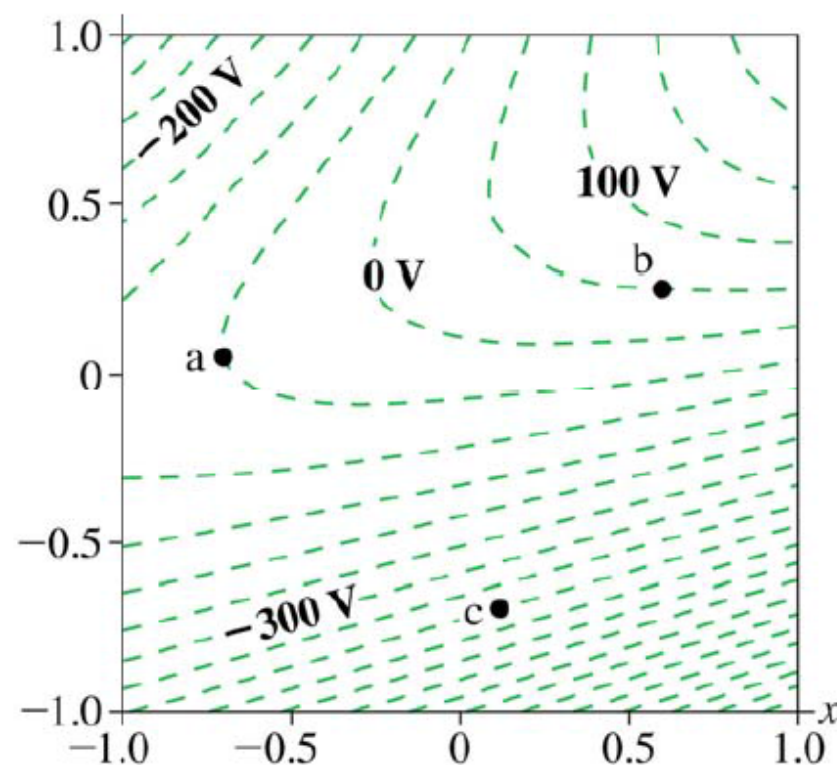
Oct. 1, 2015

1) In which case does the electric field at the dot have the largest magnitude?



2) The equipotentials in the figure are spaced by the same difference in potential, and several of the potential values are given. At which point is the magnitude of the electric field the greatest?

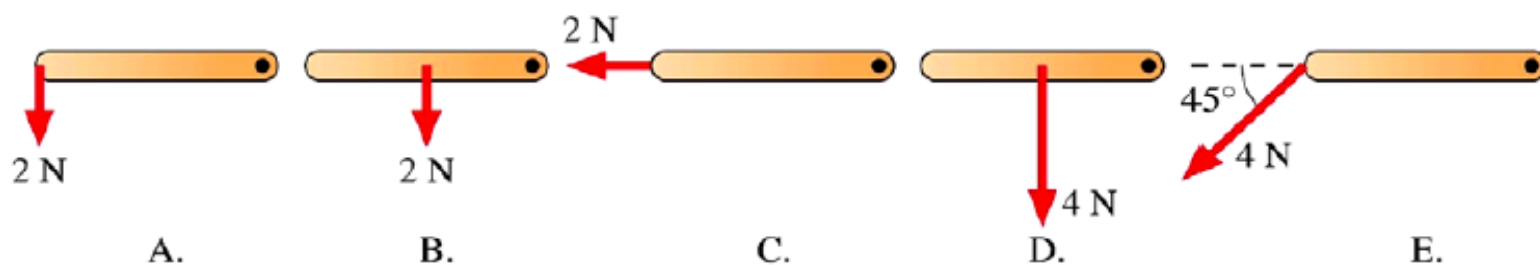
- A) point a B) point b C) point c
D) equal at all points



3) The direction of the electric field at point b is closest to which direction?

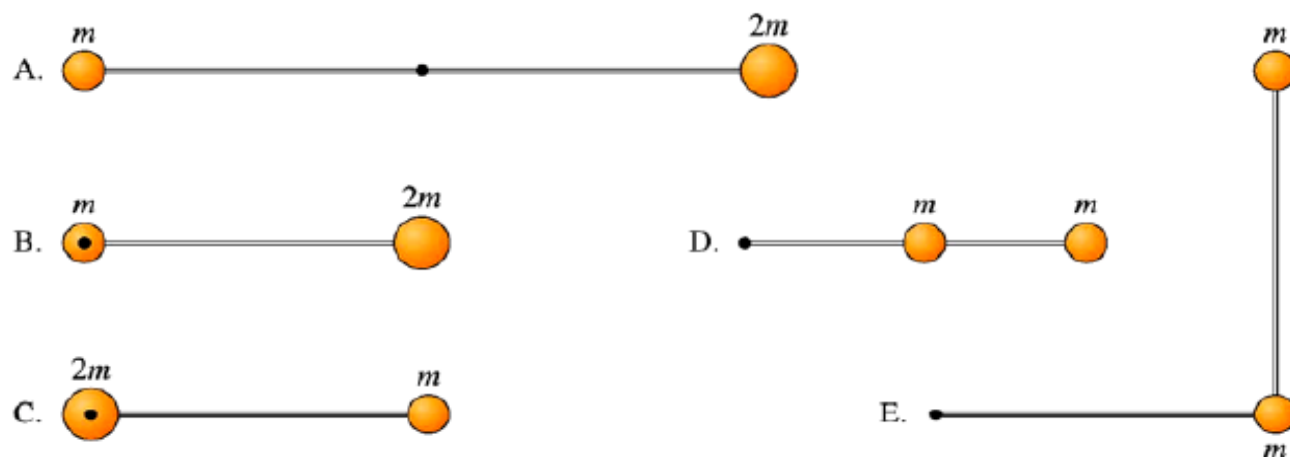
- A) right B) left C) up D) down

43) Forces of 2 N or 4 N are exerted on a hinged rod. Which of these torques is the largest?



44) Balls are connected by massless rods pivoted at the point indicated by the black dot. The rods are all the same length, except for rod A, which is twice as long. Which case (or cases) below have the greatest magnitude for the gravitational torque about the indicated pivot?

- A) rod A
- B) rods B and E
- C) rods B, D and E
- D) rods A and B
- E) rods B and D



45) Which one of the following objects is in static equilibrium?



Quiz #3

(41) Which of these contains the most energy per gram?

- a) TNT
- b) uranium**
- c) battery
- d) chocolate chip cookies
- e) gasoline

(42) Which of these is the least expensive, for the same energy delivered?

- a) gasoline
- b) electricity
- c) natural gas
- d) AAA battery
- e) coal**

(44) Roughly what percentage of the electrical energy used for incandescent light bulbs actually goes into producing light?

- a) over 75%
- b) about 45-55%
- c) about 20-30%
- d) about 5-10%**
- e) less than 2%

(45) Heat flow through empty space (no atoms present) occurs due to. . .

- a) conduction
- b) diffusion
- c) radiation**
- d) convection
- e) this is impossible

Outcomes

- **Students discuss questions very seriously**
 - ✓ they are very careful about their selections
 - ✓ possibly motivated by the fear of losing points!
- **Groups get loud!**
 - ✓ audible groans or cheers can be heard
- **Tendency for a competitive atmosphere**
 - ✓ bonus points for best group score
- **Improved scores in group part**
- **Seems to be fun!**



Name	Individual	Group	Total
Student 1 (group 1)	20	50	70
Student 2 (group 1)	40	50	90
Student 3 (group 1)	50	50	100
Student 1 (group 2)	20	37	57
Student 2 (group 2)	35	37	72
Student 3 (group 2)	35	37	72
Student 1 (group 3)	25	42	67
Student 2 (group 3)	25	42	67
Student 3 (group 3)	30	42	72
Student 1 (group 4)	25	48	73
Student 2 (group 4)	30	48	78
Student 3 (group 4)	35	48	83
Student 1 (group 5)	35	44	79
Student 2 (group 5)	40	44	84
Student 3 (group 5)	35	44	79

Group-Indiv.

+0

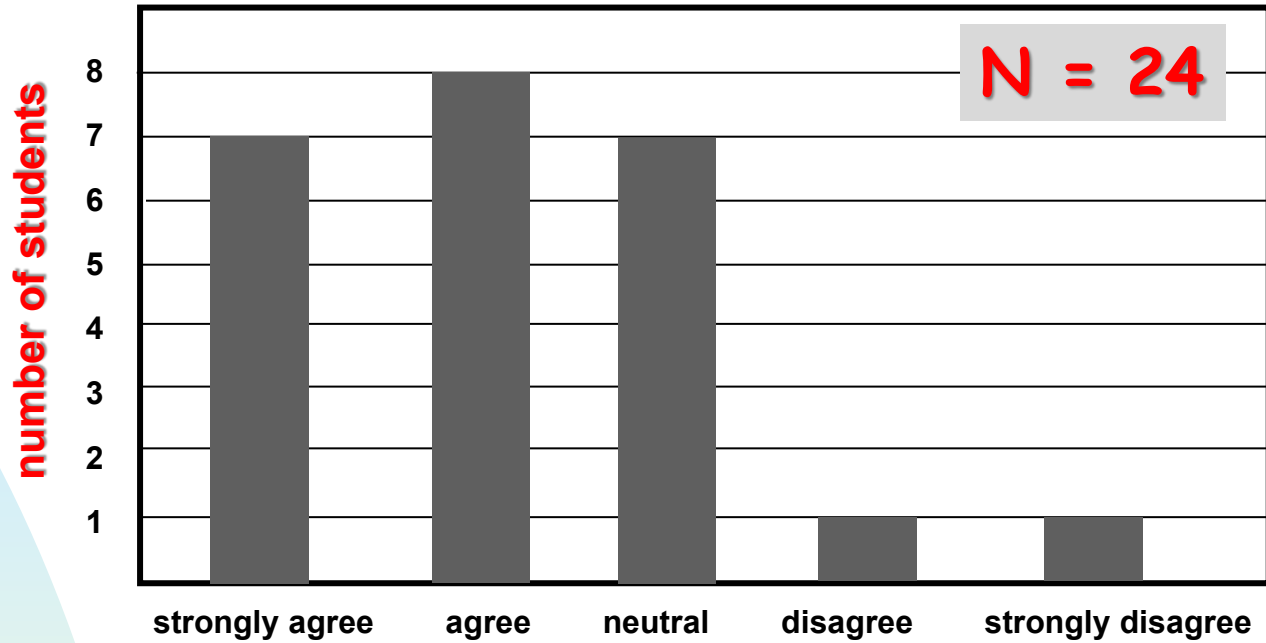
+2

+12

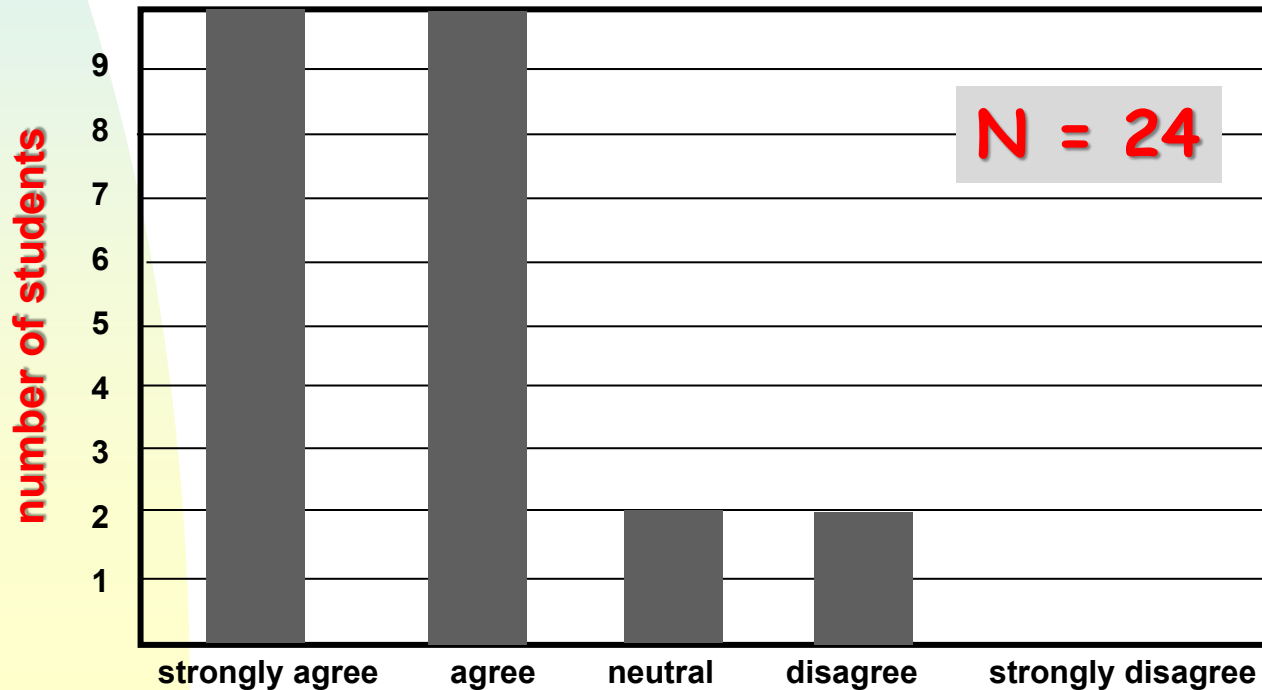
+13

+4

Useful
tool for
learning



Liked it as a
collaborative
activity



Student Comments (1)



- ◆ The group quiz was very helpful. My groupmates and I were able to go over answers we disagreed on, **work through the problems together, and come to a better understanding** of the material. **Also the scratch-off sheets are fun!**
- ◆ I thought it was a good way to see how much we knew before the test. It was also **nice to be able to discuss what we thought the answer was with others** to confirm or deny our answers.
- ◆ I have always **preferred a discussion-based learning approach as I find it to be less stressful**. Talking it out helps cement the knowledge a little bit better. **It was also exciting to scratch the card hoping for the right answer.** I strongly recommend this tool in the future.
- ◆ I liked being able to go through the questions and jog each other's memories. Or if **two people had different opinions, it was a good exercise to try and convince the other person.**

Student Comments (2)



- ◆ I absolutely loved the group quiz and thought that **it was very helpful to have help going over the questions.** **The scratch-off section also added an element of fun.**
- ◆ Group quiz is great. We can actually **discuss and work things out** as a group.
- ◆ I thought it was **more helpful than the individual quizzes** since we could share our answers and explain it to each other.
- ◆ I think **this was very subject to the person/group.** I would say that I got along and clicked with my group much more than average person.
- ◆ I think that this type of exercise is a good opportunity for members of a group to teach each other certain concepts, but it would probably be **less beneficial for groups in which all the members are struggling.**



- ◆ The group quiz is **only a good idea when some type of cohesion between group members exists**. If that isn't the case, a quiz like this could be extremely frustrating.
- ◆ **I did not personally find that the quiz helped my understanding** because I already understood the material. However, I made a silly mistake that I realized through discussing with my group.
- ◆ I like working with my groupmates, but **doing it on our own first wasn't very useful**. I'd rather only do a group quiz because a lot of people just get a poor grade out of the individual quiz and it doesn't help studying or confidence.
- ◆ **For some reason the group quiz made me really anxious**. I also don't think that you should have a quiz on past material if the exam is going to test your knowledge on that material anyway.
- ◆ I thought the **group quiz was not an efficient way of going about learning the application of material** we learn in class and applying them in a quiz format. Not only did it cause more confusion when discussed as a group, but also led to a worse outcome on the quiz.



Summary

- **Introduced group quizzes using IF-AT scratch-off forms**
 - ◆ student accountability ensured from **individual portion**
 - ◆ collaborative work during **group portion** helps improve scores and enhances learning
 - ◆ **this is similar to doing clicker questions, but in written form**
- **Basic feedback from students**
 - ◆ reviews are surprisingly **mixed**
 - ◆ results can depend heavily on **group dynamics**
- **Conclusions (my own...)**
 - ◆ group quiz is a good system, but needs to be **properly motivated**
 - ◆ instructor should **prepare students** for this novel experience
 - ◆ quiz must consist of **well-crafted questions** for maximum effect