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Enhancing Learning via the Internet: The Internet Agricultural Bank Simulation Game

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Enhancing Learning via the Internet: The Internet Agricultural Bank Simulation Game

www.agbanksim.org

The Oklahoma Agricultural Bank Simulation Game (Ag Bank Sim) is a software based, experiential learning tool through which participants historically have learned key financial, economic, and banking lessons (Petermann, Mapp, and Love 1998). The game offers a "real world" experience in which management decisions affect institutions interacting in a geographic market, enhancing understanding of the complex, competitive environment within which commercial banks operate.

A new Internet version of the game has been developed, allowing participants to play Ag Bank Sim in a virtual environment. While having an experiential game on the Internet is appealing, questions arise regarding the effectiveness of this version in improving participants understanding of key concepts. The Internet version has been pilot tested with undergraduate students at Louisiana State University (LSU) and Oklahoma State University (OSU) in the spring 2010 semester.

Objectives

- Introduce new audiences to Ag Bank Sim and its features
- Assess whether the Internet version of the game enhances learning of key bank management concepts

Playing Ag Bank Sim

Ag Bank Sim is introduced to participants using a combination of lecture and website demonstration. The lecture emphasizes decisions that can be made, the environment in which they are made and the potential outcomes of different strategies. Participants are assigned to a bank management team in a county containing three competing banks that initially are equal in all aspects. Teams make multiple decisions within a time period. Figure 1 is a screenshot of the decision form.

Figure 1. Online Decision Form for Ag Bank Sim

Students make the decisions listed in Figure 1 four times while playing Ag Bank Sim. Making these decisions reinforces fundamental concepts taught in class, for example, how a savings account interest rate decision impacts deposits in a competitive financial market. Participants receive reports on bank performance and changes in market share each period to aid them in making decisions for the subsequent period. At the conclusion of the game, teams are recognized for their performance in a variety of categories (Figure 2).

Figure 2. Online Performance Report Form for Ag Bank Sim

Computer Based Simulation

The literature suggests that computer simulation learning is active learning and more effective than passive learning methods (see, for example, Arellano and Hine 2001; Boehlje and Eidman 1978; Kagan, Mayo, and Stout 1995; Villalobos 2007; Arias-Aranda 2007). Research shows that simulation:

- is effective in reinforcing classroom concepts;
- entwines theory with practice and lets students be responsible for their decisions;
- allows students to learn from and analyze the results of their own strategies and decisions;
- stimulates students interest in how the system is working which in turn creates learning, as opposed to memorizing facts to pass a test;
- can reinforce concepts through circular learning: test new scenarios via a concrete experience, reflect upon what happened in the game, then repeat the process;
- forces students to think non-linearly, which is how the mind operates, as opposed to linear textbook (lecture) learning.

Results and Discussion

An undergraduate capstone strategy class at LSU and an undergraduate agricultural finance class at OSU played the game independently this spring (the potential exists for intercollegiate competition). Instructors noted that the competitive nature of the game enhanced interest in playing and learning. At LSU, the instructors played the game with students, causing great curiosity among students as to how well they were doing relative to the instructors. Instructors who have used both the traditional game and the Internet Ag Bank Sim reported a reduction in time spent managing the game of up to 30%. Also, students learn results of their decisions soon after the decision-making deadline via an e-mail so are not forced to wait until the next class period for results.

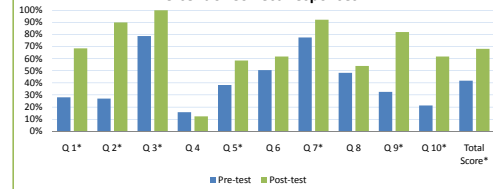
Pre- and post-tests were given to students to measure their understanding of banking principles: agricultural bank's primary source of loanable funds, factors that affect loan supply and demand, factors that affect the after-tax returns on investments, etc. Figure 3 contains the 10 questions used in the test.

Figure 3. Pre and Post Test Questions (correct answers in bold)

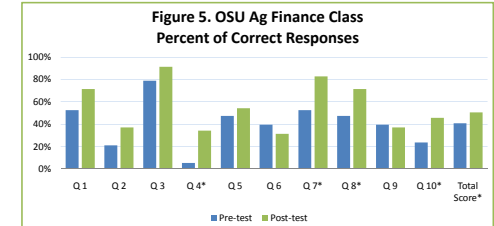
- Q1. An agricultural bank's primary source of loanable funds are: **a. Fed funds** b. Deposits c. Investments d. Cash
- Q2. Assuming the bank's marginal income tax rate is 35%, the equivalent taxable yield for a tax-free municipal bond that pays 4.75 percent interest is: **a. 13.57%** b. 7.31% c. 4.75% d. 3.09%
- Q3. Employee salaries, number of loan officers, interest rates charged on deposits, and interest rates charged for loans affect net income of a bank. **a. True** b. False
- Q4. Which of the following will not affect the amount of new agricultural production loans, that a bank could possibly make: **a. Setting the amount of desired agricultural production loans to the maximum allowable amount** b. The decisions made by other banks in the county c. Estimates on agricultural profitability d. Agricultural production loan charge offs (loan losses)
- Q5. For a bank, sources of revenue include Certificates of Deposit, Money Market Deposit Accounts, Negotiable Orders of Withdrawal, and Savings Accounts. **a. True** b. False
- Q6. When a bank does not have enough cash to meet operating needs and Federal Reserve requirements on deposits, Federal Funds are sold. **a. True** b. False
- Q7. The difference between the loan interest rate you charge customers on loans and the deposit rate you pay customers is essentially the bank's: **a. Return on assets** b. A measure of liquidity c. Profit margin d. A measure of solvency
- Q8. In order to avoid missing a revenue generating opportunity, it is important for a bank management team to do what at the beginning of every earnings period (monthly, quarterly, biannual, annual, etc.)? **a. Estimate funds available for loans and investments** b. Calculate the return on assets of all competitors c. Make sure the bank has cash funds in excess of the Federal Reserve requirement d. Write off all bad loans from the previous period.
- Q9. When cash on hand exceeds the Federal Reserve requirement for a bank, no revenue is earned on this excess cash. **a. True** b. False
- Q10. Which of the following ratios is used by the banking industry as a measure of liquidity? **a. Loan to deposit ratio** b. Operating profit margin ratio c. Times interest earned ratio d. Capital to asset ratio

In the capstone strategy class at LSU, where the game was integrated as one of the course's learning modules, the number of correct student responses increased significantly on 9 of 10 questions posed (Figure 4). To determine if the pre- and post-test scores were statistically different, a nonparametric pairwise t-test, the Wilcoxon Rank-sum Test, is calculated. In Figures 4 and 5, a * indicates statistical significance at the 5 percent level.

Figure 4. LSU Strategy Class Percent of Correct Responses



Similar results were observed in the OSU Agricultural Finance class. Here, the number of correct student responses increased significantly on four questions. At both LSU and OSU, the total test score showed statistically significant improvements.



At both institutions, a guest lecturer presented the information. However, the incentives for participation differed slightly between the two courses. In the LSU Strategies class, participation in the game was 5% of the course grade; in the OSU Ag Finance class, participation in the game counted as one of six homework grades, with homework grades counting 25% of the total grade.

Conclusions

Through playing Ag Bank Sim, participants learn key financial, economic, and banking lessons that traditionally were limited to a series of in-person meetings. The Internet environment enhances the student experience, which lead to improved learning. Instructors value the time-saving features of the new game.

John Milazzo, President and CEO Campus Federal Credit Union: "The game does a good job of replicating the types of decisions banking executives make. The format (web-based) of the game, makes it much easier to play and understand when compared to other bank management games I have played."

Student comments: "I like being able to know where my bank stands after each round, because I want to win the game." "[This feature was not available in the previous version] "Getting the results quickly and having access to all previous decisions and results was helpful when my group decided on our strategies."

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