

Enhancing Students' Learning: Instant Feedback Cards

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ABSTRACT

This study illustrates an active learning approach using instant feedback cards in the first course in accounting. The objectives of this study are to (1) describe instant feedback cards and (2) show how this tool, when used in an active learning environment, can enhance learning. We examined whether students exposed to immediate feedback scratch-off cards in an active learning environment would perform better on subsequent objective exams than students in a traditional lecture review setting. Students enjoyed the active learning aspect of working in groups, debating answers, and then using the scratch-off cards to select the correct multiple-choice responses. Scratch-off cards are a tool that educators may find very useful to enhance their lectures and add a component of active learning into their courses.

Keywords: Active Learning; Instant Feedback, Scratch-Off Cards; IF-AT Cards

INTRODUCTION

*A*ccounting and business school educators are constantly faced with the challenge of motivating students. How do we excite students? How do we get them involved in the learning process? Educational experts assert that we need to engage students in active learning. Active learning is defined as students participating in exercises rather than just being passive learners listening to lectures (Bonwell & Eison, 1991; Killian & Brandon, 2009). Learning is enriched when students are highly motivated to actively engage in learning activities.

With respect to motivation, it is interesting to see the incentive power of game pieces to change consumer behavior. Students, often categorized as millennial students, may have encountered games of chance in their young lifetimes. Millennial students are categorized as those students born in 1982 to 2004 (Strauss & Howe, 1992, Hoover, 2009). Today's millennial students often want instant gratification and feedback (Fogarty, 2008). As stated by Fogarty, p. 369, "The generational category is upon educators with increased ferocity, since Millennials now make up the entirety of our traditional undergraduate student population." The following vignette drives home this point:

For lunch my young daughter surprisingly picked Burger King® rather than her favorite McDonalds® restaurant. Why the sudden change in venue I asked? The answer was that Burger King® was offering its customers special game pieces. The game pieces allowed customers to scratch-off boxes to win prizes. Scratch-off the correct box and one could win an expensive new video gaming system, screamed the promotional materials. That day we won French fries.

If scratch-off game pieces can motivate a person's lunch preferences, could such tools be helpful in promoting active learning in an academic setting? Commercially produced scratch-off cards that allow students to select answers to objective questions are now readily available at a nominal cost. We would expect students to enjoy a new novelty item, such as scratch-off cards, and we wanted demonstrate how this tool could be used in the classroom to facilitate an active learning environment.

This study examined the impact of scratch-off cards to facilitate students' learning in the introductory accounting class. We obtained scratch-off cards from our campus faculty development center. The development

center obtained the cards from Epstein Educational Enterprises, a company based in Cincinnati, Ohio. The scratch-off cards are called IF-AT cards which stands for “Immediate Feedback Assessment Technique” and are available at a minimal cost from the Epstein Educational Company (Epstein, 2013). It should be noted that the authors of this paper are independent of the Epstein Education Company. We have no association or connection to this company.

Like computer forms that educators use for grading multiple-choice questions, the IF-AT cards allow students to select a multiple-choice answer that is covered by a waxy opaque coating similar to the coating that is used on scratch-and-win lottery tickets. Students select the answer they think to be correct and scratch-off the coating. If the selection is correct, a star appears in the box and students go on to the next item. If the choice is incorrect, a blank space appears. Should they get a blank space, students can then reconsider the options that remain and continue to scratch-off the boxes until the star is found (DiBattista, 2001). Exhibit 1 shows an example of a scratch-off card.

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.	■	■	■	■	_____
5.	■	■	■	■	_____
6.	■	■	■	■	_____
7.	■	■	■	■	_____
8.	■	■	■	■	_____

Exhibit 1

To illustrate, assume that the first question asks the following: “What accounting constraint refers to the tendency of accountants to resolve uncertainty in a way least likely to overstate assets and net income? A. Comparability; B. Conservatism; C. Materiality; D. Consistency.” If students answer the correct answer (B), then the students would scratch-off the protective coating of the scratch-off card, and know that the answer is correct since a star would appear in the box. If they answer wrong, say (D), the box would be blank.

The designers affiliated with producing scratch-off cards have asserted that the answer-until-correct procedure may allow students to learn from their mistakes in a real-time learning environment (Epstein, et al. 2002; Epstein & Brosvic, 2002; Epstein et al., 2010). The correction of initially inaccurate responses aids the cognitive process in understanding the correct response. Students’ reactions to using IF-AT cards have been very positive (DiBattista et al., 2004). Use of this tool has grown in popularity in promoting active learning in many disciplines. For example, IF-AT cards have been used in courses dealing with undergraduate nursing (Peck et al., 2013), athletic training (Bowman & Laurent, 2011), pharmacy (Persky & Pollack, 2008), calculus-based physics (Slepkov, 2013) and strategic human resources management (Blackman, 2012).

In the studies involving nursing, calculus-based physics, and strategic human resources, the authors found that that the IF-AT format was significantly more effective than the traditional testing in enhancing learning. For

example, Slepkov (2013) used the IF-AT cards in a one-term calculus-based course titled “Introductory Physics II – Electricity and Magnetism” offered at a Canadian university with 60 students enrolled at the beginning of the course. He writes, “*The IF-AT was designed as a valuable tool for standardized and classroom testing in the social sciences, but because it enables the practical integration of testlet items, it becomes uniquely attractive in physics education where conceptual scaffolding and integration are keys to developing and assessing physics synthesis and analysis skills*”(Slepkov, 2013, p. 791). Slepkov (2013, p. 782) further states “*as has been found in other disciplines, the reaction of undergraduate physics students to the IF-AT is highly positive, further motivating its expanded use in formal classroom assessments.*”

In contrast, in the athletic and pharmacy studies, the researchers found that student scores were equivalent to those students not using the IF-AT format. However, Bowman & Laurent’s (2011) sample size consisted of only 23 students and the small sample size may have contributed to the researchers not finding statistically significant results. Perskey & Pollack (2008) employed a much larger sample size of students (i.e., 144 in the treatment group) in their pharmacokinetics courses. The researchers compared scores from the 2006-2007 academic year (treatment group using IF-AT cards) to those from students from the 2005-2006 academic year (control group with traditional exam format). They concluded that the grades of students who were given the immediate feedback examination format were equivalent to those of students in the previous year. Nevertheless, the researchers asserted that “*overall, students reported that they preferred the immediate feedback format, and that they preferred it over almost every other testing method to which they had been exposed previously*” (Perskey & Pollack, 2008, p. 6)

METHOD

An Experiment with IF-AT Cards

To see if the scratch-off cards could be effectively used to enhance learning for students in introductory accounting, an experiment was conducted at a major public university located in the southwest United States. The university has an enrollment of over 19,000 students and the Business school, which is an AACSB (*Association to Advance Collegiate Schools of Business*) accredited school has an enrollment of 2,250. Two instructors, each teaching multiple sections of the introductory course, participated in a trial in which some sections were given scratch-off objective questions for study as review material for midterm exams and other sections were given access to the same review questions, but no scratch-off cards. The selection of which sections received the scratch-off cards and which sections did not was done on a random basis. The students were almost all “traditional students” (e.g. 18 to 20 year olds), with about an equal split between males and females.

Students in the “treatment” sections, working independently, completed a 20-item multiple choice test. They were then randomly assigned into teams consisting of 4 or 5 students and were given the task of determining a consensus answer for each question. Groups of students worked through a scratch-off card to ascertain whether their consensus answer was correct. We used the 25-question IF-AT scratch-off form. The last five questions on the form were not used. There was no grade associated with this exercise; however, to make the exercise interesting and to boost team rivalry we sometimes posted the scores of the teams on the white board. Providing such feedback added a more competitive element to the exercise. Teams that correctly answered all 20 objective questions would earn the top score of zero, whereas teams that had to scratch-off extra boxes before reaching the correct answers would be assigned a score based on the number of extra boxes that had to be scratched-off (e.g., scratch-off six extra boxes and the team score would be six). One hundred students engaged in the scratch-off review exercises. It took about 30 minutes of class time to complete this active learning exercise.

We also taught 73 students in two other introductory principle sections in which students did not participate in the scratch-off experiment and who spent the extra time listening to the instructors conduct review sessions. These students served as our “control” group. Like their counterparts in the treatment sections, they had full access to the pre-exam review objective questions along with answers to those questions. Therefore, our hypothesis, as stated in the alternative form, is:

H₁: Students who participate using the active learning exercise employing scratch-off cards will perform better on the objective portion of the mid-term exams than students who do not participate in such exercises using scratch-off cards.

Results of the IF-AT Experiment

We measured the responses on two mid-term exams from 173 students; 100 students in treatment sections and another 73 in control sections. Before comparing how well the students did on the multiple-choice sections of the mid-term exams, we obtained from students' records the cumulative grade point average (GPA) of the students. The mean GPAs were 2.92 and 2.80 with a standard deviation of 0.65 and 0.72 for the treatment and control groups, respectively. The mean GPA difference between the two groups was not significant ($p = 0.1037$).

The scratch-off cards were used as reviews prior to two midterm exams. The midterm exams contained objective questions worth 100 points. Students' results are listed in Table 1.

Table 1: Exam Performance

	Treatment classes	Control classes
Students	N= 100	N=73
Mean Scores	145.23	133.11
Standard Deviation	26.35	23.44
T-Test on H ₁	.00103	

Our results from Table 1 indicate that there was a positive learning experience from using the scratch-off cards. The mean difference in mid-term scores of the two groups was over 12 points and the difference was significant ($p = 0.0013$, Table 1). The educational literature on team-based studies suggests that the active learning environment is important to enhance learning (Hillier & Dunn-Jensen, 2013; Andersen et al., 2011; Killian & Brandon, 2009).

While IF-AT cards have been used for testing purposes in other scholarly disciplines there has been very little mention about these cards and how they can be used in business school education. Blackman (2012) was the first study to report using the cards in the business discipline. She used IF-AT cards in her second year undergraduate Human Resource Management students at an Australian university and she found that the cards helped to facilitate positive team interactions. Our study is the first to describe using IF-AT cards as a review tool for students and the first to describe using them for business students in an American university.

The psychological effect of using immediate feedback cards is similar to the long-standing use of clickers in the classroom. Studies have shown that immediate feedback and the use of clickers improve learning (Roush & Song, 2013; Yourstone, et al., 2008; Kenwright, 2009; Martyn, 2007). A psychological difference between using polling software and immediate feedback cards is that instructors have the option to have students form into groups to reach consensus answers. In addition, more costly special equipment is needed for clickers whereas instant feedback cards are relatively inexpensive and easy to use. DiBattista (2005) provides implementation tips for educators regarding the use of immediate feedback assessment techniques.

Research has shown that immediate feedback has a significant impact on student outcomes (Dihoff, et al. 2012; Butler, et al., 2007; Epstein, 2010; Smith et al., 2009; Smith, 2013). For example, Smith et al. (2009) found that peer discussion enhances understanding, even when none of the students in a discussion group originally knows the correct answer. Professor Larry Michaelsen, a leading scholar in the area of management and team-based learning, lists using IF-AT scratch-off answer sheets under his "best practice" approach for providing feedback on team decisions (Sweet & Michaelsen, 2012, p. 23).

Students' Comments on IF-AT Cards

We asked students to provide us some written comments, either positive or negative, regarding the IF-AT cards. Students liked using the IF-AT cards. Below is a subset of the comments that appeared on the end-of-the semester course evaluation forms. All the comments were positive; we received no negative comments.

The practice problems that we checked with the scratch card were very useful the week of the test. It helped give me an opportunity to see where I was truly struggling.

I liked the review with the groups. The scratchers were a great idea and you should continue that. It was helpful because you got to work in groups to figure out the right answer. If you didn't know the right answer and someone in your group did, they would show you how to do it.

The in class exercises that we did in groups with the little sheet of paper that we had to scratch off our answer helped me the most.

The choice card is very interesting and very helpful. I love it.

Loved the multiple choice group exercise before the exams. The scratchers make the multiple choice questions a lot more fun!

I liked working in groups and doing the scratch off quiz. It told you how much you still needed to study for the test.

LIMITATIONS AND CONCLUSIONS

There are some limitations to using IF-AT cards. First, unlike computerized scoring sheets, students' cannot second guess their answers or change their answers once the waxy opaque coating has been scratched-off. Second, scratch-off cards cannot be computer graded. The scores have to be computed manually.

Another limitation of this study is that we did not control for differences in the accounting ability between the sections. It is conceivable that "more advanced" accounting students may have signed up for the same sections of the course. However, the selection of sections for which we designated as "control sections" and which we designated as "treatment sections" was done on a random basis. In addition, this was a beginning accounting course and therefore we did not expect students to have much accounting knowledge upon entering the program.

The accounting and business literature recognizes that more active, student-centered learning helps students to achieve higher-level competencies (Killian & Brandon, 2009). Educators can make substantial course improvements by including more "doing" experiences and reducing the traditional lecture and discussion (Fink, 2003). To promote learning, students need to be engaged and involved (Wilson, 2004). The use of immediate feedback scratch-off cards is one way to get students participating and engrossed in active learning.

The use of immediate feedback cards facilitates an environment in which students' peers assist in the learning process and allow students to learn from their mistakes by immediately displaying the correct answers. Active involvement in the assessment process seems to play a crucial role by providing an opportunity for students to determine where they are struggling. Students are then able to see how much they still need to study for the exams. Immediate feedback scratch-off cards have been used in other academic disciplines and educators have found this instrument to be beneficial. Accounting and business educators may find this tool to be very useful for enhancing their lectures and adding active learning to their students' academic experience.

AUTHOR INFORMATION

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NOTES