

THE IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF-AT) IN A LARGE ENROLMENT INTRODUCTORY ORGANIC CHEMISTRY COURSE



Stephen L. MacNeil
Department of Chemistry
Wilfrid Laurier University



PRESENTATION OUTLINE

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- INTRODUCTION
 - CH203
 - IF-AT
- RESULTS
 - effect of marking scheme on grades
 - effect on information retention
 - student reaction
- CONCLUSIONS

INTRODUCTION TO CH203

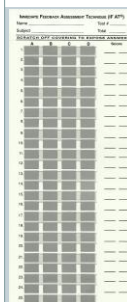
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- ~200 enrolled in winter term of 2011
- Faculty of Science service course
- prior to 2011 → primarily lecture based
- starting in 2011 → “blended” approach
- CH203 assessment scheme, 2011
 - in-class clicker questions 10%
 - on-line homework 10%
 - midterm test 20%
 - final exam 35%
 - laboratory work 25%

NEED FOR FORMATIVE ASSESSMENT

THE IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF-AT)

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- “answer until correct” response card for multiple choice tests
- developed by Drs. M. L. and B. B. Epstein, Rider University
 - fairness of standard multiple choice tests
 - benefit of immediate feedback to learning
 - last response given is the one typically learned

epsteineducation.com

WHAT ARE THE DRAWBACKS OF USING IF-AT?

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- no commercially available optical scanning device
- item analysis laborious and time-consuming
- may increase risk that cheating will occur
- test construction takes more time
- IF-AT forms are more expensive than Scantron

IF-AT IMPLEMENTATION

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- Midterm Test (20%)
 - 15 multiple choice questions 60%
 - 1 scratch = 2pts
 - 2 scratches = 1pt
 - 3 scratches = 0.5pt
 - Short/Descriptive Answer Section 40%
- Final Exam (35%)
 - 50 multiple choice questions ~66%
 - 1 scratch = 1pts
 - 2 scratches = 0.5pt
 - 3 scratches = 0.25pt
 - Short/Descriptive Answer Section ~33%

IF-AT IN CH203 - QUESTIONS

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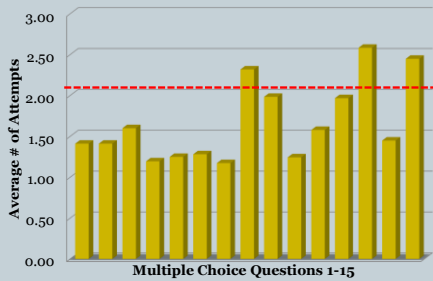
- What is the effect of IF-AT marking scheme on grades?
- Does IF-AT affect information retention?
- What do *my* students think of IF-AT?

WHAT IS THE EFFECT OF IF-AT MARKING SCHEME ON GRADES?

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AVERAGE NUMBER OF ATTEMPTS – MIDTERM TEST

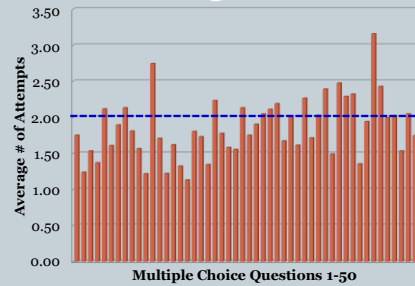
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12 of 15 questions required, *on average*, 1-2 attempts

AVERAGE NUMBER OF ATTEMPTS – FINAL EXAM

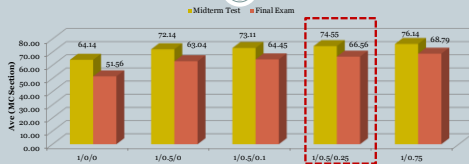
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34 of 50 questions required, *on average*, 1-2 attempts

EFFECT OF MARKING SCHEME ON GRADES

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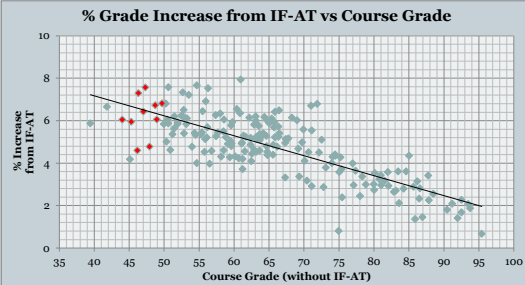


Marking Scheme	Effect on MC Section, % Midterm	Effect on MC Section, % Final	Overall Effect on Course, % Midterm	Overall Effect on Course, % Final	Overall Effect on Course, % Total
1/0/0	+8.00	+11.49	+0.96	+2.68	+3.64
1/0.5/0.1	+8.96	+12.89	+1.08	+3.01	+4.09
1/0.5/0.25	+10.41	+15.00	+1.25	+3.50	+4.75
1/0.75	+12.00	+17.23	+1.44	+4.02	+5.46

IF-AT resulted in a ~5% increase in the course average

WHO BENEFITS THE MOST FROM IF-AT?

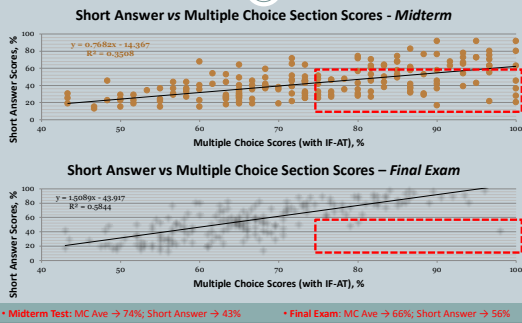
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pass rate without IF-AT = 176/189 = 93%; pass rate with IF-AT = 186/189 = 98%

ARE SOME BENEFITING MORE THAN THEY SHOULD?

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SOME FEEDBACK FROM THE END-OF-TERM SURVEY

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“It is a great idea, however use only in spaced out environments. Rooms like BA201 and N1001 are too easy to cheat...it is discouraging hearing how many people cheat on these IF-AT cards...I think its fair during exam times when everyone is spaced out at the AC, there will be no cheating and it will be completely fair.”

DOES IF-AT AFFECT INFORMATION RETENTION?

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COMPARISON OF COMMON MULTIPLE CHOICE QUESTIONS – MIDTERM VS FINAL

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	Midterm Test		Final Exam			
	% correct	ave # attempts	% correct	ave # attempts	mistakes corrected	new mistakes
1	88	1.19	82	1.23	19/22 (86%)	30/163 (18%)
2	79	1.28	74	1.36	23/38 (61%)	34/147 (20%)
3	42	2.32	52	1.88	44/106 (42%)	28/79 (35%)
4	82	1.24	84	1.22	24/34 (71%)	20/151 (13%)
5	71	1.58	64	1.71	23/53 (43%)	37/132 (28%)

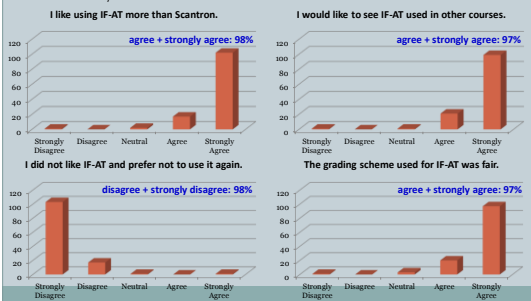
WHAT DO STUDENTS THINK OF IF-AT?

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END-OF-TERM SURVEY RESULTS

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• overall like of / dislike for IF-AT

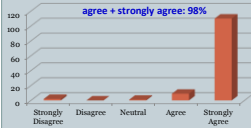


END-OF-TERM SURVEY RESULTS

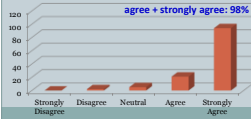
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possible reasons for liking IF-AT

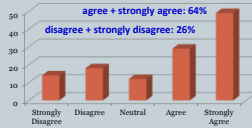
I like that IF-AT allows me to get part marks.



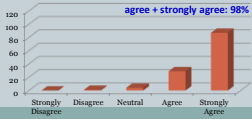
I like that IF-AT lets me know correct answers.



Even without part marks, I'd like to use IF-AT.



I like that IF-AT lets me figure out my mark.

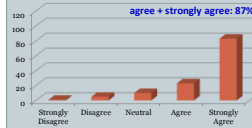


END-OF-TERM SURVEY RESULTS

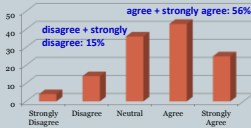
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possible reasons for liking IF-AT

IF-AT better reflects my level of understanding.



IF-AT makes the test feel a bit like a game.



END-OF-TERM SURVEY RESULTS

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possible reasons for disliking IF-AT

The IF-AT form is confusing and difficult to use.



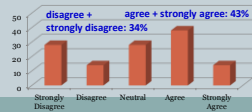
I don't like that the IF-AT doesn't allow me to change answers.



Getting immediate feedback interfered with my test performance.



It takes more time to complete the multiple choice section using IF-AT.

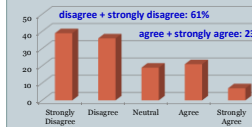


END-OF-TERM SURVEY RESULTS

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negative effects of IF-AT?

Using IF-AT made me feel more anxious compared to Scantron multiple choice tests.



Choosing an incorrect answer distracted me and made it harder to concentrate on the test.

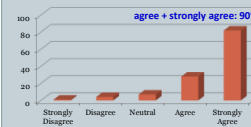


END-OF-TERM SURVEY RESULTS

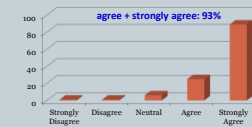
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perceived learning

Knowing right away when I was wrong helped me to correct misconceptions.



I learn more using IF-AT than using Scantron for multiple choice tests.

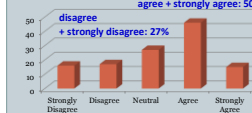


END-OF-TERM SURVEY RESULTS

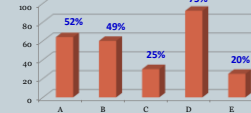
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new test-taking strategies?

IF-AT changed my typical strategy for completing multiple choice tests.



Which of the following strategies did you use?



- A - I would work through multiple-choice questions recording answers on the test but wait until late in the test period to scratch the IF-AT card.
- B - I would scratch the IF-AT card for questions for which I was confident in my answer, but postpone scratching the IF-AT card for questions I was unsure about.
- C - I would work through the multiple-choice questions in order, choosing an answer and immediately scratching the IF-AT card to see if I was correct.
- D - When my first answer was wrong, I would immediately reconsider the question and answer again.
- E - When my first answer was wrong, I would move on to the next question and wait till later to reconsider questions that were answered incorrectly.

CONCLUSIONS

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- IF-AT allows awarding of part marks for multiple choice tests without unreasonably inflating course grades
- IF-AT *likely* improves information retention and overall learning
- students are big proponents of IF-AT
 - part marks
 - perceived learning

OVERALL IMPRESSIONS

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"I experienced a lot of stress immediately before each test. It was sometimes distracting that I did not get the right answers..."

"Helpful for students as your marks increase but definitely more stressful. It is easy to get frustrated if you keep getting wrong answers..."

"It was a difficult course to improve. It also accurately reflected my performance in the course."

"I liked being able to have part marks on the MCQs. It increased my stress levels every time I answered one wrong. I made a lot of mistakes right on making me more anxious overall." ... while being tested."