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

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

INTRODUCTION TO CH203

- ~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

WHAT ARE THE DRAWBACKS OF USING IF-AT?

- 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

THE IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF-AT)

- “answer until correct” response card for multiple choice tests
- developed by Drs. M. L. and 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

IF-AT IMPLEMENTATION

- 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

- 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?

AVERAGE NUMBER OF ATTEMPTS – MIDTERM TEST

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

AVERAGE NUMBER OF ATTEMPTS – FINAL EXAM

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

EFFECT OF MARKING SCHEME ON GRADES

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

WHO BENEFITS THE MOST FROM IF-AT?

pass rate without IF-AT = 176/189 = 93%; pass rate with IF-AT = 186/189 = 98%
ARE SOME BENEFITING MORE THAN THEY SHOULD?

Short Answer vs Multiple Choice Section Scores - Midterm

Short Answer vs Multiple Choice Section Scores - Final Exam

SOME FEEDBACK FROM THE END-OF-TERM SURVEY

“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?

COMPARISON OF COMMON MULTIPLE CHOICE QUESTIONS – MIDTERM VS FINAL

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<th>Midterm Test</th>
<th>Final Exam</th>
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WHAT DO STUDENTS THINK OF IF-AT?

END-OF-TERM SURVEY RESULTS

I like using IF-AT more than Scantron.

I would like to see IF-AT used in other courses.

I did not like IF-AT and prefer not to use it again.

The grading scheme used for IF-AT was fair.

agree + strongly agree: 98%  
strongly disagree: 98%  
agree: 43%  
strongly agree: 83%
**End-of-term survey results**

### Possible reasons for liking IF-AT

- I like that IF-AT allows me to get part marks.
- Even without part marks, I'd like to use IF-AT.

### Possible reasons for disliking IF-AT

- The IF-AT form is confusing and difficult to use.
- Getting immediate feedback interfered with my learning.

### 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.

### 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.

### New test-taking strategies?

- 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

- 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

"I experienced a lot of stress immediately before each test used in the course. Very distracting and stressful for me."
"Helpful for students as your marks increase but definitely wrong answers..."
"It was sometimes distracting that I did not get the right more stressful. It is easy to get frustrated if you keep getting wrong answers..."
"Helpful for students as your marks increase but definitely wrong answers..."
"Other stressful. It is easy to get frustrated if you keep getting wrong answers..."
"I liked being able to have part marks on the X-axis..."
"I liked being able to have part marks as the 3rd error on the Y-axis..."
"I liked being able to have part marks on my stress levels every time I answered one wrong increased my stress levels overall..."