

Simulation Games and Experiential Exercises in Action, Volume 2, 1975

SOME IMPACTS OF VARYING AMOUNTS OF INFORMATION ON FRUSTRATION AND ATTITUDES IN A FINANCE GAME

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Since the American Management Association introduced the first practical business game in 1957, such games have become available at a rapid rate. In addition, the number of users of business games has increased. Despite these increases, minimal research has been conducted to determine what *games* teach and what key variables may influence decisions, decision making, and performance in business games [8].

What may be one of the key variables influencing decisions and performance is the amount of information available to the decision makers. An important consideration is “Flow much information is necessary for effective decision making to occur?”

The impact on decisions and performance of the amount of information provided to game players in a business game is important if such games are to be effective pedagogic devices. The fact that game designers have often assumed that a great deal of information is necessary for effective game play can be inferred by the size of the players’ manuals [see for example, 1 & 71. The absolute size of the player’s manual is not the only variable which influences the amount of Information, however. The number of pages of computer output of data, the type of data, and the form of the data also constitute influences on the amount of information. The time provided for making decisions (including the time between decisions) also influences the amount of information since too little time may make it impossible to absorb all the information.

In addition to the question of the impact of the amount of information on decisions and performance in a business game, the question of the impact of the amount of information on player perceptions, frustration, and attitudes is important. The importance of these variables is that they may act as intervening variables which influence decisions and decision making and, thereby, performance in a business game.

The focus of this paper is on the impact of the varying levels of information (from underload to overload) on group frustration and group attitudes in a business game playing environment. The results reported are part of a large study [3] which primarily dealt with the impact of varying levels of information on decision and performance in a business game. Some of the results of this larger study have been reported elsewhere [6J.

In this study the independent variable was the amount of information available for decision making for teams playing FINANSIM: A financial management simulation [7]. The dependent variables were group frustration and attitudes. Three groups were formed with respect to the independent variable. The first group (Group A) received minimal information. The information available to this group consisted of a blank

Simulation Games and Experiential Exercises in Action, Volume 2, 1975

decision form and the period 1 Income and Position Statements. The second group (Group B) received moderate information. The information available to this group included the information available to Group A, plus a Supplemental Information Statement and Chapters 1 and 2 (37 pages) of the players' manual for FINANSIM. These chapters contain information on the objectives, focus, and characteristics of FINANSIM as well as a fairly detailed discussion of the decision variables in FINANSIM. Also provided to Group B was the filled-in decision form for period 1, which generated the results for period 1. The third group (Group C) received extensive information. The information available to this group included the information available to Group B plus Chapters 3, 4, 5, 6, and 7 and the Appendices of the players' manual for FINANSIM. Thus, Group C had the complete players' manual for FINANSIM which contains 200 pages (about 75 pages are blank forms, quizzes, etc.). These chapters basically provide analytical tools and problem solving techniques of financial management.

Before discussing the current study it is necessary to present a brief description of FINANSIM. In FINANSIM, players assume the role of managers of a business firm with a single unknown product. The primary objective in the game is to maximize the growth of the firm's owners' wealth per share which is the sum of the change in value of the firm's stock per share and the value of dividends accumulated per share. The game is not competitively interactive.

Players in FINANSIM can make decisions in a number of areas each decision period. Players decide on how many units to produce, how many units of plant and machine capacity to buy, which of available capital improvements to purchase, to purchase or sell marketable securities, acquire bank term loans, issue or retire debentures, issue common stock and pay dividends. Within the simulation, players experience such real life parameters as depreciation, income taxes, and the threat of insolvency. Insolvency will be experienced if the liquidity position becomes extremely low. When insolvency occurs, the computer provides the firm with sufficient cash so that game play and the educational experience can continue. Each decision period in FINANSIM represents one year of operations. The first set of decisions FINANSIM players make is for period 2. The set of decisions for period 1, which were developed by the designers of the game as a "reasonable" set of decisions are submitted by the game administrator. This set of decisions generates the computer output which is used as the starting point for the game players.

Each period, each firm receives three computer printouts of data on its operations, an Income Statement, Position Statement, and Supplemental Information Statement. These statements provide information concerning current operations as well as information concerning the next period. With this brief background it is possible to look at the design of the current study.

Simulation Games and Experiential Exercises in Action, Volume 2, 1975

Subjects, undergraduate male business administration students, were randomly assigned to three groups and within each group to 3-man teams. Teams made decisions for 12 periods; however, only the first 10 periods were analyzed to negate the impact of a terminal attitude. Game play was continuous with each team making decisions for all periods in one day. The experiment was conducted over three consecutive weekends, with Group A teams participating the first weekend, Group B teams the second, and Group C teams the third. This sequencing was used to prevent the transfer of meaningful information from one group to another since Group A had less information than Group B which in turn had less information than Group C. Each team was given one hour to make the first decision (period 2), 1/2 hour to make its next 4 decisions, and 15 minutes to make each of the remaining decisions. Teams had 15 minutes between the time a decision was submitted and the return of the results. During this time they were expected to continue their analysis of prior decisions and results. The primary incentive to participate actively was monetary reward which consisted of a fixed payment for participation plus additional payment based upon game performance.

While It was recognized that variables such as intelligence, personality, cognitive complexity, etc. might influence game decisions, decision making, and performance, no attempt was made to match the groups on these variables since random assignment should equalize groups and since the evidence in this area is contradictory. However, a check was made on a number of variables which might confound the results of the experiment. Data was collected on prior game playing experience, College- GPA, Business-GPA, college credit hours completed, business credit hours completed, cognitive complexity [2], and category width [9]. None of the subjects had prior business game playing experience. Statistical analysis of the other variables indicates that the groups did not differ significantly ($p < .05$) on any of these variables.

A number of questionnaires were administered to each subject at two points during game play (the end of period 6, which encompassed the first 5 decision periods, and the end of period 11, which encompassed the last 5 decision periods). Two questionnaires were used as frustration measures--Schein's Group Effectiveness Questionnaire [10] and Schein's Group Maturity Questionnaire [10].

It was hypothesized that the three groups would differ significantly in their feelings of frustration midway through the game (i.e., end of period 6) and at the end of the game (i.e., end of period 11). It was further hypothesized that the rank order on frustration from highest to lowest would be Group A, Group C, Group B. It was also hypothesized that at the end of period 6 Groups A and C would not differ significantly from one another in their reported frustration but would differ significantly from Group B in that they would report more frustration.

Simulation Games and Experiential Exercises in Action, Volume 2, 1975

By period 11 it was hypothesized that Groups B and C would not differ significantly from one another but would differ significantly from Group A in that they would report less frustration.

The basic rationale for this hypothesis was that Group A would experience frustration due to a lack of information for decision making. Due to its lack of information concerning game rules and parameters, Group A was expected to submit decisions in the early periods of game play that would result in lower performance than anticipated, thus, causing a high degree of frustration. Even by the final decision period, Group A was unlikely to understand all the rules and parameters of the game and, therefore, would still experience frustration. Group C would also experience frustration; however, its frustration was expected to result from the inability to use all the information provided (200 page manual) at least in the early decision periods. However, since Group C was expected to be able to make adequate decisions, the frustration for Group C was expected to decrease by the final decision period. The possibility of information underload (Group A) and information overload (Group C) contributing to frustration is supported by Eliason [5]. He found teams with too little information reported being frustrated while teams with too much information reported being overwhelmed. Group B was not expected to be frustrated due to an overload of information; however, some frustration was anticipated because they lacked information in some areas.

A second hypothesis which is directly related to the hypothesis above was that all three groups would take a "wait-and-see" attitude in the initial decision period rather than make numerous and/or extreme decisions. Due to frustration teams might engage in functional or dysfunctional activity. The functional response for Group A would be to attempt to analyze the information available in detail. The decision to "wait-and-see" (i.e., make no decisions in a particular decision area) would also be constructive action for Group A in those decision areas in which information was lacking to make a rational decision since, by making decisions in only a few areas, teams in Group A would be better able to assess the impact of their decisions when they analyzed their results. Groups B and C were also expected to take a "wait-and-see" attitude initially in order to adequately assess the impact of their decisions. The possibility of a "wait-and-see" attitude is supported by other research [4].

While no hypotheses were formulated concerning cohesiveness, and satisfaction with work and coworkers, questionnaires relating to these variables were administered at the end of periods 6 and 11. The questionnaires were: Seashore's Group Cohesiveness Questionnaire [11] and two of the scales from the Job Description Index (JDI) [12], satisfaction with work and satisfaction with co-workers. The results of these questionnaires along with the results pertaining to the two hypotheses are presented and discussed below.

Simulation Games and Experiential Exercises in Action, Volume 2, 1975

As Table 1 indicates, the hypothesis of a significant difference among the groups on frustration was rejected. However, analysis of Table 1 does show some directional support for the hypothesis. As predicted at the end of period 6 (i.e., decision 5), Group A reported higher frustration (i.e., lower group effectiveness and maturity) than Group C, which in turn reported more frustration than Group B.

TABLE 1
MEANS ON FRUSTRATION END OF PERIODS 6 AND 11

Questionnaire	End of Period	Mean for Group			F Ratio
		A	B	C	
Group Effectiveness	6	163.12	183.18	173.36	2.59
	11	179.87	197.27	190.64	.97
F Ratio Period 6 to 11		.93	3.89	4.90*	
Group Maturity	6	104.00	108.00	104.45	.48
	11	108.37	115.82	114.45	.61
F Ratio Period 6 to 11		.23	2.88	5.82*	
*P < .05					

At the end of period 11 (i.e., decision 10), Group A continued to report the greatest frustration, and Group B the least with Group C falling between as predicted. Teams with a moderate amount of information did experience less frustration than teams with more or less information. From period 6 to period 11, Group C decreased significantly in its frustration, while Groups A and B decreased in frustration but not significantly.

The results presented in Table 2 generally support the hypothesis that teams would take a “wait-and-see” attitude.

TABLE 2
NUMBER OF DECISION AREAS IN WHICH TEAMS MADE
DECISIONS IN THE INITIAL DECISIONS PERIOD

Number of Decision Areas	Number of Teams	Percent of Teams	Cumulative Percent
8	0		100
7	1	3	99
6	3	10	96
5	4	13	86
4	12	40	73
3	4	13	33
2	4	13	20
1	2	7	7
0	0	0	0

The majority of teams made decisions in 4 or fewer of 11 possible decision areas. Further, as is indicated in Table 3, decisions tended to occur in certain decision areas and these were the areas where the greatest information was available (eg., production and machine capacity). Analysis of the decisions for each team revealed only 4 teams of 30 making what could be considered

Simulation Games and Experiential Exercises in Action, Volume 2, 1975

extreme decisions in 5 decision areas. team, for example, elected to retire debentures (\$400,000) acquire short-term loans (\$600,000). This team elected to change long-term indebtedness for short-term indebtedness. While the decisions were extreme in terms of magnitude they could be argued to be rational due to the cash heavy position of the firm in period 1.

TABLE 3
NUMBER (#) AND PERCENT (%) OF TEAMS MAKING DECISIONS IN
EACH DECISION AREA IN THE INITIAL DECISION PERIOD
BY GROUP AND FOR ALL GROUPS COMBINED

Decision Variable	A		B		C		Total	
	#	%	#	%	#	%	#	%
Capital Improvements	2	25	5	45	5	45	12	40
Expand Plant Capacity	0	00	3	27	9	82	12	40
Expand Machine Capacity	3	37	9	82	11	100	23	80
Production	7	87	11	100	11	100	29	97
Marketable Securities Purchased	4	50	2	18	1	9	7	23
Marketable Securities Sold	2	25	2	18	2	18	6	20
Bank Term Loans Acquired	3	38	4	36	3	27	10	33
Debentures Issued	0	00	2	18	1	9	3	10
Debentures Retired	2	25	0	00	0	00	2	7
Common Stock Issued	1	12	3	27	1	9	5	17
Dividends Paid	2	25	3	27	1	9	6	20

No hypotheses were formulated concerning the questionnaires on group cohesiveness, or satisfaction with work or coworkers. However, the results presented in Table 4 show that the groups did not differ significantly on these measures nor did each group differ significantly from

TABLE 4
MEANS ON GROUP QUESTIONNAIRES END OF PERIODS 6 AND 11

Questionnaire	End of Period	Mean for Group			F Ratio ^a
		A	B	C	
Seashore's Group Cohesiveness	6	51.62	53.64	51.82	.62
	11	56.12	55.64	54.91	.11
F Ratio for Each Group for Period 6 Compared to Period 11					
		1.84	1.23	2.46	
Smith's et al. Satisfaction With Coworkers	6	119.00	128.55	127.45	.72
	11	116.37	135.18	127.27	2.50
F Ratio for Each Group for Period 6 Compared to Period 11					
		.05	1.50	.00	
Smith's et al. Satisfaction With Work	6	106.50	110.64	116.73	.59
	11	101.12	106.45	111.27	.34
F Ratio for Each Group for Period 6 Compared to Period 11					
		.17	.14	.46	

^aThe groups did not differ significantly on any of these measures nor did any of the groups differ significantly from Periods 6 to 11.

Simulation Games and Experiential Exercises in Action, Volume 2, 1975

period 6 to 11. At the end of period 6 Group B reported greater cohesiveness with Group C second, and Group A third. Since Group B was not frustrated by too little or too much information, it is possible that more attention was paid to group interactions. For all groups the reported cohesiveness increased from period 6 to 11. However, Group A increased its cohesiveness more than Groups B and C, and by period 11, Group A reported the greatest cohesiveness. It may be that Group A, because of its extreme lack of information, was able to select a common enemy (the game administrator) which acted as a superordinate goal uniting group members.

At the end of periods 6 and 11, the order from greatest to least satisfaction with co-workers was Group B, Group C, and Group A. This result is consistent with the finding on the cohesiveness questionnaire for the end of period 6; however, the findings are not consistent for period 11 since the rank order from highest to lowest was Group A, Group B, and Group C. Evidently, individuals could be less satisfied with their co-workers and still express high cohesiveness. To some extent this result may have occurred because the JDI is descriptive whereas Seashore's Cohesiveness Questionnaire is an evaluative attitudinal measure. Also it may be that individuals knew of friends in other groups with whom they would prefer to work yet did not feel negatively about the group with which they were currently working.

The rank order for satisfaction with work from highest to lowest was Group C, Group B, and Group A. It is interesting to note that the satisfaction with work for all groups fell from the end of period 6 to the end of period 11 even though teams tended to be performing more successfully. This finding supports the view that playing a game too long may result in boredom [5].

Several findings in this study deserve further discussion. The results indicate, directionally, although not significantly, that the amount of information provided players in a business game influences the level of frustration which is experienced during game play. Teams with moderate information experienced less frustration than teams with too much or too little information. Since frustration may inhibit learning, it is important that designers and users of business games determine the amount of information that is necessary to play any business game so that minimal frustration will occur. It should be kept in mind that the amount of information is, to a great extent, a function of the time available to assimilate the material. Therefore, designers and users also need to make determinations on the time variable. Likewise, the impact of information underload and overload on decisions and performance needs to be assessed.

The results indicate that teams will take a "wait-and-see" attitude in the Initial decision period rather than make numerous and/or extreme decisions. If users of business games want students to participate in active decision making early in game play, adequate time must be provided for making the first decision. An alternative is to permit a series of "trial" decisions

Simulation Games and Experiential Exercises in Action, Volume 2, 1975

and then start game play at the initial point.

While this study raises more questions than it answers, it provides some directions for future research. What is the impact of varying amounts of information on frustration, attitudes, etc. on a business game? What impact does frustration have on decision making? Answers to these questions as well as answers to questions on optimal team size, method of assignment of players to teams, personality variables, etc. will greatly aid the use of business games as effective and efficient pedagogic devices.

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