

**REALISM IN BUSINESS GAMES:
A THREE GAME COMPARISON**

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In recent years, computer game designers and publishers have produced a wide variety of computerized business games aimed at serving a number of educational needs. Some of the simpler games introduce students to the complexity of business management at the introductory level. Specialized games such as FINANSIM in Finance, JOBLOT in Production, and MARKETING IN ACTION in Marketing, address a single functional area of specialty. The more common application of computerized business games for undergraduate and graduate college courses, however, is as an adjunct to the capstone business policy course which is normally taught near the conclusion of the student's educational program.

The purpose of this paper is to describe a research study in which a comparison is made of the perceived realism of three popular computerized business management games. The principal elements of complexity on which these games can be differentiated are noted, as is the extent to which each serves to aid in understanding the management of a total business enterprise, the subject of the policy course.

BUSINESS POLICY AND THE BUSINESS GAME

The typical business policy course is designed to integrate functional areas in business administration and to develop the concepts of business strategy, policy formulation and policy implementation. The computerized business game serves as a practicum of sorts, an experiential medium which simulates a business and its industrial and economic environment. Students are required to cope with the exigencies of a competitive marketplace and trends in economic forces, and must engage in careful financial planning and analysis.

In simulations such as the business game realism aids in learning, particularly in the process of transferring learning from the conceptual base to its ultimate application. The strong relationship between the degree of perceived realism and the perceived contribution of the business game to learning was observed in an earlier study assessing the perceived realism of a single game. (Dittrich, 1975) Computerized management games can be compared for differences in perceived realism in the three major functional areas of business administration (e.g., marketing production, and finance), and in the realism of their respective interactions. Thus, the

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comparison by dimension of perceived realism can provide important data on business games, to potential adapters, and especially to those considering games for use in the business policy course.

An entirely realistic simulation of an operating business would involve innumerable variables and is obviously impractical. Designers of games nonetheless strive to add complexity by adding multiples of design elements, such as markets or products. Computer subroutines are also used which make the game's results less predictable. One game, for example, incorporates a quarterly economic index that follows a pre-planned general trend, but includes a random variation from quarter to quarter. Similarly, a random chance process is sometimes built into the research and development subprogram so that the payoff in new product or process improvements is problematic, as might be the case in an ongoing commercial enterprise.

For games used in conjunction with other material for business policy, realism is important if the experience is to transfer to future job situations. Some instructors opt for games offering a high degree of complexity, believing that the more complex game is a better simulation, that is to say, more realistic. Administrative difficulties with complex games, and the necessity for students to learn the mechanics of the games before proceeding to the game itself tend to push the choice in the direction of simplicity. The relation-ship between complexity and perceived realism, therefore, is one of the major focal points of the study.

GAME SELECTION

Several computerized general management games could serve to provide comparisons of realism. Three seemed particularly appropriate, and were chosen because of their popularity and differing levels of apparent complexity.

The Business Management Laboratory (Jensen and Cherrington, 1973) has been in use for a number of years and is used in intercollegiate competition at Emory University. Similarly, the Executive Game (Henshaw and Jackson, 1972) has had wide acceptance, and is used in competition in several Western states. A third game, Intop (Thorelli and Graves, 1963), was developed at the University of Chicago and has been in wide use in the larger schools in the Midwest and elsewhere. Table 1 provides a quick comparison of elements of complexity found in these three games. The more obvious factors include number of products, number of market areas, number of decision elements, number of production shifts and number of production facilities possible, and number of types of financing sources available. Other elements which might be included but which

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are not considered here include number of parameters subject to administrator change, core space requirements, and number of elements utilizing random number generation.

TABLE 1
Three Game Comparison of Complexity

	EXECUTIVE GAME II	BUSINESS MGT. LABORATORY	INTOP
Maximum Number of Products	1	2	4*
Maximum Number of Markets	1	2	4
Maximum Number of Teams	9	8	25
Number Decision Elements in Each Set	7	49	over 100
Maximum Number of Production Shifts	2	2	3
Maximum Number of Production Plants	1	2	24
Number of Financing Sources Available	2	9	5

*Students may choose two of five quality levels for each of two products.

COMPLEXITY AND REALISM: A PROPOSITION

This research is exploratory rather than directed at theory testing. It is aimed at gaining some understanding of the value of the game as a teaching aid. In considering the relationships between game complexity and perceptions of realism, however, our common sense suggests that an overly simple game will seem unrealistic to more advanced students who are completing course work covering many complex aspects of business administration. At the other extreme of complexity, one might assume that a very high level of game complexity would be seen as highly realistic. If the complexity of the game is more than the student can handle, however, the game would probably be regarded as unrealistic simply for being beyond his own ability, since by projection it would also be beyond the ability of the general run of business practitioners. This line of reasoning leads to the proposition that higher levels of perceived realism will be found associated with a moderate degree of game complexity. Very high and very low levels of game complexity should be seen as less realistic by participants in the game.

RESEARCH DESIGN

Six classes of business policy students in two universities were asked to provide perceptual data on the realism of the computerized business management game which they were currently using. A total of 203 respondents completed the questionnaires. 66 students in two classes reported on their perceptions of the realism of the Executive Game, 47 in two classes on the Business Management Laboratory, and 90 students in two classes on INTOP. The questionnaires were administered anonymously after students had completed a total of 16 quarters of game play, 8 quarters of practice, and 8 quarters of decisions "for the record."

The questionnaire used (Exhibit 1) is a 27 item check-off type instrument that has good internal reliability and is easily completed in 10 to 15 minutes. It measures realism in Marketing, Production, Finance, and in the interaction of functions and competitors. In addition, it assesses the extent to which students perceive the game as aiding in the understanding of the concepts of managing a total business enterprise. (See Dittrich, 1975 for further information on the questionnaire.)

RESULTS

The results of this research study are seen in Table 2, an array of mean values of each of the realism dimensions and the mean value for perceived contribution to learning.

TABLE 2
Perceived Realism Scores: Three Computerized Business Games

	Realism in Marketing	Realism in Production	Realism in Finance	Realism in Interaction	Overall Realism	Cont. to Learning
EXECUTIVE GAME (n=66)	16.95	20.17	17.32	13.27	3.18	3.49
BUSINESS MANAGEMENT LABORATORY (n=47)	19.64	21.47	20.90	13.68	3.42	3.89
INTOP (n=90)	17.49	18.26	21.03	13.45	3.24	3.30
Significance of Between-Groups Variance	p<.015	p<.001	p<.001	N.S.	N.S.	p<.003
Significance of Non- Linear Between- Groups Term	p<.005	p<.018	N.S.	N.S.	N.S.	p<.003

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One way analysis of variance indicates that a significant difference exists between the three in the perceived realism of the three major business functions, and in the extent to which the games contribute to understanding the concept of managing a total business. The differences were most significant for Finance and Contribution to Understanding Management, but were nearly as high in perceived realism of Production and Marketing.

The Executive Game, the least complex of the three games, is seen as the least realistic of the three in four out of five of the realism categories. The Business Management Laboratory, standing in the center in terms of complexity, ranks highest in realism in four out of five of the categories. INTOP, the most complex game, ranks lowest in realism in Production, highest in realism in Finance, and in the middle in the other three realism dimensions.

The assessment by students of their games' contribution to understanding management in a total business sense indicates that the Business Management Laboratory was rated much higher than the Executive Game, which in turn was well above the rating for the INTOP. The proposition made earlier that realism would have an inverted U shaped relationship with complexity is generally borne out by these findings. While not precise due to an inadequate measure of game complexity, a test for the significance of the non-linear portion of the between-games variance indicates that there is a significant non-linear element in Realism in Marketing and Production, and in the Degree of Contribution to Understanding Management of the Total Enterprise.

CONCLUSIONS

These findings indicate that there is a significant difference in perceptions of realism and the learning contributions of the game between these three very popular business games. They suggest that the choice of game may have a significant experiential impact in terms of realism, and that undue complexity is detrimental with respect to both perceived realism and the contribution of the game to learning business management.

Additional research seems called for with respect to the curvilinear relationships seen in these data and the numerous elements of complexity noted in Table 1. The development of a complexity index, for example, or the testing of these elements in a multiple regression framework on perceived realism may provide additional insights into the sensitivity of perceptions of realism to these game design variables.

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EXHIBIT I QUESTIONNAIRE

Perceptions of the Business Game as a Simulation of an Operating Business

Please rate the following aspects of your business game with respect to the extent to which these seem to be a realistic simulation of business operations. If you feel that based on your own participation or personal lack of experience you would have difficulty in assessing realism, please indicate "no opinion".

	<u>Not</u> <u>Real-</u> <u>istic</u>	<u>A</u> <u>little</u> <u>Real-</u> <u>istic</u>	<u>Moder-</u> <u>ately</u> <u>Real-</u> <u>istic</u>	<u>Quite</u> <u>Real-</u> <u>istic</u>	<u>Very</u> <u>Real-</u> <u>istic</u>	<u>No</u> <u>Opin-</u> <u>ion</u>
MARKETING						
1.Total Product Demand	_____	_____	_____	_____	_____	_____
2.Effect of Advertising on Sales	_____	_____	_____	_____	_____	_____
3.Effect of Quality Control on Sales	_____	_____	_____	_____	_____	_____
4.Effect of Sales Compensation on Sales	_____	_____	_____	_____	_____	_____
5.Effect of Total Sales Force on Sales	_____	_____	_____	_____	_____	_____
6.Sales Lost/Backorders Effects	_____	_____	_____	_____	_____	_____
PRODUCTION						
7.Scheduling Problems	_____	_____	_____	_____	_____	_____
8.Product Cost Calculations	_____	_____	_____	_____	_____	_____
9.Materials Purchasing	_____	_____	_____	_____	_____	_____
10.Capacity expansion via 2nd shift/overtime/subcontracting/capital expenditure	_____	_____	_____	_____	_____	_____
1.Process study effects	_____	_____	_____	_____	_____	_____
2.Capacity deterioration effects	_____	_____	_____	_____	_____	_____

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	Not Real- istic	A little Real- istic	Moder- ately Real- istic	Quite Real- istic	Very Real- istic	No Opin- ion
FINANCE						
13. Capital Expenditures processes						
14. Sources of Capital						
15. Financial interaction effects						
16. Tax Calculations						
17. Accounts receivable effects						
18. Accounts payable effects						
INTERACTION EFFECTS						
19. Marketing/Production interactions						
20. Marketing/Finance interactions						
21. Production/Finance interactions						
22. Competitive interaction within the industry						
23. Overall rating for realism						
24. What would you see as the improvements that would add the most realism to the Business Game?						
25. The extent to which I was active in all decisions for my Business Game team.						
_____ Active in every decision						
_____ Active in most decisions						
_____ Active in about half of the decisions						
_____ Active in a limited number of decisions						
_____ Active in very few decisions						

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26. The extent to which I feel that the Business Game aided in understanding the concepts of managing a total business enterprise.

- _____ None
- _____ A little
- _____ Moderately
- _____ Quite a bit
- _____ A great deal

27. Indicate the total number of months and years of work experience you have had since graduation from high school.

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