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TEACHING FORECASTING TO THE MASSES: LITTLE DECISION SUPPORT TRAINING, BUT A LOT OF ANSWERS

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ABSTRACT

Recent calls within the discipline have indicated that forecasting should be an important part of a marketing student's curricula. However, the goal of providing the student with usable forecasting knowledge is a very difficult task. Certainly, the development and diffusion of sophisticated and user- friendly forecasting software has made certain aspects of providing this information to students easier. Unfortunately, the availability of this complex technology does not insure that the forecasting knowledge disseminated in the classroom is appropriate or useful to the student as they enter the business world. The authors argue that the successful outcome of an undergraduate forecasting class is gauged by the student's ability to understand forecasting as an integral component of an organization's decision support network rather than by the number of forecasting techniques presented to the student.

INTRODUCTION

Forecasting is an accepted and necessary function performed to some degree by all businesses. Forecasts are used to help identify expected labor demand or wage rates, anticipated cash flow, future product sales, plant utilization, raw material usage, purchasing requirements, and general economic trends for use in strategic planning. Given the breadth of business activity affected by forecasted information one might assume that a forecasting class would be a basic offering at most business colleges. Unfortunately, this does not seem to be the case for business colleges or marketing departments (3].

Certainly, some functional area within an organization must assume the responsibility for the provision of forecasted information. This responsibility, according to (3), is being allocated increasingly to the marketing area. Therefore, the need for a marketing curricula that includes fore- casting is even more apparent as marketing departments address the business environment's expectations of marketing graduates.

Cox (3] has indicated that many schools are beginning to broaden their course offerings to include a forecasting class. It appears that academia is being responsive to a need expressed by the business community. However, the extent to which these new courses are able to prepare the student for the forecasting function of a business is questionable. The limited quantitative backgrounds of undergraduate students and the use of very sophisticated software packages presents a number of potential problems that may arise when teaching forecasting courses.

For example, the tendency to approach forecasting from a technique oriented perspective is very likely when the range of available techniques are easily accessible in the form of user-friendly PC software. Unfortunately, the ability to "get an answer" using a forecasting software package is probably less useful to the student than understanding the limitations of the procedure, its data requirements, the interaction of the forecasted variable and its relationship to other company and environmental variables. Forecasting should not be perceived by the student as a list of complex quantitative techniques. Rather, the process of forecasting should be viewed by the student as one type of decision support system available to managers. As the focus shifts from techniques to decision support, new considerations arise with respect to what is truly important information in the development and selection of a forecast and forecasting tool.

This paper will identify some potential mistakes that may be made in teaching a forecasting course as well as more basic underlying problems associated with this type of instruction. Additionally, some suggestions are offered that may enhance the student's educational experience in the course by stressing the decision support aspects of the forecasting process. First, a brief discussion is offered describing the basic philosophy of decision support systems and some of their potential strengths and weaknesses.

DECISION SUPPORT SYSTEMS: A BRIEF REVIEW

The concept of decision support systems (DSS) for managers has been evolving for more than a decade. It involves the provision of decision support to managers through their direct interaction with a computer based information system. DSS may be defined as:

> a computer-based system (say, a data base management system or a set of financial models) which is used personally on an ongoing basis by managers and their immediate staffs in direct support of managerial activities-that is, decisions. Another term for DSS might be 'executive mind-support system' (7, p. 117).

As this definition suggests, the most important component of any DSS is the extent to which it supports managerial decisions. However, for a DSS to provide optimal decision support several design and operational aspects of the system must be present. Altler [1], Keen and Scott-Morton [6], Sprague (9), and others in the DSS field have identified important design and operational features. First, DSS should be interactive and easy to use by managers that do not have extensive knowledge in computer information systems. Second, these systems should be flexible enough so that the user can examine a variety of analytical models under different situational assumptions. The process of investigating a problem through a DSS will provide the user with many new perspectives that would not otherwise be obtained.

Finally, DSS are evolutionary in their design. This suggests a dynamic process through which models are reexamined, data bases expanded or changed, calculations recomputed, procedures varied, and reports altered so that decisions may be improved in the long run.

One method for classifying the applications or uses of DSS is offered by Keen and Scott-Morton (6]. Basically, they see DSS supporting three types of tasks; structured, semi-structured, or unstructured. Several authors, including Keen and Scott-Morton (6] have suggested that DSS are most useful in the semi- structured situation. A semi-structured situation is one where both objective information (information which is known with certainty) and subjective information (uncertain information) are available and required to address the decision problem at hand. Problems such as forecasting interest rates, setting marketing budgets for consumer products, or capital acquisition decisions are semi-structured problems. Certainly, most forecasting situations would fall into this category.

Potential Managerial Contributions from DSS

DSS can offer numerous contributions to their users. Obviously, decision support is the foremost contribution expected from decision support systems. However, the term masks more specific advantages of this decisional process. For example, complex problems are given a more definitive structure when modeled and examined with the help of DSS. Intuitive or subjective judgments are quantified and their relationship to other situational variables are made explicit. In fact, the development of the models and the specifying of relationships may be the most valuable component of decision models (5]. The structuring of complex problems should aid in the pursuit of logical solutions.

Generation of alternative solutions are enhanced through the interactive process of viewing the data in different ways. As forecasted data are manipulated, numerous "what if" scenarios may be easily investigated. This kind of structured probing should allow the user a much greater understanding of the problem. It also highlights the potential ramifications of alternative solutions to that problem.

Finally, DSS should improve managers' ability to communicate effectively when discussing complex problems. An improved understanding of the problem, available data, and models employed will help managers better communicate with subordinates and superiors concerning the problem investigated.

Potential Problems With DSS

DSS can make a valuable contribution to most organizations, yet, they are not without some potential drawbacks. Grove, Pickett, and Williams ('3] and Santee (8] have identified some of these problems. One problem with the use of computer based systems is that the technology that they employ often far out paces the user's knowledge of the model. Santee (8] suggests that many software statistical packages available for the PC provide an easy "answer," however, they are too complex for most of the population to fully understand. This is also true for many forecasting packages. Unfortunately, in order to use that "answer" to make intelligent decisions a fuller understanding of the procedure and its implications are required. Technology and user knowledge must progress together.

Another potential problem with DSS relates to the quantification of subjective variables (1). As uncertain relationships are made more objective through modeling, the underlying assumptions sur- rounding the subjective variables may become lost. Over time and use, "answers" from the developed model containing subjective evaluations may take on a degree of certainty that is unwarranted. Only through continued questioning of the model's assumptions and relationships may the full value of that model be maintained.

The business forecaster may benefit greatly from the understanding of DSS concepts. Similarly, effective instruction in a forecasting class would seem to be most possible when the important tenets of DSS are presented and pursued. Unfortunately, this perspective is not easily maintained and mistakes are easily made in teaching forecasting to undergraduate students.

FORECASTING IN THE UNDERGRADUATE CLASSROOM

The ability to forecast seems to be widely required across departmental areas in business classes. Often, students are expected to be able to select some kind of quantitative forecasting procedure and have enough familiarity with it to produce an "answer" suitable for the situation being investigated. Unfortunately, time constraints and an instructional focus other than forecasting make it difficult to insure that the student producing the forecast fully understands the technique being employed or is cognizant of the intricacies involved with forecasting. This kind of forecasting knowledge is much more likely to be developed in a forecasting class. However, personal experience indicates that students who have taken a forecasting class may not have received the kind of information they need to produce meaningful predictive data. The effectiveness of a forecasting course may be reduced by many potential instructional errors.

Common Mistakes Made in Teaching Forecasting

Cox (3] has suggested ten common mistakes made by forecasting instructors. Seven of these common mistakes are directly related to the instruction being technique driven. The availability of a large number of different techniques with software employed in class does not require that each of these techniques be taught. Attempting to familiarize the student with a large number of techniques may "compartmentalize the course" in such a way that students perceive forecasting as nothing more than a "series of unrelated topics." When techniques become the focus of the course, the broader picture of the business environment may be missed. Forecasting should be shown to relate to other areas of the firm and environment.

Additionally, a course driven by quantitative techniques may neglect other important aspects of forecasting such as the procedures for evaluating different forecasting methods (other than accuracy), data collection and preparation, forecasting implementation procedures, proper report generation, and even problem definition. Qualitative forecasting techniques should also be presented and discussed. Finally, Cox (3) suggests that not getting the students hands "dirty" through computations designed to provide the student a greater appreciation for the method being used and not allowing the student to undertake an outside forecasting project is a mistake.

Cox's [3] identification of these common forecasting instructional mistakes can serve as a valuable guide in the development and execution of a forecasting course. However, several additional underlying problems appear to exist in this area.

Forecasting Instruction: Additional Underlying Problems

The availability of powerful forecasting software has made certain aspects of teaching forecasting much easier. This proliferation of sophisticated software and "usable" techniques has contributed to the tendency for forecasting courses to be software driven. Certain software packages, such as Sibyl/Runner [10], will evaluate the potential usefulness of various techniques and suggest which technique might yield the best results. This package will then run the identified technique, if requested, and present a summary statement of which technique appears to be the most accurate for the data set. All of this information may be generated by the computer without the user ever understanding the techniques employed. Technology, in this case, has out paced the user's knowledge.

The problem with the availability and ease of use with these advanced forecasting techniques is accentuated by the limited quantitative backgrounds of most undergraduate marketing students. Few undergraduate students are able to understand advanced techniques such as Box-Jenkins, yet complex techniques are often employed in the classroom. Should techniques which are obviously beyond a student's comprehension be used in a course? Finally, the certainty associated with results generated by computer-based forecasting models inhibits the students from critically examining the model, the data, or the results. Students seem to have the tendency to accept information that has been generated by a computer as "correct." This problem may stem from their lack of knowledge concerning DSS and the role forecasting plays in the decisional process of most firms. Both quantitative and qualitative forecasts are used by decision makers. Therefore, quantitative forecasts should not be viewed by students as the only credible information source available to managers when attempting to predict future events. Quantitative forecasts are only one contributing factor in an organization's decision support network.

NEW DIRECTIONS: USING DSS CONCEPTS AS AN INSTRUCTIONAL GUIDE IN THE FORECASTING CLASSROOM

According to Bails and Peppers [2, p. 4], "the goal of a business forecaster is to provide management with information that will facilitate the decision making process." The ability of the forecaster to provide useful information to management necessitates that the forecaster supplies more than just a generated "answer." Managers need to know under what circumstances the forecast may not apply and to what degree the forecasted data may be affected by changes in external and internal environments. Information generated through decision support systems should include different perspectives developed under a variety of conditions. The production of a single answer held out to management as "the correct pre- diction" may actually preclude effective decision making on the part of the decision maker. The likelihood that management will accept information from individuals that are incapable of defending their position under questioning is remote. Therefore, the forecaster must have an understanding of the techniques being employed to provide truly useful information to management.

Forecasting instruction in the classroom should attempt to instill in the student the tentative nature of all predictions. Students should be encouraged to critically examine every aspect of a forecast in order to determine where, when, and how the forecasts may not apply to a particular decision. This questioning attitude may not be developed through an over emphasis on obscure (in the student's mind) techniques. Enough time should be devoted to the technique so that the student feels confident in their ability to understand its use in a dynamic environment. This suggests that the focus of the course may shift from providing the student with a wide range of forecasting techniques to a much more narrow range of tools that are better understood.

Logically, a large component of the course must be devoted to situations that provide a more holistic picture of the forecasting situation. Students should be evaluated on their ability to integrate potential answers in a report format that is logically structured and includes a wide range of variables that potentially affect the managerial decision at hand, rather than to provide just an "answer."

CONCLUSIONS

A sound forecasting knowledge base can be a very useful component of a marketing student's education. However, re-direction in course format may be necessary to provide students with a better understanding of the forecasting function. This knowledge base may be best developed through a reorientation away from a casual introduction to numerous forecasting techniques via sophisticated computer-oriented software. Instead, emphasis should be placed on insuring that the student understands the forecasting function in an organization's decision making network. For the forecasting student, knowledge must precede technology.

REFERENCES

[1] Altler, 5. (1980), "Transforming DSS Jargon into Success," DSS-81 Transactions, Addison-Wesley.

[2] Bails, D. and L. Peppers (1982), Business Fluctuations: Forecasting Techniques and Applications, Prentice-Hall.

[3] Cox, J. (1984), "Increasingly Complex Forecasting, Neglected Area of Marketing Education, is Crucial to Firm's Success," Marketing Educator, Vol. 3, No. 13, (Fall), pp. 1-2.

[4] Grove, S.J., G. M. Pickett, and R. H. Williams (1986), "The Subjective Side of the Decision Support System: A Pitfall for the Panacea," Developments in Business Simulation and Experiential Exercises, eds., Alvin C. Burns and Lane Kelley, Vol. 13, pp. 170-173.

[5] Hays, R. H. and R. L. Holan (19713), "What Kind of Corporate Modeling Functions Best," Harvard Business Review, (May-June), pp. 102-112.

[6] Keen, P. G. W. and M. S. Scott-Morton (1978), Decision Support Systems: An Organizational Perspective, Addison-Wesley.

[7] Keen, P. G. W. and G. R. Wagner (1979), "DSS: An Executive Mind-Support System," Datamation, (November), pp. 117-122.

[8] Santee, D. J. (1986), "Don't Misuse Power of the PC," Marketing News, Vol. 20, No. 19 (September), p. 10.

[9] Sprague, R. H. (1980), "A Framework for the Development of Decision Support Systems," MIS Quarterly, Vol. 4, No. 4, (December), pp. 1-26.

[10] Wheelwright, S. C. and Makridakis (1984), Sibyl/Runner Version 4.04, Temple, Baker, and Sloane, Inc.