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AN EXPERIMENTAL COMPARISON OF PAPER AND PENCIL AND COMPUTER AIDED DECISION SUPPORT TOOLS

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ABSTRACT

Four weeks into a multi-period simulation game, a random sample of student groups was given a computer driven decision aid. Until that time, all groups had been required to use a paper and pencil tool. The two types of student groups were tracked for the remaining periods of the simulation. The results showed that there was no difference between the paper and pencil groups and the randomly chosen groups on several dependent variables. However, the groups differed significantly on attitude toward the simulation.

BACKGROUND

In a Fall semester we were using the LAPTOP simulation (Faria and Dickinson 1987) as a continuing exercise in a large (approximately 130 students) section of Principles of Marketing. Decisions are based on a market and sales forecast that groups make.

For the first 3 or 4 periods a common occurrence was for company to sell all its product and to lose large sums of money and/or have underpaid salespeople (which contributed to turnover). These results came as a surprise to the very companies who "planned" for them!

DESIGN

Between semesters, we developed two decision aids. The paper and pencil tool was in the form of a simple 4-page worksheet that instructed groups to calculate costs and revenues. Students here asked to make a mark on a tally sheet every time they tried a different decision.

The computer decision tool took the form of a Lotus 1 2 3 based program. Student groups simply entered their decisions, paged ahead to see the "bottom lines", and were able to page back to change decisions.

The experiment was structured as a pre-test post-test with control group design. For the first three decision periods, all groups used only the paper and pencil tool. At the end of period 3, several groups were provided with the computer aid and instructed to transfer their decisions to the worksheet.

The sample was comprised of 5 randomly chosen groups who used the computer aid at least twice in the post-test phase and 32 control group companies.

RESULTS

Several companies sold all their product (exactly met their forecasts) during the simulation. NONE of those

companies had unexpected bottom lines or sales force satisfaction.

Conclusion:

forcing students to calculate and state their expected bottom line, under the assumption that their forecast is accurate, serves to reduce (or eliminate) "dumb" errors.

This is probably true no matter what form the decision tool takes.

Decision Effort

On average, the groups who eventually got the computer tool made fewer decision changes (trials) than the control group in the base period. After receiving the computer tool, this group increased its effort by 7 changes per decision period. The control group increased its effort by 3.2 changes per period. Not significant.

Conclusion:

There is no evidence to suggest that introducing the computer tool increased decision effort.

Performance

The performance measure was based on cumulative total profits at the end of the pre-test and at the end of the post-test periods. The companies were ranked (1st through 6th) within industries (10 industries).

Conclusion:

There is no evidence to suggest that groups who used the computer tool improved performance more than groups who used paper and pencil.

In fact, the median rank of the computer groups got worse, but not statistically worse.

Attitudes

At the conclusion of the game, all students completed a 6-item Likert type attitude scale designed to measure attitude toward the simulation. The scale had a reliability of .82.

Conclusion:

Students who were in-groups that received the computer aid had significantly lower attitudes toward the simulation than other students.

CONCLUSION

The results of this experiment suggest that as long as we ask students to calculate and report the anticipated bottom line results of their decisions, it does not matter whether it is with a paper and pencil tool or with a computer tool. However, We should probably allow students to use tools that they are most comfortable with.

REFERENCES

Faria, A.J., and John R. Dickinson, LAPTOP: A Marketing Simulation, Plano, Texas: BPI, Inc. 1987.