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AN INQUIRY INTO BUSINESS GAMING
AS A PEDAGOGICAL TECHNIQUE IN
ACCOUNTING EDUCATION

by

JIMMY CARL CALDWELL

A DISSERTATION

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PREFACE

The application of business games in business education has increased steadily during the last decade. However, most of the gaming activities were concentrated in the areas of business policy, management and marketing education. This concentration of gaming activities and many unknown factors resulted in a lack of gaming in accounting education.

This study investigates the application of business games as a pedagogical tool in accounting education. The study will determine the extent of the use of gaming in accounting education, the problems that caused their limited use in accounting education, the advantages and disadvantages associated with gaming in accounting education and the effectiveness of gaming as a pedagogical tool in accounting education.

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Jimmy C. Caldwell
The University of Alabama
Tuscaloosa, Alabama
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CHAPTER I

INTRODUCTION

Business gaming, as a pedagogical tool, has proliferated rapidly in recent years in business educational programs. Business gaming originated in 1956 when the American Management Association developed their Top Management Decision Simulation. Enthusiasts hail this new technique as one of the most powerful teaching devices ever developed. Richard C. Henshaw, professor at Michigan State University, believes that business gaming may become more widely accepted than the Harvard Case Method. Dean Lowell W. Herron of Clarkson College of Technology calls business gaming a significant forward step in teaching methodology.¹

Gaming appears to be the answer to the problem that has plagued business educators for years:

. . . how do you expose the student to an operational experience that transcends the normal classroom offering without actually placing him in an operating firm on an internship arrangement.²

A survey in 1964 shows that a majority of the members of the American Association of Collegiate Schools of Business were

¹"In Business Education, The Game's the Thing," Business Week, July 25, 1959, p. 63.

²J. James Miller, "The Game's the Thing - Or Is It?," Collegiate News and Views, Vol. 22 (March, 1969), p. 13.

using business games in their curricula. Games were applied in every business discipline except business statistics and business law. The educational areas receiving the greatest exposure to gaming were management, business policy and marketing. There was an obvious lack of gaming applications in the area of accounting education.³ "In recent years, the business game steadily (although slowly) increased in importance for accounting instruction."⁴

Although business gaming is making an impact on business education in general, its use in accounting education remains limited. This limited application of gaming in accounting raises such questions as the following: To what extent is it used in accounting education? What problems have resulted in the limited application of gaming in accounting education? What advantages or disadvantages exist when this teaching device is applied in certain accounting courses? Is business gaming a pedagogical tool that can be used effectively in accounting education?

Objectives of the Study

The basic purpose of this study is to research, analyze and evaluate the use of business games in the field of collegiate accounting education. Four separate objectives must be attained

³Alfred G. Dale and Charles R. Klasson, Business Gaming (Austin, Texas: Bureau of Business Research, The University of Texas, 1964).

⁴American Accounting Association, Accounting Instruction: Concepts and Practices (Cincinnati, Ohio: South-Western Publishing Co., 1968), p. 90.

to achieve this purpose.

The first objective is to determine the extent of business game utilization in formal accounting education. This objective will be limited to the member schools of the American Association of Collegiate Schools of Business which will represent most collegiate schools of business.

The second objective is to determine the problems that caused the limited application of gaming in formal accounting education.

The third objective is to determine the advantages and disadvantages of applying business games in specific areas of accounting education.

The final objective is to determine whether or not gaming is an effective pedagogical tool for accounting education.

Description of the Study

Information to accomplish the objectives of this study will be gathered from: (1) a survey of existing literature, (2) a survey of American Association of Collegiate Schools of Business, (3) correspondence and interviews with accounting educators using business games, (4) an examination of available business games used in accounting education and (5) a scientific evaluation of gaming as a pedagogical tool in accounting.

The first step of the research will be a detailed examination of the general literature on business gaming. This research will determine the nature of gaming and its use as a teaching

device in business education. The literature examined will include books, periodicals and special literature such as publications of symposium proceedings.

The second step of the research effort will include a survey of the accounting departments of member schools of the American Association of Collegiate Schools of Business. This survey will indicate the current use of business games in formal accounting education. The survey will cover both undergraduate and graduate programs. The results of the survey will locate schools that are applying, have applied or intend to apply business games in their accounting curricula.

Step three will include interviews and correspondence with accounting educators who are applying, have tried to apply or intend to apply gaming in formal accounting education. Data from this research will indicate the problems, advantages, disadvantages and trends of applying games in formal accounting education.

The final step of the research effort will be the application of a business game in elementary accounting courses at the University of Alabama and the University of Tennessee at Martin. The students at both schools will be divided into control and experimental groups. The control group will be taught using the lecture method and problems for outside assignments. The experimental group will be taught using the lecture method, a business game and fewer problems. Each group will be given valid elementary accounting tests for testing purposes. The tests will be

analyzed statistically to determine if the experimental group comprehended accounting principles as well, not as well or better than the students in the control group.

Contributions of the Study

The results of this study will provide four contributions to the field of accounting education.

1. A concise exposition of the applications of business games in accounting departments of member schools of the American Association of Collegiate Schools of Business.
2. Identify the problems that exist which have resulted in the limited use and development of business gaming in formal accounting education.
3. Indicate the advantages and disadvantages of applying business games in specific areas of accounting education.
4. Determine the effectiveness and validity of business gaming as a pedagogical tool in formal accounting education.

CHAPTER II

NATURE OF SIMULATION

Introduction

Simulation, an operations research technique, has recently reached the point of development that it is now acceptable as a tool in the analysis of business decision problems. The main reason that simulation has become a practical tool of management is that business now has the ability to manipulate and process large amounts of data rapidly. This new ability is a result of the increased capabilities of the electronic computer.¹

Simulation recently has become popular in business education as well. However, it is not necessarily a new technique. Many writers indicate that simulation is not a development of the twentieth century. "Model building and simulation are age-old."² "Simulation may be traced back to the beginning of time--be it the make-believe world of the child at play or the adult make-believe world of the stage."³ In an article entitled "The Gentle Art of Simulation,"

¹George Schussel, "Simulation and Sales Forecasting," Data-mation, Vol. 13 (June, 1967), p. 40.

²Ira M. Kay, "An Executive's Primer on Simulation," Data Processing Magazine, Vol. 8 (October, 1966), p. 53.

³Harry Harmon, "Simulation: A Survey," Proceedings of the Western Joint Computer Conference (Glendale, California: Griffin Patterson Company, 1961), p. 1.

The writer states that ". . . simulation is the oldest analytical tool known to man."⁴ However, simulation, as a "tool to be applied to management problems is a comparatively new"⁵ analytical technique that has evolved with the development of the electronic computer.

Definitions of Simulation

The term simulation means many things to different people and, to an extent it should, for it is a generic term.⁶ Because it is such a general term, most writers establish their own definitions. The definitions of simulation that are found in current literature range from very broad ones to those that are restricted to a well defined process. A review of some of these definitions should be of benefit in gaining a perspective of the broad spectrum of simulation. Webster provides the fundamental notion that simulation is the art of ". . . giving the appearance or effect of, without the reality."⁷ Bowman and Fetter in their book, Analysis for Production Management, present a broad explanation by defining simulation as the

⁴"The Gentle Art of Simulation," Business Week, (November 29, 1958), p. 74.

⁵E. N. Khoury and H. Wayne Nelson, "Simulation In Financial Planning," Management Services, Vol. 2 (March - April, 1965), p. 13.

⁶Donald W. Fogarty, "Simulation: A Decision Making Technique," Production and Inventory Management, Vol. 8 (October, 1967), p. 69.

⁷Philip Babcock Gove, Webster's Third New International Dictionary (Springfield, Massachusetts: G. & C. Merriam Company, 1967), p. 2122.

". . . taking of a real system . . . and in some sense duplicating it."⁸

In other definitions of simulation, we find restricting terms, such as mathematical model, logical model, computer, experimentation and real time. One of the more restricted meanings is presented by Reed Ruddell, Jr. He states that "simulation is the representation of reality through the use of a model or other device, which will react in the same manner as reality under a given set of conditions."⁹ Ruddell's definition is an improvement over the broader ones in that it states that a model is used to represent reality. James C. T. Mao defines simulation as ". . . the technique of evaluating the merits of alternative courses of action through experimentation performed on a mathematical model representing the actual decision-making situation."¹⁰ Mao emphasizes two aspects of simulation. First, reality is represented by a mathematical model and second, in performing a simulation, alternative courses of action are evaluated by experiments performed on the model. John Dearden in his book, Computers in Business Management, contributes the notion that the results of experiments on the model should indicate something about the real situation. Further he writes that simulation

⁸ Edward H. Bowman and Robert B. Getter, Analysis for Production Management (Homewood, Illinois: Richard D. Irwin, Inc., 1961), p. 343.

⁹ Fogarty, op. cit., p. 69, quoting Reed Ruddell, Jr., Plant Layout (Homewood, Illinois: Richard D. Irwin, Inc. 1961).

¹⁰ James C. T. Mao, "Essentials of Computer Simulation," Financial Executive, Vol. 35 (October, 1967), p. 55.

is ". . . a method of approaching a problem by constructing a model of a real situation, and then manipulating this model in such a way as to draw some conclusions about the real situation."¹¹

Other writers restrict their definitions by stating that the model has to be set up in a computer. W. E. Martin, in Electronic Data Processing, states that simulation is ". . . the representation of systems by mathematical models and logical models that can be operated over time in the computer to test possible management decisions ahead of time."¹² Martin's explanation restricts the use of simulation to the computer but at the same time he indicates two aspects of the term that the above definitions fail to consider. First, he says that the model of reality does not have to be a mathematical model but also can be a logical model. Second, he states that the model can be operated over time. By adding the time factor, Martin has shown that simulation does not have to be a static analytical tool.

In the book, Computer Simulation Techniques, the authors say that simulation is

. . . a numerical technique for conducting experiments on a digital computer, which involves certain types of mathematical and logical models that describe the behavior of a business or economic system (or some component thereof) over extended periods of real time.¹³

¹¹John Dearden, Computers in Business Management (Homewood, Illinois: Richard D. Irwin, Inc., 1961), p. 14.

¹²E. Wainright Martin, Electronic Data Processing (Homewood, Illinois: Richard D. Irwin, Inc., 1969), p. 14.

¹³Thomas H. Naylor, et. al., Computer Simulation Techniques (New York, New York: John Wiley and Sons, Inc., 1966), p. 3.

Individuals who are writing in the area of management sciences regard simulation as "the science of employing computational models as description for the purpose of learning, experimenting and predicting in management problems."¹⁴ A more restricted interpretation states that simulation as applied in management science is

. . . the systematic abstraction and partial duplication of a phenomenon for the purpose of effecting (1) the transfer of training from a synthetic environment to a real environment; (2) the analysis of a specific phenomenon; or (3) the design of a specific system in terms of certain conditions, behavior and mechanisms.¹⁵

The definitions presented above are varied in scope, but they contain many common elements. All of the definitions presented state in various ways that simulation is an attempt to represent some segment of reality. To represent some segment of reality, a simulation requires that a model of real world factors be constructed. Once a model has been constructed the definitions indicate that it can be manipulated either manually or with the aid of an electronic computer. If a simulation can be performed manually or with the aid of a computer, then the model can be either a logical or mathematical model.

After the model has been developed, experimentation is performed with it. The experiments on a simulation model usually are in the form of alternative courses of action. Since the model

¹⁴Harmon, op. cit., p. 2, quoting The Institute of Management Science Bulletin, Vol. 5, (November 2, 1958)

¹⁵Harmon, op. cit., p. 2, quoting E. Bogdanoff, et. al., Simulation: An Introduction to A New Technology (Santa Monica, California: Systems Development Corporation, 1960).

represents reality, we may assume that the results derived from a simulation model for each alternative are approximately equivalent to the results that would be obtained under the same conditions in a real situation. This explanation of simulation is diagrammed in Figure 1.

Classifications of Simulation

Simulation activities are varied and have been classified in various ways. One classification of simulation activities is based on the nature of the system being studied, such as

1. A sociological, economic, political system, or some combination thereof.
2. A physical system.
3. An industrial system or sub-system.¹⁶

The first category encompasses such simulations as war games and economic systems, while the second includes actual scale models such as those used by engineers. Exemplary of the third category is a two or three dimensional representation of a plant layout.

Another suggested division of simulation activities has been to group them into time dependent or time independent simulations.

Time dependent models are those models whose performance is a function of time. The status of the model, or the system itself, changes with time irrespective of the occurrence of internal events that affect the system.
 . . . Time independent models are those simulation models whose performance does not depend on time, that is, the performance of the model does not depend on the length of time the model was simulated, but depends solely on

¹⁶Fogarty, op. cit., p. 70.

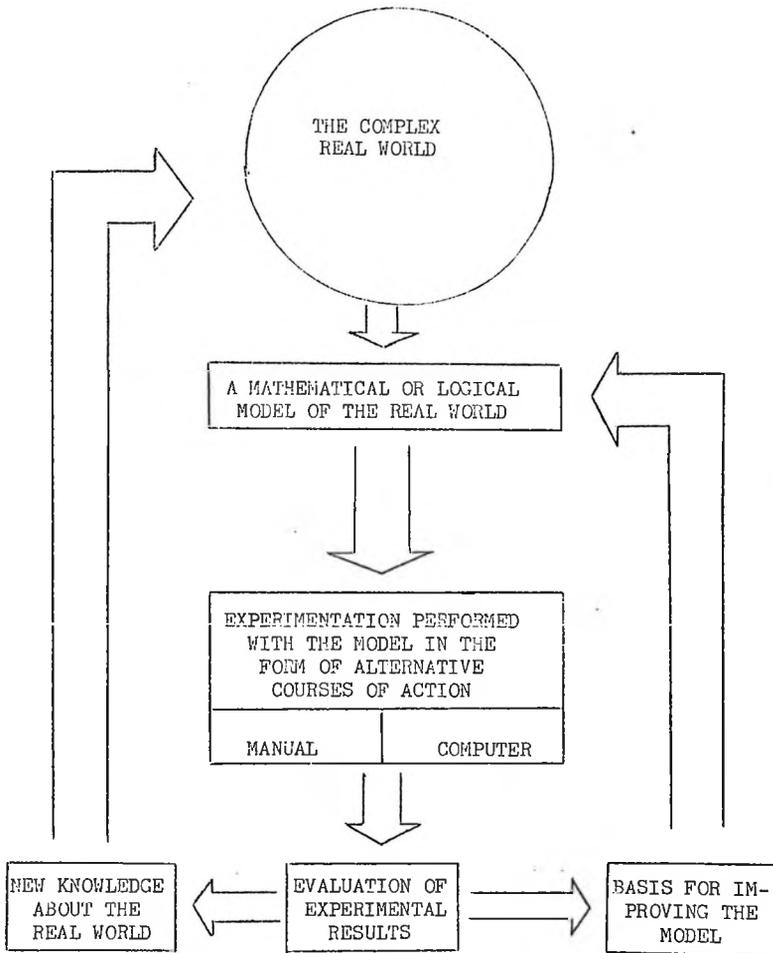


Figure 1.--Diagram of simulation as adapted from a figure in Demitris N. Chorafas, Systems and Simulation (New York, New York: Academic Press, 1965), p. 29.

the number and nature of events that affect the status of the system.¹⁷

A third taxonomy is the degree of abstraction from the real-life situation.

This basis of classification follows:

- (1) In the most extreme instance the actual system can be used to obtain knowledge about itself.
- (2) Only one step removed from the real life instance is the attempt to replicate the system with the highest degree of fidelity, by means of an operational model of the system in its normal environment. A SAC mission flown to test the air defenses of the United States is an example of an essential replication of a war situation.
- (3) The replication might be attempted in the laboratory instead of the field. . . . A laboratory model might consist of the actual replication of some elements and the abstraction and substitution by symbolic representation of others. . . . Perhaps the best example of "laboratory simulation" is operational gaming.
- (4) A more clear-cut abstraction from reality is involved in the complete "computer simulation" of a real system. . . . This type of simulation is quite common in operations research, with a popular example being a "computer simulation" of a (hypothetical) business firm.
- (5) The highest degree of abstraction leads to the complete "analytical simulation," wherein the real system is represented completely by means of a mathematical model and a solution (at least theoretically) can be obtained by analytical means.¹⁸

¹⁷Ibid., p. 71.

¹⁸Harmon, op. cit., p. 3.

This classification presents a continuum on which simulation activities might be ordered. The simulations that are in use today would appear more frequently in the second, third, and fourth classes. The third class encompasses the simulation activity that is the topic of this study--business gaming and its use in accounting education.

Education and Simulation

Simulation is not a new educational technique as it has been used for many years in preparation for the professions. The legal profession has ". . . long supplemented the study of the principles of law and past precedents with experience in the moot court."¹⁹ The moot court is a model courtroom where law students participate in arguing cases before a faculty member. The students gain experience in legal principles and their application in presentation of a case.

The teaching profession also applies simulation by maintaining ". . . practice or campus schools where the young teacher stands before his students and seeks to master the rudiments of classroom instructional work."²⁰

Military personnel have used simulation techniques for many years. During peacetime it is impossible for military personnel to

¹⁹W. S. Wilkstrom, "Serious Business of Business Games," Management Record, Vol. 22 (February, 1960), p. 6.

²⁰John W. Plattner and Lowell W. Herron, Simulation: Its Use in Employee Selection and Training (American Management Association, Management Bulletin #20, 1962), p. 1.

gain wartime experience; therefore, ". . . models and machines simulating the conditions and situations men would meet in combat could provide a cheap and efficient method of training."²¹ War games exemplify such a simulation device. Opposing teams of military personnel carry out theoretical missions enabling the officers and their troops to gain wartime experience or to become familiar with new warfare methods.

In business education simulation is being used in the form of cases, role playing and business games. The case approach to business education provides for a static description of a problem situation within a firm. The problem area is usually directly modeled from things that have happened in a real firm. The company's affairs are presented and complemented by verbal description with excerpts from the company's accounts, financial statements and other quantitative files. Cases are designed to test students' ability to determine the problem areas and provide solutions to these problems. The drawback that exists with cases is that there is little direct guidance for the student or the instructor to predict what the outcome of particular solutions may be.²²

Role playing is a simulation device that requires a student to play the part of a manager, foreman, a worker or some combination

²¹Miles Kennedy, "Business Games for Accountants," Accountancy, Vol. 73 (March, 1962), p. 219.

²²William R. Dill, James R. Jackson and James W. Sweeney, Proceedings of the Conference on Business Games (New Orleans, Louisiana: Tulane University, 1961), p. 21.

of these to solve a problem. The success of role playing has been limited due to the difficulty a student encounters in playing a role he has not experienced.²³

Business games are used in approximately the same manner as the other educational simulation devices. But the use of games as an educational tool in business is a rather recent development.²⁴ The idea of business games is the same as that of other simulation devices that are used as educational tools. This idea is ". . . to substitute a model of a situation for the situation itself so as to prepare people to act effectively in the real situation when it does arise."²⁵ However, the business game differs from a case or role playing. Gaming has taken a static case and made it dynamic. This has been accomplished by making feedback available to the students. The feedback is the results of decisions that are made by the students as they attempt to manage a firm or a particular function of a firm. It differs from role playing in its use of rigid rules, enforced by an administrator, and its emphasis on quantitative, material problems rather than on human relationships.²⁶

²³Ibid., p. 23.

²⁴Kalman J. Cohen and Eric Rhenman, "The Role of Management Games in Education and Research," Management Science, Vol. 7 (January, 1961), p. 135.

²⁵Robert M. Smith, "Management Games: Toy or Trend," Office Management and American Business, Vol. 21 (September, 1960), p. 16.

²⁶"In Business Education, the Game's the Thing," Business Week (July 25, 1959), p. 58.

Summary and Conclusions

The analytical tool of simulation is age-old but as a practical tool of management and business education it is comparatively new. The inability to manipulate and process large amounts of data rapidly was the reason for the limited use of simulation in these areas. As the electronic computer evolved its capabilities increased so that the business world obtained the ability to manipulate and process data rapidly. With this new found ability the business world has added simulation to its analytical tools.

The term simulation is general and as a result it means many things to different people. Every individual defines the term to fit his particular field; therefore, the spectrum of simulation definitions is broad. Based on the many definitions, simulation involves the construction of a logical or mathematical model to represent reality. Experiments are then performed with the model either manually or with the aid of a computer. The experiments are in the form of alternative courses of action which might be followed in a real situation. The results should be an approximation of those in a real situation under the same conditions.

Simulation activities are as varied as the definitions of simulation but the activities are usually categorized in some manner. Three suggested classifications of simulation activities are to group teams according to the system being studied, whether they are time dependent or independent models and finally according to the degree of abstraction the activity is from the real-life situation.

The use of simulation in education is not new to the law, teaching and military professions. They have used it for years in the form of moot courts, practice schools and war games. In business education simulation is a more recent development and has been used in the form of cases, role playing and business games. The business game is the newer technique of the three and has added rigid rules and a dynamic nature to business education that did not exist with cases or role playing.

Since the business game is the topic of this study, a basic understanding of a game is a necessity. A typical game, the historical development and the types of games available are considered in the following chapter.

CHAPTER III

THE DEVELOPMENT OF GAMES TO SIMULATE BUSINESS ENVIRONMENTS

Introduction

Business gaming has its origin in war games, operations research and educational role playing and is based on the concept of simulation. Gaming has advanced rapidly since the introduction of the American Management Association's Decision Simulation in 1957.¹ This new technique has been hailed as "one of the dramatic education innovations . . ." ² in the last few years.

Business games are being applied in many areas but they predominantly are an integral part of corporate and collegiate educational programs. Within the area of industrial education business games are being played to

. . . simulate problems of running an industry, a company, or a particular corporate department. They are being used for everything from teaching the executive investment strategies and collective bargaining techniques to boosting the morale of clerks.³

¹Paul S. Greenlaw, Lowell W. Herron, and Richard H. Rawdon, Business Simulation in Industrial and University Education (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1962), p. 5.

²Kalman J. Cohen, et. al., "Carnegie Tech Management Game," Journal of Business, Vol. 33 (October, 1960), p. 303.

³Elliot Carlson, "Versatile Business Game: Its Growing Use in Industry," Management Review, Vol. 55 (September, 1966), p. 45.

In collegiate education they are used as a complement to other pedagogical tools. The game may be a model of a complete firm or a special function of the firm such as inventory control or production. Those that represent a complete firm are played to create an awareness or an understanding of the functions of each discipline within the business environment. The special function games are played for the purpose of providing a link between the principles of the functional area and their use in a realistic situation.

There is a misconception that exists in the application of business games in business education. This delusion is associated with the word 'game'. The use of the word is considered by many educators to be unfortunate because it has an implication of fun or some form of entertainment rather than being a serious form of business education.⁴ However, there is no reason why education has to be a drudgery. In an attempt to alleviate this misunderstanding many educators prefer not to use the word 'game'. They have chosen to use such terms as, 'business simulation', 'business model', 'simulation exercise', 'decision models', or 'dynamic decision making exercises'. However, since the concept seems to be better known as business gaming, this terminology will be used in this study.

⁴Nicholas Radell, "Concepts of Management Games," Systems & Procedures Journal, Vol. 15 (March-April, 1964), p. 24.

Definition

Business games have been variously defined since their inception in 1956 by the American Management Association. G. R. Andlinger, a forerunner in the area, states that a

. . . business game . . . is a set of rules that corresponds to the economics of a business as realistically as possible within the limitations of a game structure.⁵

In their books, Business Simulation in Industrial and University Education, the authors expand the above definition by writing that a business game is

. . . a sequential decision-making exercise structured around a model of a business operation, in which participants assume the role of managing the simulated operation.⁶

The above definitions are satisfactory; however, a conference on business games held at Tulane University resulted in a more detailed explanation. Many of the professors interested in the area combined their ideas and presented the following interpretation.

. . . A business game is a contrived situation which imbeds players in a simulated business environment, where they must make management-type decisions from time to time and their choices at one time generally affect the environment conditions under which subsequent decisions must be made. Further, the interaction between decisions and environment is determined by a refereeing process which is not open to argument from the players.⁷

⁵G. R. Andlinger, "Business Games - Play One!" Harvard Business Review, Vol. 36 (March-April, 1958), p. 115.

⁶Greenlaw, et. al., op. cit., p. 5.

⁷William R. Dill, James R. Jackson, and James W. Sweeney, Proceedings of the Conference on Business Games as Teaching Devices (New Orleans, Louisiana: Tulane University, 1961), pp. 7-8.

Typical Game

To better understand the nature of a business game a discussion of a typical game should be of assistance.

A typical business game is divided into three distinct parts. "These are the initial brief session, the actual play of the game, and the final critique session."⁸

A representative business game begins with the initial briefing or introduction to familiarize the participants with the game. The introduction is made by the administrator of the simulation. In collegiate education he is usually the class instructor and in industrial education he is usually a member of the training staff. During this presentation by the administrator such items are discussed as:

1. The type of company that is to be managed.
2. The nature of the product(s) that is produced or sold by the company.
3. The history of the company.
4. The rules and relationships that exist in the game.
5. The economic environment in which the companies will operate.
6. The types of decisions that are to be made by each participant or team.
7. The educational purpose of the game.

⁸David G. Graham, "The Role of Management Games in Management Education Programmes," Business Review (Australia), (September, 1966), p. 248.

These items are found in the text of the game but are re-emphasized by the administrator for clarity.

Upon completion of the introduction, the participants are divided into teams with each team assuming the role of management of a company in the simulated environment. The number of the members as well as the number of teams varies according to the game being played and the desires of the administrator. The next step involves organization of each team and the assignment of various managerial roles to each participant. This procedure may be accomplished by the administrator or the team members. Some of the roles that might be assigned are: (1) president, (2) vice-president of finance, (3) vice-president of marketing and (4) vice-president of production. Once the teams are organized the actual play of the game begins, and both short and long range objectives should be determined for each company by each team.

A business game is played by periods. Each period may represent a day, a week, a month, or a quarter of a year of business transactions. The game being used determines the length of the periods. In most games the participating teams have received operating results for the first period of play. Each team then analyzes this information to enable it to make decisions for the second period.

The decisions that are made are very similar to those that are made in a typical business environment.⁹ For example, a team may be required to make the following decisions:

⁹Ibid.

1. Determine the quantity of each product to be manufactured.
2. Determine the quantity of each raw material that is to be purchased.
3. Decide whether to expand or contract investment in plant and equipment.
4. Determine the quantity of labor to employ.
5. Determine the selling price of the product(s).
6. Decide how much to spend for research and development.
7. Determine if there is idle cash available that can be invested in short-term securities.

When the decisions have been completed, they are recorded either on a piece of paper or an IBM card and collected by the administrator. They are then entered into the model where calculations are performed using the decisions as data. The calculations are performed either manually or with the aid of an electronic computer. The products of the computations are the operating results of the second period. The results are usually in the form of financial statements.

Supplementary reports are also prepared in many games to give information on such items as the potential demand of the product(s) and the amount of beginning inventory for the following period. The various teams use the new reports to make decisions for the following period. The new decisions are then processed to obtain operating reports for that period of play.

This cycle of decision-making, calculations and feedback of results is repeated a number of times after which results of play are discussed and analyzed in a critique session.¹⁰

The critique session is considered by many educators to be the most important aspect of business gaming. During the play of the game, the teaching or instruction that takes place predominantly is self-learned. Some of the lessons that are included in the design of the game are not always apparent to the participants. Therefore, guidance is needed in the critique session to focus attention on these areas.¹¹

The critique session may be held by the administrator with each participant or with all participants in a group. A discussion may take the form of a guided but general discussion where each team may make a formal presentation of the strategies it followed in obtaining its objectives. Sometimes a top-level company officer or an outside consultant may be used to comment on the strategies presented.¹² In both instances the responsibilities of the administrator during the critique are:

1. To assist the participants to share and compare the experiences they have had in operating the simulated company.

¹⁰Greenlaw, et. al., op. cit., pp. 6-7.

¹¹Joel M. Kibbee, Clifford J. Craft, and Burt Nanus, Management Games (New York, New York: Reinhold Publishing Corporation, 1961), p. 87.

¹²Walter S. Wikstrom, "Serious Business of Business Games," Management Record, Vol 22 (February, 1960), p. 8.

2. To provide the participants with further information on the results each group has achieved.
3. To direct attention on the most critical and meaningful portions of the play.
4. To tie together the loose ends at the close of the critique by a precise general summary of the learning which has taken place.¹³

A representative game has four essential characteristics. They are (1) rules, (2) structure, (3) competition and (4) feedback.¹⁴ "The rules specify the types of decisions a player can make and the restrictions placed upon his decisions by the game designer."¹⁵ For example, a team may make a decision to invest in short-term securities. This is a proper decision in most business games, but the design of the game may only allow investments to be made in multiples of one-thousand dollars. The rules of play are made known to the participants in the text of the game and are usually emphasized by the administrator in his introduction.

The structure of a business game may also be considered a part of the rules for they ". . . consist of the constants and variables and the relationship between them."¹⁶ The constants and variables and their relationship to each other are usually expressed

¹³John W. Plattner and Lowell W. Herron, Simulation: Its Use in Employee Selection and Training (American Management Association, Management Bulletin #20, 1962), p. 1.

¹⁴Jay R. Green, "Business Gaming for Marketing Decisions," Journal of Marketing, Vol. 25 (July, 1960), p. 21.

¹⁵Ibid.

¹⁶Ibid.

mathematically but this is not a necessity. They describe the fundamental characteristics of the environment in which the companies operate. These relationships are not made known to the participants because one of the objectives of gaming requires the teams to determine their company's environment in order that more efficient decisions can be obtained.

Competition is one of the most important characteristics of business simulations. The rivalry between participating teams in business gaming is a result of the game design. A game may be designed in one of two ways. First, a game may be designed in order that each team's decisions will determine its position in the industry as well as that of the remaining teams. This interaction results in each team attempting to improve or maintain its share of the market. Second, the game may require that participants only compete against an environment. Rivalry occurs when each team attempts to make efficient decisions so as to obtain a greater increase in its owner's equity as compared to the other teams.

Finally, the feedback in business gaming ". . . adds a dynamic aspect to gaming" because "the decisions and results of one period influence future conditions."¹⁷ For example, if a company fails to produce enough inventory to supply the demand for the product a stock-out results. The stock-out may result in loss of customers and back orders for the following periods. The feedback would indicate the stock-out and proper action would have to be

¹⁷ Ibid.

taken for the next period of play.

Historical Development

Business gaming is a direct outgrowth of military war games and has historical roots in the fields of operations research, electronic computers and educational role playing.

The military war game has been used as a training device for many centuries. Many writers believe that the war game was an outgrowth of the parlor game chess.

When chess was first introduced in the 15th century, kings and lords used it as a model for warfare.¹⁸ This type of chess was referred to as war chess and different varieties were developed in the 17th and 18th centuries. One of the more advanced forms of war chess was designed in the 18th century by Helwig, the Master of Pages at the Court of Brunswick. This game consisted of a board that required 1,666 squares and pieces that represented battalions of fusiliers, squadrons of dragoons and batteries of siege guns.¹⁹

The actual war game dates back to around 1798 when a game was designed called 'New Kriegspiel'. This game replaced the boards of war chess with actual maps on which maneuvers were simulated. Further developments of this military war game are credited to Herr von Reisswitz and his son. They added an elaborate set of rules that did not exist with war chess.

¹⁸ Charles E. Redfield, "Should Business Men Play Management Games?", Office, Vol. 53 (June, 1961), p. 16.

¹⁹ Kibbee, et. al., op. cit., p. 136.

In employing 'New Kriegspiel' during the 19th century, a dilemma arose that continues to plague the business games of today. This quandry was whether to design the model to be realistic or playable. As a result the development of war games branched in two directions, 'Rigid Kriegspiel' and 'Free Kriegspiel'. The design of 'Rigid Kriegspiel' emphasized reality and introduced new formal rules to more accurately reflect the changing nature of a war. In this version dice were incorporated to produce random effects. Also, extensive charts, tables and calculations were used to determine the exact details of troop movements.²⁰ The 'Free Kriegspiel' design was more playable and used experienced military judgement rather than formal rules, charts and tables to determine decision results.

The popularity of the war game resulted in rapid acceptance in other countries. Games were adopted in 1872 by the British Army and a few years later at West Point by the United States Army. In the United States extensive work was done to improve 'Rigid Kriegspiel' by adding a new technical apparatus and tables based on the American Civil War and Franco-Prussian War. However, the ease of administering 'Free Kriegspiel' led to its increasing popularity in the United States Army and also in the Armies of the rest of the world.²¹

²⁰ Kalman J. Cohen and Eric Rheman, "The Role of Management Games in Education and Research," Management Science, Vol. 7, #1 (January, 1961), p. 132.

²¹ Ibid., p. 133.

War games have been used throughout the world during the 20th century but Germany and Japan have used them extensively. The Germans used them as training devices in both World War I and World War II. During World War II Japan used war games to prepare war maneuvers as well as internal government policies. An example of Japan's application of war gaming was its ". . . pre-Pearl Harbor play at the Naval War College of Japan."²²

The United States also has continued to use war games in this century as training devices. The Navy's seven million dollar Navy Electronic Warfare Simulation is perhaps the most elaborate war game in existence today.

In the typical war game military personnel are divided into opposing teams. Each team is given a map and an imaginary mission and then is instructed to make decisions that are necessary to accomplish the mission. The decisions are made and the results are calculated and returned to the participants. After a number of periods of play have been completed the results are analyzed. This procedure is similar to the play of a business game that is described in the first few pages of this chapter. The military war game also is similar to the business game in providing the participants with decision-making alternatives that are structured around a model of reality.

Originating during World War II, Operations Research was another field that contributed to the development of business gaming.

²²John D. Stanley, "Management Games, Education or Entertainment?", Personnel Journal, Vol 41 (January, 1962), p. 15.

During this war British scientists developed radar but the military was uncertain about how to use it productively. To solve this problem, the aid of the scientists who developed the equipment was requested. These individuals were accustomed to solving problems in a scientific manner so they used the same approach in solving this one. They collected data about the use of radar and analyzed it with mathematical and numerical techniques. From the analysis a theory was developed to explain the data that were collected. Next the facts and theory were used to make predictions of future operations. Finally, they tested their predictions against future operations and modified their theory so that it more closely corresponded to actual results. As a result of their work British air defense was said to have increased tenfold.²³ This type of problem-solving technique continued to be used successfully in the war and later was introduced in industry.

One of the more powerful operations research techniques in use in industry today is simulation. However, the need for its application in industry differs from that in business gaming. The operations researcher utilizes it to develop a model of an organizational system which is used to test various alternatives without interrupting the real system. New policies and procedures can then be produced as a result of these tests. Many organizations train their employees in these newly developed policies and procedures by simulating several

²³Abe Shuchman, Scientific Decision Making in Business (New York, New York: Holt, Rinehart and Winston, Inc., 1963), pp. 2-3.

periods of the firm's operation. When operations research is utilized in this manner, the simulation that is obtained is very similar to business gaming.²⁴ It is also interesting to note that several of the men who developed the first business game were operations researchers.

Business gaming also has historical roots in the area of educational role playing. The essence of educational role playing is the development of a problem situation involving two or more persons. The participants are asked to play the roles involved and to perform them in a manner that would solve the problem. The roles may be those of top executives, department heads, foremen, workers or some combinations of these.

There is a close relationship between educational role playing and business games. Both tools require the participants to assume a role in a problem situation. Also, there is a feedback on the appropriateness of a person's decisions or actions in the problem environment. In role playing the feedback is obtained from other participants but the feedback of a business game is based on the designed conditions of the game. Even though there is a close similarity between these two educational tools there is a difference. Business gaming is predominantly different from role playing ". . . in its use of rigid rules enforced by an umpire, and its emphasis on quantitative material problems rather than on human relationships."²⁵

²⁴Greenlaw, et. al., op. cit., p. 9.

²⁵"In Business Education, The Game's The Thing," Business Week, (July 25, 1959), p. 58.

The evolution of the electronic computer has made an impact on the development of business games. The availability of the electronic computer ". . . has provided an opportunity for the designers of games to incorporate in them a great deal of realistic complexity while still keeping their administration relatively simple. An electronic computer also adds considerably to the drama of the play"²⁶ of business games.

The use of gaming as a pedagogical tool in business began in 1956 when the American Management Association began the development of their Top Management Decision Simulation. This simulation was a direct outgrowth of military war games and was an attempt to provide business executives with experience in decision-making that confronted every top management. These facts were emphasized in the following statement taken from a publication of the American Management Association which explained their simulation. The authors stated that

In the war games conducted by the Armed forces, Command officer of the Army, Navy and Air Force have an opportunity to practice decision making creatively in a myriad of hypothetical yet true-to-life competitive situations. Moreover, they are forced to make decisions in areas outside their own speciality; a naval communications officer, for example, may play the role of a task force commander.

Why, then, shouldn't businessmen have the same opportunity? Why shouldn't a vice president, say, in charge of advertising have a chance to play the role of company president for fun and practice? Why not a business 'war game' in which teams of executives would make basic decisions of the kind that face every top management - and would see the results immediately?

From these questions grew AMA's Top Management Decision Simulation. After an exploratory visit to the Naval

²⁶Cohen and Rheman, op. cit., p. 134.

War College, a research group was formed and work began on a game . . . ²⁷

Franc M. Ricciardi, AMA's Vice President in charge of Divisions was chairman of the research group that developed this simulation. Other members of the group were: Clifford J. Craft, AMA Division Manager of Manufacturing, Richard Bellman, who was associated with the Rand Corporation and the Consulting firm of Booz, Allen & Hamilton, and Charles Clark and Donald G. Malcolm, who engaged in operations research with Booz, Allen & Hamilton. Of the group, an interesting observation is that two of the five were associated with operations research. Their presence would seem to indicate that the operations research techniques may have played a considerable role in the development of the first business game.

The electronic computer also contributed to the development of the first business game. The calculations required in the play of AMA's simulation could be performed in forty-five minutes. If a computer was used the calculations only required five minutes. Due to this time differential it was decided by the research group to use an IBM 650 computer to administer the game.

Numerous test plays were held by the research group, which indicated weaknesses in the model. As a result many changes were made. When the research group felt that the model was acceptable, they introduced the simulation at a management training course. This

²⁷Franc M. Ricciardi, et. al., Top Management Decision Simulation (New York, New York: American Management Association, Inc., 1957), p. 59.

course was held in September, 1957, at the newly built American Management Association Academy at Saranac Lake, New York.²⁸ Since that time the AMA has improved its first game and has designed several other simulations.

The AMA game simulated top management's problem of allocating limited working capital to the factors of production in a competitive market.²⁹ The game required five teams with three to five executives per team. Each company produced a single consumer product that was sold in competition with the other companies in a common market. The environment of the game included all the common functions of a business such as production, finance, research and development and marketing. The decision period of the game represented a quarter and each team had to make six decisions per quarter. These decisions were: (1) the price to be charged for their product, (2) how much to spend for marketing activities, (3) their research and development expenditures, (4) a rate of production, (5) whether to change plant capacity, and (6) whether to purchase marketing research information about competitors' behavior.³⁰

Once all the teams completed their decisions for a quarter, they were punched on IBM cards and read into an IBM 650 computer. The computer combined the decisions and determined the interaction

²⁸Kibbee, et. al., op. cit., p. 7.

²⁹Ricciardi, et. al., op. cit., p. 79.

³⁰Cohen and Rhenman, op. cit., p. 135.

which resulted from them. The results of the decisions were then printed by an IBM 407 printer and returned to the teams. This decision process was continued for twenty to forty quarters. This meant that a group of executives could actually participate in making decisions that would cover five to ten years in approximately one day. At the close of play a critique session was held and the executives discussed their performance and exchanged ideas.

The executives who participated in the early use of this simulation indicated that it was a valuable training technique. Following the play of the game Patrick J. Robinson of Imperial Oil commented that

. . . the game suffers somewhat from its lack of random occurrences, such as those which frequently affect real-life business operations and decisions, . . . But I enjoyed playing the game and I feel that it has great possibilities for in-company training as well as for use in business school.³¹

Paul W. Pinkerton, a partner in Haskins & Sells, felt that the game would ". . . contribute greatly to broadening the outlook of specialists in industry . . ."³² A view that was expressed by many of the executives was expressed by George W. Chane, a manager in the New York office of Ernst & Ernst. He said that the

. . . game demonstrates once again the complexity of running a modern business. It shows you that you can't do it by rule of thumb. I believe the game will make a really substantial contribution to the training of

³¹"How to Build Know-How Fast," Nation's Business, (May, 1957), p. 123.

³²Ibid.

junior executives and, later on -- as it develops -- to the training of upper echelon executives.³³

Approximately at the same time that the AMA simulation was developed a second business game was being designed by G. R. Andlinger and Jay R. Greene. Their game was published in the March-April, 1958 issue of the Harvard Business Review. The game became known as the Andlinger game and helped contribute to the rapid growth of interest in business games. Since this game could be obtained by purchasing a copy of the Harvard Business Review, its use became widespread. The limited use of the AMA simulation to AMA training courses contributed even more to the use of Andlinger's game.

Andlinger's game was similar to the AMA simulation in that both encompassed the common functions of a business. His game, however, dealt with a capital goods market whereas the AMA game dealt with a consumer goods market. A major difference between these two pioneer business games was the way in which each was administered. The AMA simulation used a computer but Andlinger's game was manually administered and was played on a board similar to many parlor games. The decisions required, the decision periods and the critique sessions were similar in the two games.

The field of business gaming experienced an extraordinary growth during the few years that followed the introduction of the Andlinger and AMA simulations. During this period of time there were one hundred different business games being used in businesses and

³³Ibid.

colleges.³⁴ These games first appeared on the campuses of UCLA and Carnegie Institute of Technology. Other schools such as Michigan State University, the University of Pennsylvania, the University of Washington, Indiana University and the University of Oklahoma followed with their games. In industry such well known companies as Pillsbury, Kroger, General Electric, Westinghouse, Remington Rand, and International Business Machines were the forerunners in introducing business games in their training programs.

The growth of business games is continuing today. Most of the major publishers of business texts recently have published a business simulation or have one in progress.

Types of Games

Business games generally are classified as being either general policy games or functional games.³⁵ However, each type of game may have many common characteristics. For example, each type of business game could be administered manually or with a computer, could represent a general or specific industry, or contain random or deterministic elements.

The main difference between the two basic types of business games is the level of management that each attempts to simulate. General business games concentrate on simulating top-level management.

³⁴Redfield, op. cit., p. 18.

³⁵"In Business Education The Game's The Thing," op. cit., p. 56.

They are designed

. . . to teach decision-making at the top management level where all major functional areas of the total enterprise are involved in achieving fundamental organizational objectives, such as maximum profit, return on investment, or attainment of certain sales levels or a certain share of the market.³⁶

Many of the early games such as the AMA game, the UCLA game and the Carnegie Tech game were general policy games. They are similar in design and include such decision areas as pricing of products, rate of production marketing, market research, plant investment, short-term investments and research and development expenditures. In some of the more complex general policy games the participants are subjected to other problem areas such as taxation, depreciation and distribution of dividends to stockholders.³⁷

The functional games simulate decision-making at middle and lower levels of management. They are structured to teach certain skills or techniques in a functional area of management such as marketing, production, inventory control or finance. The participants in these games usually attempt to minimize costs through efficient operations rather than attempting to attain some organizational goal as in general business game.³⁸ The functional games usually are simpler in design than the general policy games. They are structured

³⁶John R. Carson, "Business Games: A Technique for Teaching Decision-Making," Management Accounting, Vol. 44 (October, 1967), pp. 31-32.

³⁷Greenlaw, et. al., op. cit., p. 17.

³⁸Carson, op. cit., p. 32.

so that optimum solutions may be obtained in contrast to the top management games where optimum solutions are difficult to obtain.

The two basic types of games may be further delineated according to how the decision results are calculated. If a computer is used to perform calculations, the game is considered to be computer administered. If a computer is not used, it is considered to be manually administered. Even though some games have been designed with the computer in mind, and some have not, the basic structure of the two is similar.

The major difference between computer and manually administered games generally is the complexity of the computations. The computations required by most non-computer games are simple. This simplicity permits calculations to be performed by hand or with a desk calculator. The more complex games require many computations and for accurate calculations, a computer is used to administer these calculations.

There has been considerable discussion of the advantages and disadvantages of computer and non-computer games. Some of the factors that have been the subject of these discussions are (1) costs, (2) speed and accuracy, (3) reports produced, (4) flexibility and (5) administration time. The discussion that follows concerning these factors is generally based on the book Business Simulation in Industrial and University Education.³⁹

³⁹Greenlaw, et. al., op. cit., pp. 27-28.

The cost factor is an advantage associated with the manual game. The costs incurred in the development and application of a manual game as compared to those of a computer game is considered minimal. The expenditures incurred for a manual game include the salary of the designer, administrator and desk calculators or adding machines for calculation purposes. Similar expenditures for a computer game are more expensive because they include the salary of the designer, salary of the programmers and computer time.

The major advantage of computer administered games is the speed and accuracy with which the computer determines and presents the results of game decisions. Speed is an appealing characteristic but may not be necessary. The need for speed in obtaining decision results depends upon the time available between decisions. If decisions are made every week, time is not an important factor, but it is if decisions are made at thirty minute intervals.

Accurate computations and the presentation of their results is a prerequisite for effective gaming. If errors appear in the game results, the participants may become disillusioned with the administration of the game and its effectiveness as a pedagogical tool. Computer games have an advantage in accuracy because computer hardware has built in checks to guarantee arithmetic accuracy. However, the computer program must be debugged to maintain accuracy.

One of the critical aspects of business gaming is the feedback of information that is made available to the participants for future use in making decisions. For proper decisions to be made the players must be presented with adequate information. The computer makes

possible more kinds of informative reports in a shorter period of time as compared with manual games. Also, the information may be neater.

Flexibility of game administration is an advantage associated with non-computer games. A manual game may be played with little difficulty almost any where at anytime, while the use of a computer game requires the availability of a computer. This reasoning may be challenged because most large businesses and universities have computers or the availability of computer time.

A second concept concerning flexibility is that if a computer game is well programmed it may be more flexible than a manual game.⁴⁰ The logic of this opinion is that if a game is properly programmed various sets of parameters may be used with the same game. Under these conditions different environments may be presented to the same teams in the same play of the game.

The administration time required of business games is an advantage that has been associated with computer games. The time required to administer a computer game is considerably less than that required for a similar manual game. The time-saving advantage was evident in the American Management Association's first business game, which required five minutes of calculations by a computer and forty-five minutes by hand. With the increase in the speed of electronic computers since 1956, this time differential is even greater today.

Another characteristic of both general policy and functional

⁴⁰Kibbee, et. al., op. cit., pp. 137-138.

games is the effect which a team's decision has on its own market position as well as the position of other teams. The decisions made in either type of game may be interactive or non-interactive. A game is considered to be interactive if the decisions made by a participant or a team of participants have a specific mathematically determinable effect upon the results achieved by other participants or teams.⁴¹ In other words, a game is interactive if the companies in a game environment compete against each other for customers and the effectiveness of each company's decisions depends upon the decisions of its competitors as well as its own decisions.

In a non-interactive game the decisions of a participant or team do not have any affect on the operating results of the others. The competition in this form of business game is not between the various companies. The competitive spirit arises as each team attempts to make more profit by operating more efficiently than other teams in the same environment.

Another feature of the two basic types of business games is the number of individuals that represent a decision-making unit. Many of the functional games are designed to enable each player to represent one decision-making unit.⁴² Most of the games; however, are designed for team play and each team is divided according to a typical business organization and the players make group decisions.

⁴¹Greenlaw, et. al., op. cit., p. 23.

⁴²Hans B. Thorelli and Robert L. Graves, International Operations Simulation (London, England: Collier-Macmillian, Ltd., 1964), p. 10.

The designs of the model environments of business games are oriented toward a generalized hypothetical business operation, or toward a specific firm or industry.⁴³ The early games such as the AMA game, the UCLA game and the IBM game were designed with a generalized business environment. More recent ones are attempts at simulating particular industries. For example, the Esso game is a model of the petroleum industry and the Carnegie Tech game is a model of the detergent industry.⁴⁴

A final aspect of the description of business games is that a game may be designed around a model that is either deterministic or stochastic. The results of games using a deterministic model are determined only by the decisions that are made by the participants. Similar decisions made using this model will produce similar results. The results of games using a stochastic model are determined by probabilities. Similar decisions made using a stochastic model may result in a variety of results. A model of this type produces the randomness that exists in the real world.⁴⁵

To assist in a better understanding of the above discussion, a summary of the types of business games is presented in Table 1.

⁴³Greenlaw, et. al., op. cit., p. 21.

⁴⁴Cohen and Rheman, op. cit., p. 138.

⁴⁵Ibid.

TABLE 1

THE TYPES OF BUSINESS GAMES AND
THEIR MAJOR CHARACTERISTICS

GENERAL POLICY GAMES	FUNCTIONAL GAMES
1. REPRESENTATION: Top-level management.	1. REPRESENTATION: Middle and lower level management.
2. EDUCATIONAL PURPOSE: Teach decision-making at the top management level.	2. EDUCATIONAL PURPOSE: Teach certain skills or techniques in functional areas of management.
3. PARTICIPANT'S OBJECTIVE: Attempt to achieve certain fundamental objectives of a firm such as the maximization of profits.	3. PARTICIPANT'S OBJECTIVE: Attempt to solve the problems of a functional area by minimizing cost through efficient operations.
4. DESIGN: Complex.	4. DESIGN: Simple.
5. ADMINISTERED: Most are computer administered.	5. ADMINISTERED: Many are manually administered but the trend is toward computer administration.
6. DECISION EFFECTS: Most decisions are interactive.	6. DECISION EFFECTS: Decisions are usually non-interactive.
7. PLAY OF THE GAME: Team play.	7. PLAY OF THE GAME: Some are individual play but most are team play.
8. TYPE OF MODEL: May be deterministic, stochastic or both.	8. TYPE OF MODEL: May be deterministic, stochastic or both.

Summary and Conclusions

Business games, a form of simulation, had their origin in war games, operations research and educational role playing. They have been proclaimed by many educators to be one of the better educational tools developed in the last few years. Since their introduction in 1956, their use has increased rapidly, especially in corporate and collegiate educational programs.

The use of the word 'game' in the name of a pedagogical tool was considered by many educators to be unfortunate. These individuals indicated that the word implies some form of entertainment rather than a form of education. To alleviate this misunderstanding many other names have been used to describe this tool. Some of these are business models, business simulations and decision models.

A typical business game consists of three parts and has four essential characteristics. The typical game consists of a briefing session, the actual play of the game and a critique session. The characteristics that are essential to a business game are rules, structure, competition and feedback.

The growth of new business games after the introduction of the Top Management Decision Simulation was extraordinary. This growth resulted in more than one hundred business games being used in 1960. These games were being used in many of the better known business schools and in training programs of large corporations. The growth of business games is continuing today but not at the pace of the first few years of their existence.

The games that have been designed can be classified into two types, general policy and functional. The general policy game is designed to teach decision making at the top management level while the functional game is used to teach certain skills or techniques in functional areas of management.

The following chapter presents a closer look at the educational application of business games. The discussion includes applications in graduate or undergraduate business curriculum, internal company training programs and executive development programs run externally by a business school or a professional organization.

CHAPTER IV

EDUCATIONAL APPLICATIONS AND THE FUTURE OF BUSINESS GAMES

Introduction

The use of business games has spread rapidly throughout the business world since their introduction in 1956. They have been applied in three distinct areas in the last decade. These areas are education, research and business planning.¹

The application of business games received more publicity in the field of education than in research and planning. This publicity was in the form of publications and presentations by educators and businessmen at various symposia. These publications and presentations concerned such topics as the purposes of gaming, what a game teaches, various applications of gaming, the advantages and disadvantages of their use and the possible future of business games.

The use of business games in research and planning is not within the scope of this study. However, the value of applying gaming in these areas is recognized. Research games are used to study such topics as social interaction, organization theory, decision processes and logistic policies. The application of gaming in

¹Hans B. Thorelli and Robert L. Graves, International Operations Simulation (London, England: Collier-Macmillan, Ltd., 1964), p. 9.

business planning is limited to applying management's new ideas to a game model.

The future of business games looks promising in the areas mentioned above as well as in many new ones. New applications mentioned by different writers include employee selection, measuring aptitude and abilities of employees and training employees in information processing.

Education

Most business games are used primarily in educational programs.

In business education, gaming is applied in three types of programs:

. . . in a graduate or undergraduate university business curriculum; in an internal company training program; and in an executive development program run externally either by a university business school or by a group such as the American Management Association.²

Business games are used for different educational purposes. Many writers have stated in general terms what they consider to be the educational purpose of this education technique. G. R. Andlinger says that business games may have either or both of two educational purposes - to solve problems or to teach.³ He states that

A problem solving game is one in which the objective is to arrive at an approximate answer through repeated trials--in essence, to arrive at a higher level of insight into a process that existed previously. . . . A

²Kalman J. Cohen and Eric Rhenman, "The Role of Management Games in Education and Research," Management Science, Vol. 7, #1 (January, 1961), p. 143.

³G. R. Andlinger, "Looking Around," Harvard Business Review, Vol. 36 (July-August, 1958), p. 148.

teaching game, on the other hand, has as its main objective the demonstration of already existing insight or principles to the participants.⁴

Other writers state that there is a threefold purpose of business games in business education. The first purpose is to increase student or employee understanding of business problems, such as production or inventory control, at the functional level. The second purpose is to improve the understanding of the interrelated functions of a business as well as to understand the various firms within an industry. The final purpose is to broaden student or employee knowledge and to provide practical training in the problems of organization, policy and decision-making processes in general.⁵ These three purposes are stated independently, but they are merely a breakdown of Andlinger's educational purposes of business games. There are various other statements concerning the educational purpose of business games. However, an analysis of these statements indicates that the educational purpose of gaming can be classified as either problem solving or teaching.

Exactly what does a business game teach is a question that has been asked by many skeptics. The question has been answered by many individuals in education, but the reply of G. R. Andlinger is unique. He approaches the question by dividing business education into four segments. He then discusses how business games would apply

⁴Ibid.

⁵Thorelli and Graves, op. cit., p. 3.

to each segment. These segments and a discussion of each is presented below.⁶

1. Education in facts. -- An executive must know a vast amount of facts and background information to handle his job properly. This knowledge would include tax regulations, anti-trust laws and industrial statistics. Andlinger points out that the framework of a business game would not be beneficial in teaching these facts.
2. Training in business methods and techniques. -- Many methods and techniques are common to businesses such as production scheduling and accounting. Andlinger believes that a business game can contribute substantially in this area of business education. His opinion is based on two advantages associated with gaming. First, a game creates an interest on the part of the participant in the methods and techniques used in the game. Second, the realistic environment of a business game provides learning by active participation.
3. Teaching of management principles. -- Until recently the case method was the best pedagogical tool available for teaching management principles. Andlinger believes that the business game is a better tool for teaching management principles. Gaming is superior than the case method because it adds the feature of feedback from decisions. Therefore, participants of business games have to live with their decisions and management principles require translation into these decisions.
4. Training in decision-making. -- Business educators are concerned

⁶Andlinger, op. cit., pp. 150-151.

with teaching the skills that are needed at the policy-making level of an organization. The policy-making executive has to trade his specialist identification for that of a generalist. Andlinger believes that the business game is useful in teaching the executive decision-making. His reasoning is that a business game provides experience rather than exposure to problems involving decision-making.

John R. Carson is much more specific in what he believes a business game teaches. He says that gaming teaches the importance of planning and timely decision-making by using time variations such as time compression, time lag and time cumulation. Time compression is the simulating of many years of experience in a few hours. Time compression enables the participants to observe the long-run as well as the immediate results of their decisions. Games that have time lags require decisions to be made in one period so as to achieve certain results several periods later. Time lags demonstrate to players the need for future planning. Finally, when time becomes cumulative, the participants see how their decisions build on each other. Therefore, decisions should be based on long run policies and objectives.

Carson also states that there are interpersonal forces within a team that teach the team members the art of working with people. Each team becomes a human laboratory in which the members learn to get along with each other and how to organize themselves for efficient decision-making.

Business games also introduce the elements of risk and uncertainty. These elements are important characteristics of all businesses, but are often not illustrated in business education programs.

The business game introduces players to risk and uncertainty by including some chance elements in the feedback from decisions.⁷

Business Games in Business School Curricula

A survey indicated that in 1964 a majority of business schools which were members of the American Association of Collegiate Schools of Business were using business games in their curricula.⁸

Business games are applied in almost every business discipline. Business statistics and business law are the exceptions.

Schools that are leaders in the development and application of business games are Pennsylvania State University, Michigan State University, UCLA, Yale University, University of Chicago and Carnegie Institute of Technology. Gaming is used at these schools to either preface or climax a course.

As a preface to a course, a game will be centered around the proposed areas of study and will be designed to whet the appetite; it will introduce problems, beyond the ability of the players, which the instructor can handle in his final critique. The game will have been carefully designed to make most costly those mistakes which would have been avoided had the players been expert in the subject or technique which the course teaches As the climax to a course of study, a game is useful in allowing the instructors to be present and to help their students in their first application of the knowledge

⁷John R. Carson, "Business Games: A Technique for Teaching Decision-Making," Management Accounting, Vol. 44 (October, 1967), p. 32.

⁸Alfred G. Dale and Charles R. Klasson, Business Gaming (Austin, Texas: Bureau of Business Research, The University of Texas, 1964), p. 7.

they have been acquiring.⁹

Pennsylvania State University used the UCLA Game No. 2 as an integral part of a senior undergraduate course entitled Business Policy Formulation and Control. The course was integrative. The students were expected to apply the knowledge they had obtained in their three previous years of business schooling. The development of student skills in analyzing business problems from a top management view point was the major objective of the course. The UCLA game was a general policy game. Therefore, it provided the students with a laboratory in which to practice the skills required of top management personnel. The game was used as a supplement to the course text and was played in about one-third of the class hours. Additional assignments were required to provide experience in the application of analytical tools and in other approaches to decision-making. These assignments included breakeven analyses, sales forecasts, cash budgeting and capital budgeting within the different companies in the game environment.¹⁰

Michigan State University has used various business games in its curriculum. The MSU Investment Game, UCLA Game No. 2, Andlinger's Business Management Game and Green and Sisson's Personnel Assignment and Economic Order Quantity Games were used at Michigan State

⁹Miles Kennedy, "Business Games for Accountants," Accountancy (England), Vol. 73 (March, 1962), p. 221.

¹⁰Paul S. Greenlaw, "Experience with Gaming in a Senior Undergraduate Course," in Conference on Business Games, ed. by William R. Dill, James R. Jackson and James W. Sweeney (New Orleans, Louisiana: Tulane University, 1961), pp. 85-87.

University.

The MSU Investment Game was used in an M.B.A. course entitled Management Programming and Control. The game was designed to allow the participants to take part in the formation and operation of business firms that composed a small competitive company. A separate management game was used to generate data. The data were combined with an over the counter market which accommodated the trading of equity and debt securities of the firms. The participants experienced some of the confusion and excitement of organizing, financing and operating a business enterprise.

A modified version of the UCLA game was used in a freshman introduction to business course. Michigan State applied the other games in graduate courses, but the types of courses were not available.¹¹

Martin Shubik applied business games at Yale University. His uses of gaming were similar to those mentioned above. However, he utilized one exercise that was entirely different. Professor Shubik required his students to construct a business game in a seminar on oligopoly theory. This process gave him an excellent device for teaching model building. The construction of the business game also gave the students a better understanding of quantitative and

¹¹Richard C. Henshaw, Jr., "A Report on the Use and Design of Business Games at Michigan State University," in Conference on Business Games, ed. by William R. Dill, James R. Jackson and James W. Sweeney (New Orleans, Louisiana: Tulane University, 1961), pp. 96-98.

mathematical economics.¹²

INTOP, an international operations simulation, was applied in two courses at the Graduate School of Business of the University of Chicago. The courses were Advanced Marketing Management and Business Policy and Organization. In both courses the teaching techniques included lectures and discussions, readings, writing assignments and the INTOP Game. The marketing course was offered to M.B.A. students. The policy course was a part of the school's executive development program.

The marketing management course had two major objectives. First, the course related marketing to the overall entrepreneurial objective of the firm and to the remaining major functional areas such as production and finance. Second, it integrated the subfunctions of marketing into an overall marketing management perspective. The class met approximately thirty-three times and the game was played in about one-half of the meetings. The students were required to prepare company objectives, organization plans, job descriptions and memoranda on problems of marketing management in their firms in addition to the normal play of the game.¹³ The business policy course was a part of their executive development program and will be discussed later in this chapter.

¹²Martin Shubik, "Comments Upon Games as a Teaching Device," in Conference on Business Games, ed. by William R. Dill, James R. Jackson and James W. Sweeney (New Orleans, Louisiana: Tulane University, 1961), pp. 134-135.

¹³Hans B. Thorelli, "Integrated Use of Simulations in Management Education," Personnel Journal, Vol 43 (February, 1964), pp. 68-69.

The business game was chosen to be an integral part of the graduate management science program at New York University. The UCLA Game No. 3 was chosen to be used in one of the final required management science courses. In earlier courses the students were taught such quantitative techniques as decision theory, game theory, queuing theory and the critical path method. The game was then used to provide the students with a realistic environment in which to apply these quantitative techniques in making business decisions.¹⁴

The business faculty of Carnegie Institute of Technology developed the most complex game to date. Their game is the core of their M.B.A. program and represents the detergent industry.

To emphasize the complexity of the Carnegie Tech game each team was required to record between 100 to 300 decisions every period.¹⁵ This complexity requires the students to specialize in such areas as production, marketing and finance. Many short run decisions are required in each specialized area. In the production area the students must make regularly the following decisions:

1. Order raw materials
2. Decide on size of labor force
3. Decide how much overtime to authorize
4. Plan how much to spend for maintenance of plant and equipment
5. Schedule the total quantity of production for the month by product
6. Decide what transshipments of existing

¹⁴Mark E. Stern, "Catalytic Power of Business Decision Gaming in Teaching Management Science," Computers & Automation, Vol. 11 (November, 1962), pp. 12-16.

¹⁵Kalman and Rhenman, op. cit. p. 139.

inventories need to be made from factory to district warehouse or among district warehouses

7. Decide how to allocate production among warehouses¹⁶

The marketing personnel of each team must make the following decisions regularly.

1. Set prices by product and by region
2. Determine advertising expenditures by product and by region
3. Decide distribution expenditures (for sales force and promotion) by product and by region¹⁷

Also, the personnel in the financial area must make regularly the following decisions.

1. Estimate net cash requirements for operations in the coming month
2. Authorize total receipts and disbursements for the coming month
3. Arrange for payments of funds for taxes, for interest, for construction, for retirement of debt, and for purchase of government bonds
4. Decide what share of profits should be allocated as dividends to stockholders
5. Decide (in the case of inadequate reserves) what steps should be taken to cut expenses¹⁸

In addition to the above short-run decisions each team as a group considers the following long-run decisions.

1. Expenditures for research on new products and for test market studies on consumer acceptance of the products

¹⁶Kalman J. Cohen, et. al., "Carnegie Tech Management Game," Journal of Business (Chicago), Vol. 33 (October, 1960).

¹⁷Ibid.

¹⁸Ibid.

2. Expenditures for general market research into the nature of consumer preference, into the patterns of retail sales, or into the performance of competitors
3. The desirability of dropping, changing, or adding products or of extending marketing efforts into a new territory
4. Investment in new facilities for the storage of raw materials or finished goods
5. Investment in new plant and equipment for production
6. The advisability of applying for
 - (a) Renegotiation of current debt
 - (b) Additions to working capital by short term bank loans
 - (c) Long-term additions to capital by issuing stock or by selling bonds.¹⁹

The time required of the students to play the Carnegie Tech game is equivalent to a full time course. The faculty at Carnegie Tech recognized this and in order to exploit the full educational value of their game they chose to use it as a core around which many of their M.B.A. courses could be organized. The game was incorporated as a separate course in the second year of their two year M.B.A. program. The second year enabled the students to apply quantitative techniques learned in the first year of the program.²⁰

A board of directors made up of faculty members made the Carnegie Tech game unique. Each team presented to the board oral and written reports justifying past decisions and also any future plans. The faculty associated with the game felt that this was a good method

¹⁹ Ibid.

²⁰ Richard M. Cyert, "Integration of the Game into the Curriculum," in Conference on Business Games, ed. by William R. Dill, James R. Jackson and James W. Sweeney (New Orleans, Louisiana: Tulane University, 1961), pp. 44-46.

for improving the students' ability to communicate with persons in positions of superior authority.

Within the M.B.A. program at Carnegie Tech many courses related to the game in some manner. Auditing was taught in a first year quantitative controls course. The students in this course organized themselves into teams of auditors and audited the financial reports and the management controls of the teams playing the game. The faculty as well as Certified Public Accountants indicated that the auditing students learned more about the role of auditing in the administrative process using this technique than other common educational tools.

The students in an advanced business and engineering economics course prepared a term paper that defined and performed an operations research project for the firms of the game. This assignment provided the students with an experience in applying operations research techniques in a realistic situation.

Two other courses related to the game were an electronic data processing and a marketing course. The electronic data processing course required the students to develop information systems for the game firms. The marketing students prepared term papers which developed improved procedures for analyzing marketing information and making marketing decisions in the game.²¹

²¹Kalman J. Cohen and Merton H. Miller, "The Carnegie Tech Management Game as a Persuasive Educational Tool," in Conference on Business Games, ed. by William R. Dill, James R. Jackson and James W. Sweeney (New Orleans, Louisiana: Tulane University, 1961), pp. 48-55.

The above discussion of the Carnegie Tech Management Game indicates that the faculty at Carnegie Institute of Technology has progressed further than other schools in making gaming an integral part of its curriculum. This is probably the ultimate approach to the use of business games at this stage in their development.

The application of gaming in accounting courses is omitted from this chapter. A detailed analysis of their use in accounting is presented in the following chapter.

Business Games in Internal Company Training Programs

The majority of major business firms in the United States are using business games in their internal executive training programs. These firms have developed their own games or have modified existing games for their particular purpose.²² The business games used in internal training programs are similar to those used in business schools. They range from simple to complex.

Gaming is applied in executive development in one of three ways.

1. To discredit old ways of thinking and to build up interest in learning
2. To give men experience with the problems managers face
3. To help evaluate a manager's performance.²³

²² Kalman J. Cohen, Educational Use of Management Games, Graduate School of Industrial Administration Reprint No. 110, Pittsburgh, Pennsylvania: Carnegie Institute of Technology, 1962-63, p. 137.

²³ William R. Dill, "What Management Games Do Best," Business Review (Indiana University), Vol. 4 (Fall, 1961), pp. 55-56.

Many businessmen believe that business gaming is a definite contribution to any executive development program. This contribution results from three aspects of this tool. First, a game focuses the attention of the participants on the particular problems in the game environment. Second, it involves the executives emotionally in the learning process. Third, the involvement of each player is based upon situations that he will encounter in his day to day job.²⁴

Business games have been a part of executive development programs since their development. Industrial pioneers using them in their training programs were General Electric, Westinghouse Electric Company, Proctor & Gamble Company, Boeing Company and Pillsbury Mills.

The General Electric Company was the first firm to apply business games in their training programs. The personnel of General Electric developed several for their programs. Dispatch-O, UNIFLO and Simuload are three of the better known games developed by General Electric personnel.

Dispatch-O was the first game developed and used at General Electric. The origination of this game paralleled the inception of the American Management Association's simulation. However, it was not completed until one year after the introduction of the AMA's simulation. Dispatch-O illustrated the problems associated with releasing and sequencing jobs to the factory floor. The participants were required to dispatch jobs to the machine shop using tickets placed on

²⁴Nicholas Radell, "Concepts of Management Games," Systems and Procedures Journal, Vol. 15 (March-April, 1964), p. 27.

a Gantt Chart.²⁵

Dispatch-0 was followed by the development of UNIFLO and Simuload. The UNIFLO game covered production leveling. UNIFLO demonstrates how changing production levels have a direct and measurable effect on costs.

The Simuload game emphasized master scheduling and loading (production versus capacity) in job-shop manufacturing situations. Simuload encouraged a more inductive approach to difficult scheduling problems, provided an opportunity to "learn-by-doing" and promoted a compatible atmosphere in which relative strangers could become familiar with scheduling and loading problems.

The participants of UNIFLO and Simuload began the play of the game with a sales forecast. They had to plan production based on the sales forecasts. The players were also required to meet a shipping schedule which might or might not have approximated the sales forecasts.²⁶

The Westinghouse Electric Company was another pioneer in the use of business games in executive training programs. Personnel of this company developed a simulation that bridged the gap between theory and successful application of an inventory distribution system.

²⁵William H. Fitchthorn, "Simulation: A New Tool for Management Education," Systems and Procedure Magazine, Vol. 12 (January, 1961), p. 10.

²⁶Robert R. Smith, "Business Games at General Electric Company," in Management Games by Joel M. Kibbee, Clifford J. Craft and Burt Nanus (New York, New York: Reinhold Publishing Corporation, 1961), p. 185.

The game demonstrated the problem of placing orders for industrial goods and then distributing the goods among three field warehouses. The game participants had to place orders every month. The delivery of the orders required two to three months (simulated time) and then the goods were allocated to the field warehouses. The participants received practical application in this procedure. Their success in the game depended upon minimizing carrying cost, reordering cost and stockout cost. Divisional personnel, who were responsible for the control of finished goods inventory, played the game in their training program.²⁷

Elliot Carlson wrote an article that discusses some of the more current uses of business games in industry. Three companies that are of interest include Procter & Gamble Company, Boeing Company and Sun Oil Company. The employees at Procter & Gamble play a game each year that

. . . puts P & G employees in the shoes of a simulated management team running a manufacturer of cake mix or detergents. It gives them "the opportunity to see the total decision-making process involved in running a business. . . ."28

New sales personnel, management trainees, clerks and production workers are required to play the game.

²⁷J. C. Emery, "A Simulation Exercise for Plant Scheduling and Warehouse Distribution," in Management Games by Joel M. Kibbee, Clifford J. Craft and Burt Nanus (New York, New York: Reinhold Publishing Corporation, 1961), pp. 232-233.

²⁸Elliot Carlson, "Versatile Business Game; Its Growing Use In Industry," Management Review, Vol. 55 (September, 1966), p. 46.

Managers at the Boeing Company play many different games as they attempt to rise in the ranks of the company. The games have different objectives for each level of management. Some of the ones used are Operation Feedback, Operation Interlock and Operation Suburbia. Operation Feedback demonstrates general problems that managers may encounter. Operation Interlock is played by top managers and the game models the aircraft industry.²⁹

Operation Suburbia pulls Boeing's middle-management men away from the aircraft industry to wheel and deal in real estate speculation, an exercise designed to show them the importance of planning on a long-range basis, organizing their work, and cooperating with other executives working toward similar goals.³⁰

Other games are applied in training programs to motivate thinking among executives and to make generalist out of specialist. Sun Oil Company's simulation does this as it

. . . shuffles participants into unfamiliar roles by assigning production experts to sales jobs. It also takes executives completely out of the petroleum industry to compete as waffle-iron manufacturers.³¹

A public utility has used gaming to introduce the participants to the facts about the regulatory body they must negotiate with when requesting a rate change. This game gives the participants an opportunity to study the economics of their industry as well as possible criteria which could be used by the commission in granting rate

²⁹Ibid.

³⁰Ibid.

³¹Ibid., p. 47.

increases. Participating in this type of environment increases the ability of the utility's personnel in preparing presentations before such a commission.³²

Examples of business games used in internal training programs could continue for many pages. However, for brevity a short description of some of these remaining game applications follows.³³

<u>Game</u>	<u>Description</u>
IBM Management Game	Top management decisions on marketing expenditures (by areas), plant investment (by areas), production quantity, research and development expenditures, and transportation.
ASCOT	Service station simulation. Players decide on prices, classes of service, operation, markup, advertising, marketing research and ordering.
Automobile dealer simulation & automobile dealer management decision-making simulation	Simulates automobile dealership. Decisions in pricing, number of salesmen, advertising, marketing research and ordering.
Dayton Tire Simulation	An abstraction of the marketing of tires by a small firm. Decisions include price, field sales force, advertising and marketing research expenditures.
Eso Service Station Simulation	Decisions include the pricing of motor fuel, lubrication services, tires and accessories, hiring of employees, cost of advertising, hours of operation and extra services to perform.

³²Jay R. Green, "Business Gaming for Marketing Decisions," Journal of Marketing, Vol. 25 (July, 1969), p. 24.

³³J. F. McRaith and Charles R. Goeldner, "Survey of Marketing Games," Journal of Marketing, Vol. 26 (July, 1962), pp. 70-72.

Remington Rand's
Purchasing Game

Requires decisions on the purchase of up to ten out of fifty articles of retail merchandise from two dealers.

Business Games in External Executive Development Programs

The application of gaming in external executive development programs (executive is trained outside his firm) has been limited. The American Management Association and several universities are the only sponsors that publish their use of gaming in this type of program. The AMA was the pioneer in this area and continues to be the leader. They use several different games in executive programs offered at their academy for Advanced Management.

The use of gaming in executive programs at universities is very limited. The University of Chicago utilizes their INTOP game in their executive development program. This game is played in a course entitled Business Policy and Organization. INTOP is played in approximately two-thirds of the course meetings. The participants are middle management executives between the ages of thirty and forty. The purpose of the Business Policy and Organization course is to synthesize and integrate all the previous courses of the program into a top management perspective. The Chicago faculty believe that the INTOP game plays a major role in obtaining this objective.³⁴

UCLA also uses gaming in executive programs. Since 1963 they have applied their UCLA game in conjunction with a Monte Carlo

³⁴Thorelli and Graves, op. cit., pp. 68-70.

simulation.³⁵ There are other universities that use this teaching tool in their executive programs, but their publicity is limited.

The application of gaming in executive development programs is not limited to the United States. The Universities of Melbourne and South Wales have used it in this type of program.³⁶

Business games have captured the interest and imagination of many educators. Certain factors should be considered; however, before they are used in a business curriculum or an executive development program. Any user of a business game should take particular care that:

1. The objectives of a business course or executive development program are clearly defined and the possible contributions of a business game to these objectives are determined before money is spent.
2. The difficulty of designing a business game should not be underestimated. If a game is to be designed, skilled and experienced people should be chosen to undertake the development work.
3. The important real-life factors which are disregarded in most game designs are clearly understood.
4. The game is not overly complex but concentrates on the critical variables that would supplement the course or program.

³⁵Robert B. Andrews and Thomas E. Vollmann, "Uniproduct: A Pedagogical Device," California Management Review, Vol. 10 (Winter, 1967), p. 66.

³⁶David G. Graham, "The Role of Management Games in Management Education Programmes," Business Review (Australia). (September, 1966), p. 249.

5. The game is skillfully administered and supplemented with discussion and critique sessions.³⁷

Consideration of the above factors is very important. Business games are designed to be supplements and not substitutes for other teaching methods. Therefore, care should be taken that they support the course objectives and do not conflict with other teaching methods.

Advantages of Business Games

Business games are acclaimed by many educators as being one of the best pedagogical tools to be developed in recent years. Their opinions are based on the following advantages associated with gaming.

1. Participant interest and involvement facilitates learning. Many believe that this is probably the most important attribute of the business game. One writer says that

. . . the discussions that arise during the play are often of a highly emotional nature, and many players have found themselves unable to sleep the night following such an experience. Participants frequently devote several hours before the game session to the preparation of detailed policies, development of special graphing and budgeting techniques, and analysis of past game runs.³⁸

2. The participants gain an overall understanding of a business firm. Joel Kibbee stresses this advantage by stating that business games

³⁷Andlinger, op. cit., p. 160.

³⁸E. W. Martin, "Teaching Executives Via Simulation," Business Horizons, Vol. 2 #2 (Summer, 1959), p. 101.

. . . provide an executive with an application of over-all company operations and the interaction between men, money and materials. It helps make a generalist out of the specialist who has never had the opportunity of viewing his decisions as they affect the organization as a whole.³⁹

3. Business games make use of time that former teaching devices lacked. This attribute refers to their use of time compression, time lag and time cumulation. A business game is alive and is constantly changing in response to the decisions of participants. Players are responsible for their decisions so they must consider the present as well as the future in their planning. Business gaming demonstrates the effects of this sequential decision-making more vividly than any other teaching technique.⁴⁰
4. Gaming is oriented toward team performance providing experience in group interaction. Through improved communications and coordinating skills a group can organize, set their objectives and design controls for successful game performance.⁴¹
5. Business games provide a feedback feature that is not available in other techniques. This ". . . dynamic feedback feature in gaming is an important learning element not found in lectures, textbooks, or case presentation."⁴² This feature requires the students to live

³⁹Joel M. Kibbee, "Dress Rehearsal for Decision Making: The Growing Use of Business Games," Management Review, Vol. 48 (February, 1959), p. 8.

⁴⁰Joel M. Kibbee, Clifford J. Craft and Burt Nanus, Management Games (New York, New York: Reinhold Publishing Corporation, 1969), p. 42.

⁴¹Ibid., pp. 43-44.

⁴²Jay Green, op. cit., p. 23.

with their decision.

6. The participants gain practical experience in a very realistic situation. The game environment provides the participant with the opportunity to practice his role as well as the roles of different major functional positions of a business. Experience in these roles illustrates that decisions are not always made with data that are black or white but in many cases with data that are incomplete.⁴³

7. In business games the participants learn by their mistakes.

Gaming makes experimentation possible.

It is always possible to return to a previous point in the simulation and proceed again from that point, making a different set of decisions to determine their advantages and disadvantages in comparison with those previously tried.⁴⁴

8. The use of business games as compared to other teaching techniques may be less expensive.⁴⁵

9. Gaming is fun.

10. Business games have a built-in analytical and corrective feature in the critique session. This session allows the participants to make a thorough analysis of what happened during the play of the game and why it happened.⁴⁶

⁴³John W. Plattner and Lowell W. Herron, Simulation: Its Use in Employee Selection and Training (New York, New York: American Management Association, Inc., 1962), p. 2.

⁴⁴Ibid., p. 3.

⁴⁵Jay Green, op. cit., p. 23.

⁴⁶Charles E. Redfield, "Should Businessmen Play Management Games," Office, Vol. 53 (June, 1961), p. 20.

11. The weaknesses of a player will show up in the play of a business game. With proper administration and instruction these weaknesses can be concentrated upon and strengthened.⁴⁷
12. Finally, gaming provides a link between academic studies and the business world.⁴⁸ This attribute is not frequently mentioned by writers, but it would seem to be one of the keys to the success of this educational technique.

Disadvantages of Business Games

Despite all the educational advantages associated with business gaming, the technique has considerable limitations. These disadvantages are recognized by many advocates of gaming, but it is believed that the advantages outweigh the disadvantages. These disadvantages are:

1. Business games cannot approach realism because of the limited computational capacities of the players and umpires.⁴⁹ This lack of realism omits many decisions that are important to the successful operations of a business. These problem areas that usually are omitted in games include strikes, the firing of employees, product style, mergers and anti-trust suits.

⁴⁷Kennedy, op. cit., p. 220.

⁴⁸R. Ian Tricker, "Business Simulation--Dynamic Tool or Enjoyable Pastime?" The Accountant (England), Vol. 152 (June, 1965), p. 799.

⁴⁹Andlinger, op. cit., p. 156.

2. The design of business games has placed primary emphasis on the quantitative aspects of management.⁵⁰ The models of most business games are purely mathematical formulas omitting qualitative factors. The relationship between sales and advertising is an example of quantitative aspects. In most games there is an automatic increase in sales with every increase in dollar spent on advertising expenditures. The quantitative approach to the model does not consider how successful the advertising campaign may have been. This means that all dollars in each firm are equally effective and we know that this is not true in the real world.

3. Gaming is more expensive than other teaching techniques. This is a counter proposal to those who say that it is less expensive. Advocates of gaming consider only out-of-pocket cost and do not consider opportunity costs. Business games

. . . are costly in terms of time, space and money. If a game is being played by a fairly large group of middle and top level executives, the cost of their time, during the period of play, could be staggering if totaled.⁵¹

The initial cost of developing a game and computer time are other expensive factors. The greater the complexity the greater these costs. Many advocates of gaming argue that the same educational results can be obtained by using a game already developed or a manual game.

⁵⁰Plattner and Herron, op. cit., p. 5.

⁵¹Carson, op. cit., p. 34.

4. The high degree of participant involvement may result in a lack of learning. This involvement in gaming may result in a preoccupation with winning. When this happens the players fail to consider why they should perform certain tasks. Some writers emphasize this by stating

. . . there is sometimes so much enthusiasm about the involvement of participants and the intricacies of mathematical models and computer programs that insufficient thought is given to the determination of and adherence to sound educational objectives.⁵²

5. Business games may contribute to erroneous transfer.⁵³ The participants may fail to realize that what works in a controlled environment may not work for them in a real situation. Also, a player may assume that after he has played the game, he is qualified to operate a business without any difficulty.

6. Proper use of business games requires more planning and time as compared to other teaching techniques. As a result the difficulty of integrating them into a curriculum or training program will be greater.⁵⁴

7. A person who is cool, collected and aggressive in the play of a game may lack these qualities in a real business environment.⁵⁵

⁵²Plattner and Herron, *op. cit.*, p. 5.

⁵³Kibbee, Craft and Nanus, *op. cit.*, p. 45.

⁵⁴Joel M. Kibbee and Clifford J. Craft, "Management Games," Canadian Chartered Accountant, Vol. 78-79 (August, 1961), p. 140.

⁵⁵Robert M. Smith, "Management Games: Toy or Trend?" Office Management & American Business, Vol. 21 (September, 1960), p. 22.

8. Finally, business games do not allow for the possibility of innovation. Game rules and structure result in the complete elimination or formalization of innovation.⁵⁶

Future

Business games have been on the educational scene for thirteen years. Their growth has been phenomenal during this period. People familiar with the area agree that gaming is not a panacea for all the problems in business education. The business game is only another educational tool that has its advantages and disadvantages. The educational value is probably greatest when the game is an integral part of a course or executive development program.

The general feeling is that business gaming will continue to grow in the future. The current trend of games indicates that more emphasis will be placed on:

1. The inclusion of qualitative elements.
2. The design of modular simulation segments which can be joined to obtain varying subject content and degrees of complexity.
3. Simulations, which more than before, stress communication and negotiation among the participating teams.
4. The development of continuous rather than periodic decision and feedback systems.
5. Designs which embody a variety of techniques such as in-basket exercises, cases, role playing, and incident process within the simulation structure.

⁵⁶Martin, op. cit., p. 106.

6. The refinement and expansion of the observational and critique techniques now used.⁵⁷

Kalman J. Cohen sees the typical business game of the future as being composed of different segments with each part a major segment firm. Each segment or function would have

. . . its own associated set of decision variables, which may be put together in a variety of combinations to produce a great many different specific games. Thus, depending merely upon how some program switches would be set, such a future management game might in one play be entirely a production game, in another play a general business game. . . .⁵⁸

Games of the future may require more information processing on the part of the participant. These games will not make management reports and financial statements available. The only available information will be a trial balance. The controller of each team will be responsible for obtaining financial information for his firm. He will be required to program the computer to obtain the accounting reports that are necessary for his company. The controller will determine the amount of detail that he will show or suppress in his accounting reports, the way he will define the cost of the firm's product (allocation of overhead, choice of depreciation method and so forth) and the form and content of his firm's published financial statements.⁵⁹

⁵⁷Plattner and Herron, op. cit., p. 5.

⁵⁸Cohen, op. cit., p. 141.

⁵⁹Ibid., pp. 141-142.

As a motivational influence on the students there appears to be no other educational tool that can compete with business gaming.

Potentially, simulation can become a pillar for management education by providing a laboratory in which principles can be discovered and illustrated. If we do not succumb to the temptation to be satisfied with its superficial novelty, it is quite possible that management decision gaming will achieve a place in schools of business comparable to the moot courts in the schools of law.⁶⁰

Summary and Conclusions

Business games are used in three distinct areas: education, research and business planning. They were first applied in the field of education, but its use is relatively new in the fields of research and business planning.

Games are a part of three different programs in business education. They are used in business school curricula, internal executive development programs and external executive development programs.

Gaming has grown rapidly in business school curricula. The application of this educational tool in business curricula has concentrated in management, business policy and marketing courses. Schools such as U.C.L.A., Pennsylvania State University, Michigan State University and Carnegie Institute of Technology were pioneers in using games in business curricula.

General Electric, Westinghouse, Procter & Gamble and Boeing initiated the application of business games in internal executive development programs. These companies used functional and general

⁶⁰Martin, op. cit., p. 109.

policy games in their training programs. Some of these were designed by company personnel while others were purchased from companies outside the firm. The functional games were used to teach employees functional aspects of their own company while the general policy games were used to make a generalist of a specialist.

Business games in external executive development programs have received less attention than those in business curricula and internal executive development programs. The first business application of a game, however, was in this type of program. The American Management Association used the first business game in an executive development program in 1957. The AMA has continued to be the leader in designing and using games in this type of executive program.

There are many advantages and disadvantages associated with the gaming technique. Generally the advantages deal with participants' involvement, the overall view point attained by players, improved communication skills of participants, the feedback feature and the practical experience gained. Arguments against gaming center around the lack of realism, the lack of qualitative aspects, high costs, players concentration on winning rather than learning, time consumption and erroneous transfer. However, the utilization of business games continues to expand as educators develop and improve gaming techniques.

The following chapter reviews the use of business games in formal accounting education. This presentation was delayed so that the use of gaming in accounting education could be analyzed in more detail.

CHAPTER V

CURRENT UTILIZATION OF BUSINESS GAMES AS A TEACHING DEVICE IN FORMAL ACCOUNTING EDUCATION

Introduction

Business gaming has found a place in collegiate educational programs. Business games are applied successfully in business curricula in such disciplines as management, business policy and marketing, but their use in formal accounting education has been limited.

This chapter has three objectives in analyzing the use of business games in formal accounting education: first, to determine the utilization of gaming in formal accounting education; second, to determine the problems or reasons responsible for the limited use of this teaching method in formal accounting education; third, to determine what educators believe to be the advantages or disadvantages of using business games in specific areas of accounting education.

This analysis is based on a survey of member schools of the American Association of Collegiate Schools of Business, a follow up questionnaire or personal interview with those schools using games in accounting and the literature that is available concerning business games in accounting education.

Utilization of Business Games in Formal Accounting
Education Prior to This Study

The application of business games in formal accounting education is limited in comparison to such areas as business policy, management and marketing. Information supporting this statement was obtained from a survey of business gaming by Alfred G. Dale and Charles R. Klasson of the University of Texas.¹

Dale and Klasson sent a questionnaire concerning the application of gaming in business curricula to schools that were members of the American Association of Collegiate Schools of Business. There were 107 member schools at the time of the survey. A total of ninety replies or an 84 per cent response was received on the questionnaire. Information to be determined by the questionnaire included: (1) the extent to which business gaming was used in each college curriculum, (2) when each school began to apply business games, (3) whether or not business gaming was integrated permanently in the curriculum, (4) names of both undergraduate and graduate courses in which games were used and (5) whether or not the courses which included gaming were required for a particular major or for all degree candidates.

Sixty-four of the ninety responding schools indicated that business games were a part of at least one course in their curriculum. Assuming that the schools that failed to respond to the questionnaire were not applying games, then 59.8 per cent of the major collegiate

¹Alfred G. Dale and Charles R. Klasson, Business Gaming (Austin, Texas: Bureau of Business Research, The University of Texas, 1964).

schools of business used games in 1962-1963. Business games were first introduced in business curricula in 1956. The applications of gaming rapidly increased for four years but then the increase began to falter as shown in Table 2.

TABLE 2
YEAR OF INTRODUCTION OF BUSINESS GAMES
IN BUSINESS SCHOOL CURRICULA

Year of Introduction	Number of Schools	Cumulative Number
1956	2	2
1957	2	4
1958	10	14
1959	15	29
1960	20	49
1961	11	60
1962	4	64

Source: Alfred G. Dale and Charles R. Klasson, Business Gaming (Austin, Texas: Bureau of Business Research, The University of Texas, 1964), Table 1, p. 4.

Forty of the sixty-four schools utilizing business games integrated them into at least one undergraduate or graduate course on a permanent basis. The twenty-four remaining schools used games on an experimental basis.

The application of gaming in business curricula appeared to be more extensive than what the gathered data revealed in terms of total courses offered at each school. Twenty-two of the sixty-four schools applied business games in only one course. An additional fifteen schools used this teaching method in only two courses. This means that 58 per cent of the schools used games in only one or two courses in their curricula. Table 3 shows the total spectrum of the number of courses that used gaming at the various schools.

TABLE 3

NUMBER OF COURSES IN WHICH BUSINESS GAMES WERE
USED IN BUSINESS CURRICULA IN 1962

Number of Courses	Number of Schools	Cumulative Percentage
1	22	34
2	15	58
3	14	80
4	6	89
5	2	92
6	3	97
7	1	98
Not Reported	<u>1</u>	100
Total	64	

Source: Alfred G. Dale and Charles R. Klasson, Business Gaming (Austin, Texas: Bureau of Business Research, The University of Texas, 1964), Table 2, p. 8.

In the curricula of the responding schools, gaming was applied in seventy-six undergraduate courses of which thirty-eight were different courses. The areas included accounting, business policy, finance, management, marketing and miscellaneous courses. Table 4 presents a breakdown of this information. This table shows that of the seventy-six courses in which business games were applied only five of these are accounting courses. This was only 6.6 per cent of the courses as compared to the business policy, management and marketing courses which were 28, 26 and 22 per cent respectively. The five accounting courses in which games were used were principles of accounting, introduction to accounting, intermediate accounting, managerial accounting and machine accounting. Four of these were distinctly different. The principles of accounting and the introduction to accounting were the same basic course. Four of the five accounting courses were required for accounting majors. There was no indication as to which course was not required, but it was probably the managerial or machine accounting course.

The same type of information as shown in Table 4 was obtained for graduate courses. Business games were used in seventy-five graduate courses. Twenty-nine of these were different courses. The games were applied in the same disciplines as those in undergraduate curricula. A breakdown of the graduate course information is shown in Table 5. This table indicates that of the seventy-five graduate courses including a game, only one or 1.3 per cent was an accounting course. The particular accounting course that included a business game was a controllership course.

TABLE 4
 INFORMATION ON UNDERGRADUATE COURSE AREAS IN WHICH
 BUSINESS GAMES WERE BEING
 UTILIZED IN 1962

Subject Area	Total Number of Courses	Number of Different Courses	Required Course	Elective Course	Year Offered				
					1	2	3	4	3 or 4
Accounting Courses	5	4	4	1	0	2	1	2	0
Business Policy Courses	21	1	12	9	0	0	0	18	3
Finance Courses	1	1	0	1	0	0	0	1	0
Management Courses	20	15	16	4	0	2	3	11	4
Marketing Courses	17	8	10	7	0	1	1	11	4
Miscellaneous Courses	<u>12</u>	<u>9</u>	<u>3</u>	<u>9</u>	<u>2</u>	<u>0</u>	<u>2</u>	<u>7</u>	<u>1</u>
Total	76	38	45	31	2	5	7	50	12

Source: Alfred G. Dale and Charles R. Klasson, Business Gaming (Austin, Texas: Bureau of Business Research, The University of Texas, 1964), Table 3, p. 9.

TABLE 5
 INFORMATION ON GRADUATE COURSE AREAS IN WHICH
 BUSINESS GAMES WERE BEING UTILIZED IN 1962

Subject Area	Total Number of Courses	Number of Different Courses	Required Courses	Elective Courses	Year Offered		
					1	2	and/or 2
Accounting Courses	1	1	0	1	1	0	0
Business Policy Courses	23	1	17 ^a	5	13	8	2
Finance Courses	1	1	0	1	0	0	1
Management Courses	18	9	12	6	8	6	4
Marketing Courses	19	8	12	7	6	10	3
Miscellaneous Courses	<u>13</u>	<u>9</u>	<u>8</u>	<u>5</u>	<u>4</u>	<u>6</u>	<u>3</u>
Total	75	29	49	25	32	30	13

^aOne respondent did not indicate whether their course was required or not.

Source: Alfred G. Dale and Charles R. Klasson, Business Gaming (Austin, Texas: Bureau of Business Research, The University of Texas, 1964), Table 4, p. 22.

This data supports the statement that the use of business games in formal accounting education is limited. The authors offer two possible explanations for the limited use of gaming in formal accounting education. First, it is possible that accounting does not fit into a gaming exercise. Second, accounting educators may not have felt that they were qualified to develop special functional games that could be applied to accounting courses.

Current Utilization of Business Games in Formal Accounting Education

Information contained in the remainder of this chapter is based on replies to a survey questionnaire, a follow-up questionnaire that was sent to selected respondents of the first questionnaire, and personal interviews with selected accounting educators who responded to the survey questionnaire.

The survey questionnaire (Appendix A) was addressed to the accounting departments of 130 colleges and universities that were members of the American Association of Collegiate Schools of Business (Appendix B). A 90 per cent response or a total of 117 replies were received from this questionnaire.

This questionnaire had two major objectives: first, to locate accounting departments that were utilizing business games in their curricula and to determine to what extent gaming was used; second, to obtain the ideas of accounting educators concerning the omission of gaming in accounting curricula. To obtain these objectives information was sought by the questionnaire regarding (1) the extent that

business games were being used in the accounting departments of each school, (2) whether or not gaming was a permanent part of the accounting curricula, (3) the titles and authors of the games being used, (4) whether games had been used before and the reasons for the discontinuance of the games and (5) if a school had never used games, what were the reasons for this omission in its curriculum.

The detailed follow-up questionnaire (Appendix C) was sent to those schools which responded in the first questionnaire that gaming was a part of their accounting curricula. This questionnaire also had two major objectives: first, to obtain in the greatest of detail what was being done in these accounting courses in relation to the business game that was being utilized; second, to determine the advantages and disadvantages in applying business games in different accounting courses. These objectives were met by the questionnaire which sought data concerning (1) the course(s) and text(s) in which a game was used, (2) whether or not the course(s) was a required course, (3) whether the course(s) was a graduate or undergraduate course(s), (4) the time devoted to the business game by the students and the instructors, (5) the year in which gaming was first applied, (6) the administration of the game(s), (7) the type of game(s) used, (8) when the game(s) was used in the course, (9) the additional student requirements, (10) the educational value of gaming in accounting, (11) the problems encountered in introducing gaming in the curriculum, (12) the advantages and disadvantages of gaming in separate areas of accounting and (13) what the future appears to be for gaming in formal accounting education.

The personal interviews were with various accounting professors and their staff at selected schools using gaming in their accounting curricula. The objectives of these interviews were identical to those for the second questionnaire. The interviews were made before the second questionnaire was mailed to test reactions to the questions of the questionnaire for possible weaknesses.

Summary of General Findings

The first questionnaire received an excellent response indicating a definite interest in gaming as a pedagogical tool. Eighteen of the 117 replies disclosed that business games were being applied in their accounting curricula. These schools were:

University of Alabama	University of Miami
University of Alberta, Canada	University of Minnesota
Baylor University	New York University
University of California Berkeley	Ohio State University
California State University at Fullerton	The Pennsylvania State University
University of Cincinnati	University of Pennsylvania
Columbia University	University of Rochester
Louisiana State University	Syracuse University
	Texas Christian University
	University of Texas

In 1962 the Dale and Klasson study indicated that approximately 4.7 per cent of member schools of the American Association of Collegiate Schools of Business were using games in their accounting department. This study shows that now 13.8 per cent of these member schools are using games in their accounting department. Since 1962 the use of gaming in accounting has almost tripled. However, a closer review shows that the overall use of business games in accounting courses is still very limited.

Thirteen different games currently are applied in accounting courses at member schools of the American Association of Collegiate Schools of Business. The simulation Accounting Information and Business Decisions by Jack Gray, John J. Willingham, Kenneth S. Johnston and R. Gene Brown is the only game used at more than two schools. These individuals were working with business games at Ohio State University as early as 1961. Their simulation was one of the first designed and published specifically for use in accounting education. Three other business games are used at only two schools and the remaining nine are used at only one school. This information is presented in Table 6. A majority of the games applied at only one school are those designed and developed by a member of each school's faculty.

Eleven of the eighteen schools applying business games considered games to be a permanent part of their accounting curricula. Six of the schools did not consider gaming as a permanent pedagogical tool in their curricula and one school failed to respond to this question. When gaming was not considered a permanent part of the curriculum its use was left to the discretion of the instructor.

Schools That Have Never Used Business Games
in Their Accounting Curricula

Eighty-seven of the 117 or 74.4 per cent responding schools indicated that they had never used business games in their accounting curricula. The irony of this information is that sixty-two of these eighty-seven schools believed that the technique could be an effective

TABLE 6
 BUSINESS GAMES THAT ARE BEING UTILIZED
 IN ACCOUNTING COURSES

Business Game	Authors	Number of Schools using the Game	Schools using the game in	
			Undergraduate Courses	Graduate Courses
Accounting Information and Business Decisions: A Simulation	Jack Gray, R. Gene Brown, John J. Willingham and Kenneth S. Johnston	5	3	2
The Decision Making ^a Game: OPSIM	Bill R. Darden and William H. Lucas	2 ^a	2	2
Accounting in Action: A Simulation	John J. Willingham and Robert E. Malcom	2	2	0
Accounting for Decisions: A Business Game	William J. Bruns, Jr.	2	2	0
The Executive Game	Richard C. Henshaw, Jr. and James R. Jackson	1	1	0
Business Game for Using Accounting Information	Paul E. Fertig, Donald F. Istvan and Homer J. Mottice	1	1	0

^aBoth schools use the game in their undergraduate and graduate accounting curricula.

TABLE 6--Continued

Business Game	Authors	Number of Schools using the Game	Schools using the game in	
			Undergraduate Courses	Graduate Courses
University of California "A" Game	Hector R. Anton	1	1 ^b	1
Business Decision Simulation	D. E. Wiseman	1	1	0
Materials Inventory Management Game	Jay R. Green and Roger L. Sisson	1	1	0
The Money Game	C. W. Bastable	1	0	1
The Texas Game		1	1	0
Marketing Management Simulation	Michael Schiff	1	0	1
Non-Computer Game ^c	Miles Kennedy and David Solomons	1	0	2

^bThe schools use the game in their undergraduate and graduate accounting curricula.

^cThere was no title given for the game. It was designed by faculty members.

Source: Questionnaire sent to accounting department of member schools of the American Association of Collegiate Schools of Business.

pedagogical tool. Nine of the eighty-seven schools felt that business games were not an effective educational tool. The remaining sixteen schools did not give an opinion and indicated that they did not have any basis with which to make a decision.

The faculty of the schools offered many reasons for the omission of gaming in their curricula. Some of the objections have definite merits while a few indicated a lack of adequate understanding of business games and the application as a teaching method. Those opposed to gaming mention thirteen objections which are presented below. The first four of these objections were those most consistently mentioned.

1. Business games are used already in business policy and management courses that are required of accounting students. Therefore, the additional benefits to be gained in accounting are not worth the time and costs. - This would be acceptable if all business games were designed to teach the same area. General policy games and functional games have different educational objectives; therefore, all games do not teach the same topics. The accounting courses that include business games generally are applying the general policy type. This leaves many specific areas or topics in accounting that could be taught by a functional game. For example, a functional game could emphasize inventory control by the use of the economic order quantity formula, it could give the accounting student experience in the auditing of an electronic computer or it could require accounting students to generate data for the preparation of financial statements. Those

opposing gaming for the above reason are not aware of the business game content or of how they might be applied.

2. There is a lack of faculty interest in business games or the faculty is not qualified to use them as a pedagogical tool. - This is a problem that all educational staffs usually encounter. Faculty members become so engrossed in traditional teaching techniques that they fail to consider new teaching methods that become available. The supposition that faculty members are not qualified to use a business game in accounting courses is not a good defense. To use a business game, the instructor must study it as it is presented in the game text and the instructor's manual. He may also play through a few decisions to identify the problem areas that his students might encounter. The application of a new game is comparable to preparing lectures from a new textbook that approaches certain topics in a different manner.

3. There is too much material in the accounting courses that are currently taught; therefore, there is not enough room for a new technique. - Schools must delete problems, chapters or practice sets from accounting courses to include a business game. A following section discusses the techniques for accommodating gaming in accounting courses.

4. Business games are too costly and the benefits derived from games do not justify the use in accounting. - The accounting professors that make this criticism consider the time required for proper game

application too consuming. They feel this time could be spent more profitably on other educational methods. Cases and problems that stress basic accounting concepts are two of the more beneficial educational methods in their opinion. No validation study of gaming as a pedagogical tool in accounting has been made; therefore, these objections are only personal opinions.

5. There is a lack of good accounting oriented games. - This is mentioned by only a few schools but it appears that this is sound reasoning. Currently, there are no published business games that pretend to teach accounting theory, income tax, auditing or governmental accounting. A few of the simpler accounting games are designed to allow the participants to process information for the purpose of preparing simple financial statements. The remaining published accounting games are related to decision-making and could not be used in the courses mentioned above. However, any course that includes cost accounting, budgeting or decision theory could include a business game as games are now designed to reinforce the concepts taught in these areas.

6. The accounting curricula of several schools are currently being revised. - The work that is required of the faculty members in curricula revision makes it almost impossible to consider new pedagogical techniques. Four schools list this as a reason for omitting business games from their accounting curricula. It is interesting to note that three of the four schools are definitely considering

the use of games once their problems of revision are solve.

7. Because there is a lack of computer facilities or computer time, business games cannot be utilized. - These schools consider business games to be an effective educational tool but fail to understand that all games do not require the use of a computer for administration. In fact, the majority of accounting games are administered manually. Also, many educators associated with gaming consider a well designed manual game to be just as effective as a computerized one.

8. The faculty is attempting to solve problems they have encountered in the use of other pedagogical tools. - These schools are working with traditional educational tools, but each school is considering the use of games in the future.

9. No excuse. - Two schools simply state they are behind the times. No excuse was given for not using games in accounting or for not studying the technique for possible use.

10. Business gaming is not an effective teaching method. - The opinion of one respondent is based on his own experience on other campuses. The remaining respondents gave no reason for their opinions.

11. Students already participate as contestants in an off-campus college-wide management game. - Basically, this is related to the first objection to gaming application. In one case the games are a part of the schools curriculum while in this case they are played off-campus and involve competition between different colleges and

universities. The same rebuttals can be given as those for games played in courses on campus. In addition to these rebuttals only top students play the off-campus games. This means that only a few students benefit from participating in this form of gaming exercise.

12. Faculty is unaware that any business games are readily available. - Since accounting business games have been available in published form since 1964, this statement is almost incomprehensible.

13. The students at the undergraduate level lack the background for effective participation in a business game. - This could be the case of the general policy game. First, second and third year students acquire a general knowledge of the business world but have not integrated the various business functions in order to play a general policy game. The senior and graduate students have a better background to participate in the more complex general policy games. This objection fails; however, to consider the functional games at the lower levels of course work.

One main conclusion can be drawn for the omission of business games in accounting curricula. The schools are not fully aware of the gaming technique. They are aware of the computer administered general policy game but unaware of the functional game and its potential in accounting education.

Schools That Have Discontinued Business Games
in Formal Accounting Education

The data gathered from the first questionnaire indicated that

twelve schools utilized business games in accounting but discontinued the use of games. This means that two-thirds as many schools have discontinued the use of games in accounting as are currently using games. These twelve schools that ceased the application of gaming in accounting are:

Bowling Green University	University of Michigan
University of California, Los Angeles	Ohio University
University of Denver	University of South Dakota
Georgia State College	Stanford University
University of Iowa	Wake Forest University
Miami University	University of Washington

The reasons for discontinuing gaming at these schools are varied. They can be grouped into ten categories.

1. The faculty member that designed a business game and used it in his courses left the faculty for a job in industry.
2. The business game was very time consuming.
3. The material covered by the game was a duplication of material covered in a management course required of accounting students.
4. The business game utilized was too easy and the students quickly learned how to beat the game; thereby, failing to learn anything.
5. There was a lack of computer time available for proper administration of the business game.
6. The classes in which a business game was utilized were too large for the successful application of the gaming technique.
7. The design of the game was poor. When one team made a mistake in determining the costs of their product it adversely affected the remaining teams.

8. The business game did not meet the particular course and time constraints. In other words a suitable game could not be found that supplemented the courses in which this particular school wanted to use games. Finding a suitable game is not comparable to finding a suitable text. A text can be modified by class lectures and hand-outs but a business game is rigid.

9. Business games were omitted because the business curriculum was undergoing a substantial revision.

10. The faculty at one university felt that gaming benefits were better suited for teaching in junior colleges. They reasoned that at a four year college or university a student's time is better spent reading current topics and using cases.

Five of these reasons for the discontinuance of gaming in accounting were also listed by those schools that had never used gaming. These included time consumption, lack of computer facilities, lack of suitable accounting games, curriculum revisions and the benefits of other pedagogical tools. Therefore, there was a definite overlap in the thinking between these two groups.

Schools That Are Utilizing Business Games in Formal Accounting Education

Contact was made with the eighteen schools using business games to obtain detailed information concerning the utilization of gaming in formal accounting education. These schools were mailed the follow-up questionnaire (Appendix C) or were interviewed personally. Fourteen schools responded. Eleven schools replied to the

follow-up questionnaire and three schools agreed to personal interviews.

Business games were introduced in accounting in 1959. However, game use in accounting did not surge upward as it did in the areas of management, marketing and business policy until 1964. Since then the use of gaming in accounting has increased at a steady pace as shown in Table 7.

TABLE 7
YEAR OF INTRODUCTION OF BUSINESS GAMES IN ACCOUNTING
CURRICULA AS REPORTED BY THE SCHOOLS SURVEYED

Year of Introduction	Number of Institutions	Cumulative Number
1959	1	1
1960	1	2
1961	1	3
1962	0	3
1963	0	3
1964	3	6
1965	2	8
1966	2	10
1967	1	11
1968	3	14

Table 8 illustrates the total number of accounting courses offering business games as reported by the responding schools. These

data reveals that the use of gaming in accounting curricula is limited in terms of the total courses that are offered by each school. Eight schools or 58.1 per cent, offer only one course that includes a business game. An additional five schools offer two courses that use gaming. This means that approximately 93 per cent of the responding schools are utilizing this educational tool in no more than two accounting courses. The remaining school uses the same game in four courses ranging from elementary accounting to a graduate course required of M.B.A. candidates.

TABLE 8

NUMBER OF COURSES IN WHICH BUSINESS GAMES ARE BEING
UTILIZED BY THE RESPONDING SCHOOLS OF BUSINESS

Number of Courses	Number of Schools
1	8
2	5
3	0
4	1
Total	14

Undergraduate Courses

Table 9 indicates that the use of gaming in undergraduate accounting courses has tripled since the 1962 survey by Dale and Klasson. In 1962 gaming was used only in five undergraduate accounting courses.

TABLE 9

INFORMATION ON ACCOUNTING UNDERGRADUATE COURSES IN WHICH
BUSINESS GAMES WERE UTILIZED, AS REPORTED
BY THE RESPONDING SCHOOLS OF BUSINESS

Course	Number of Courses	Required Courses	Elective Courses	Year Offered				Student's Course				
				1	2	3	4	Classroom				
								5%	10%	15%	20%	>20%
Elementary Accounting	10	9	1	0	10	0	0	3	5	1	1	0
Managerial Accounting	1	0	1	0	0	0	1	1	0	0	0	0
Cost Ac- counting	2	2	0	0	0	2	0	1	0	0	1	0
Budgeting	1	0	1	0	0	1	0	0	0	0	1	0
TOTAL	14 ^a	11	3	0	10	3	1	5	5	1	3	0

^aTwo undergraduate schools indicated they were using business games in their accounting curricula but failed to respond to the second questionnaire sent them or agree to a personal interview.

TABLE 9--Continued

Time Devoted to Gaming					Hours of Instructor's Time Devoted to Gaming													
Outside Assignments					Class Preparation							Administration						
5%	10%	15%	20%	>20%	$\frac{1}{4}$	$\frac{1}{2}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	>2	$\frac{1}{4}$	$\frac{1}{2}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	>2
1	5	3	1	0	4	2	1	0	0	0	1	5	0	2	0	1	0	0
0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
0	1	0	1	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0
0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
1	6	3	4	0	5 ^b	2	3	0	0	1	1	7	0	3	0	1	0	1

^bTwo respondents state that the time spent in class preparation and administration was left up to the instructors and this information was not available.

In 1969 the use of gaming had increased to fourteen accounting courses. Four distinctively different courses are represented within the fourteen accounting courses using games. However, the four courses are not the same as those indicated in the Dale and Klasson survey.

Currently, gaming is used in elementary accounting, managerial accounting, cost accounting and budgeting. In 1962 it was used in elementary accounting, managerial accounting, intermediate accounting and machine accounting. This information shows that business schools have discontinued the use of gaming in intermediate and machine accounting but have begun to apply it in cost accounting and budgeting.

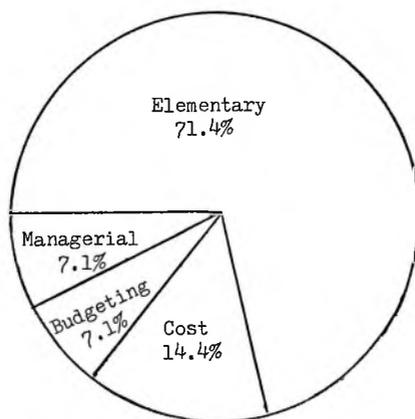
This slight increase in the utilization of gaming can be attributed to its application in elementary accounting courses. Currently, ten or 71.4 per cent of the fourteen courses utilizing business games are elementary accounting. The remaining 38.6 per cent of the courses represent the use of gaming in one managerial accounting course, one budgeting course and two cost accounting courses as shown in Figure 2.

This extensive use of gaming in elementary accounting courses as compared to other accounting courses has two possible explanations. The first explanation is that six of the ten schools that apply gaming in their elementary course use it in their second elementary course. These schools take a step in their second elementary courses that many accounting departments have taken. They teach financial accounting in the first elementary course and managerial accounting in the

second elementary course. This approach to elementary accounting makes the second course more suitable for the application of business games as games are currently designed. The content of managerial accounting courses includes topics that are necessary for decision-making in gaming exercises. Also, the elementary accounting courses usually are the first courses which faculty members will allow experimentation of new pedagogical tools. Williard E. Stone supports this idea by suggesting that the elementary accounting course is where the first efforts should be made in designing business games for use in accounting education.²

Figure 2

Use of Business Games in Undergraduate Accounting Courses



²Williard E. Stone, "Development in Accounting Instruction," Accounting Review, Vol. 36 (July, 1961), p. 475.

The majority of accounting courses using a business game are required. Nine of the ten elementary courses are required for a general degree or a degree with an accounting major. The school that does not require the elementary course for accounting majors made this change only recently. The schools that include gaming in cost accounting also require all accounting majors to take the cost course. The two remaining courses, managerial accounting and budgeting, are both elective courses for accounting majors. This information indicates that business games are integrated first into basic or core courses which have a high enrollment and are integrated last into the more specialized or elective courses.

Ten of the fourteen courses using business games are offered in the sophomore year. Three additional ones are offered in the junior year. The budgeting course is the only one offered in the senior year. The application of gaming in accounting courses is in contrast to the overall use of business games as presented in Dale and Klasson's study. Their study reveals that 80 per cent of the courses that include gaming are offered in the third or fourth year.³

Time consumption is one of the disadvantages associated with business gaming. Information was sought from those schools using this teaching method to better understand this criticism. Table 9 summarizes the approximate time that students and instructors devote to gaming in accounting courses. Five courses require the students to spend 5 per cent of their classroom time on the business game.

³Dale and Klasson, op. cit., p. 17.

An additional five courses require 10 per cent. This means that approximately 71.4 per cent of the undergraduate accounting courses devote no more than 10 per cent of the classroom time to the business game. However, one school devotes 15 per cent of its classroom time to gaming and three schools devote 20 per cent. Business games are designed as supplements to courses so there is a minimum use of classroom time devoted to gaming exercises. The gaming technique allows the students to apply the theory, methods and concepts that they have learned in class lectures and textbooks. Therefore, more time is spent in outside assignments.

Time devoted by students to outside assignments is greater than the time spent in the classroom. Thirteen of the fourteen courses require 10 per cent more of the student's outside assignments to be associated with the game. Six courses require 10 per cent, three require 15 per cent and four require as much as 20 per cent of the outside assignments to be concerned with gaming. The time required of students in gaming exercises outside of the classroom includes several factors. The time required for students to learn the rules and the environment of the game is consuming at the beginning of play. In addition the students make special analyses or apply techniques which they learn in the course. Students must organize their approach to the issues of the game and locate the data in order to be able to prepare the assignments. This procedure is more time consuming than textbook problems because textbooks provide the data for the students.

The instructors of accounting courses devote a minimum amount of preparation time to gaming. For every three hours of classroom meetings, five instructors devote only one-fourth of an hour, two devote one-half an hour and three devote one hour to their class preparation. This indicates that 83.3 per cent of the instructors devote an hour or less to class preparation for every three hours of classroom time spent with the business game. Only two instructors are devoting two or more hours to this type of class preparation.

The time spent by an instructor in the administration of a business game is also minimal. Seven or 58.3 per cent of the instructors devote one-fourth of an hour to administration for every three hours that their class meets. Three instructors spend one hour in administration, one instructor devotes one and one-half hours to gaming, while another devotes more than two hours to the administration of the business game.

There are two reasons for the minimal amount of time that instructors devote to game preparation in accounting courses: first, the classroom time spent in gaming is limited; second, many of the business games are computer administered. The instructor that uses a computer game is required only to collect the team decisions and take these decisions to the computer facility. A computer technician enters the decisions into the model and returns the results to the instructor. This procedure may be handled by the instructor's assistant which means the instructor spends that much less time in game administration.

Table 10 and Table 11 summarize the many business games and how games are used in undergraduate accounting courses. Seven different games currently are utilized in elementary accounting courses. The Decision Making Game: OPSIM and The Executive Game are computerized games and the remaining five are designed to be manually administered games. Accounting Information and Business Decisions: A Simulation and Accounting in Action: A Simulation originally were designed to be manual games but the authors of these games have programmed the model. Four of these business games are functional games and three are general policy games. The functional games are The Decision Making Game: OPSIM, Accounting for Decisions: A Business Game, Business Game for Using Accounting Information and Materials Inventory Management Game. The functional areas included in the design of these games are financial statement preparation, inventory control, production, budgeting and cash control. The three remaining games which include Accounting Information and Business Decisions: A Simulation, Accounting in Action: A Simulation and The Executive Game are the general policy games. Each of these include the major functional areas that could be found in a business firm.

The utilization of gaming in the ten elementary courses varies as to when the gaming exercises take place during the semester or quarter. Six of these schools apply their business game in the last half of the semester or quarter. Three of the schools play a game during the first half of the semester or quarter and the remaining

TABLE 10
 BUSINESS GAMES BEING UTILIZED IN UNDERGRADUATE
 ACCOUNTING COURSES AS REPORTED BY THE
 RESPONDING SCHOOLS OF BUSINESS

Accounting Courses	Business Game	Authors	Schools
Elementary:	(1) Accounting Information and Business Decisions: A Simulation	Jack Gray, R. Gene Brown, John J. Willingham and Kenneth S. Johnston	(1) University of Alberta (2) University of Minnesota (3) Syracuse University
	(2) The Decision Making Game: OPSIM	Bill R. Darden and William H. Lucas	(1) University of Alabama (2) Louisiana State University
	(3) Accounting in Action: A Simulation	John J. Willingham and Robert E. Malcom	(1) The Pennsylvania State University
	(4) Accounting for Decisions: A Business Game	William J. Bruns, Jr.	(1) University of Rochester
	(5) The Executive Game	Richard C. Henshaw, Jr. and James R. Jackson	(1) University of Texas
	(6) Business Game for Using Accounting Information	Paul E. Fertig, Donald F. Istvan and Homer J. Mottice	(1) Ohio State University
	(7) Materials Inventory Management Game	Jay R. Greene and Rodger L. Sisson	(1) University of Cincinnati

TABLE 10--(Continued)

Accounting Courses	Business Game	Authors	Schools
Cost:	(1) "A" Game	Hector R. Anton	(1) University of California
	(2) OPSIM	Darden and Lucas	(1) University of Alabama
Budgeting:	(1) OPSIM	Darden and Lucas	(1) University of Alabama
Managerial:	(1) The Texas Game		(1) University of Miami

TABLE 11

INFORMATION CONCERNING THE BUSINESS GAMES THAT ARE BEING
USED IN UNDERGRADUATE ACCOUNTING COURSES AS REPORTED
BY THE RESPONDING SCHOOLS OF BUSINESS

Course	Administration		Type of Game		When the Game	
	Computer	Manually	General	Func- tional	Entire Semester or Quarter	First Half of the Semester or Quarter
Elementary Accounting	5	5	5	5	0	3
Managerial Accounting	1	0	0	1	1	0
Cost Accounting	2	0	1	1	2	0
Budgeting	1	0	0	1	1	0
TOTAL	9	5	6	8	4	3

TABLE 11--Continued

is Played		Number of Decisions Made				How Often Decisions are Made			
Last Half of the Semester or Quarter	Other	1-4	5-8	9-12	>-12	Once Per Week	Twice Per Week	Every Other Week	Other
6	1 ^a	2	8	0	0	8	2	0	0
0	0	0	0	1	0	1	0	0	0
0	0	0	0	1	1	1	1	0	0
0	0	0	0	1	0	1	0	0	0
6	1	2	8	3	1	11	3	0	0

^aThe game was used approximately in the middle of the course.

schools utilize a business game in the middle of the semester. The last half of the semester or quarter of the second elementary course is the logical place for gaming exercises. This is the case because business games stress decision-making and the content of the second elementary course contains decision-making techniques. If a game is not decision-making oriented but financial accounting oriented then the first elementary course would be the logical choice for applying the game. Schools that use this type of game are applying it in the second quarter of a three quarter elementary accounting course.

In 80 per cent of the schools using gaming in elementary accounting, the students are required to make between five and eight decisions when they play the game. The remaining two schools require between one and four decisions. They are made once per week or twice per week. Eight of the schools require decisions by each team to be made once per week while two schools require them twice a week. This means that a game could be utilized two to eight weeks of the semester or quarter.

Miami University is the only school using a business game in a managerial accounting course. They are applying a computer administered game entitled The Texas Game. This particular game is functional and includes the topics of production and inventory control. The students play the game during the entire course and must make one decision per week for nine to twelve weeks.

In the area of cost accounting there are two schools using business games and both are applying different games. The OPSIM

game used at the University of Alabama is a functional simulation. The "A" Game of the University of California is a general policy game. Both are administered by a computer. Both games are played during the entire semester. At the University of California the students are required to make two decisions per week resulting in more than twelve decisions during the semester. More decisions are made during the play of the game at this school than at any other school in any type of course. The students in the cost accounting course at the University of Alabama are required to make between nine and twelve decisions.

The University of Alabama is the only school using a business game in a budgeting course. The functional game, OPSIM, is played during the entire semester. Students are required to make only one decision per week and they make between nine and twelve decisions during the semester.

An overall view of the utilization of business games in undergraduate accounting courses indicates that there are nine different business games currently being used. Nine of the fourteen undergraduate courses utilize a computerized game and five use a manual game. In eight of the courses the game is functional and in six the games are general policy. Some of these games are used in more than one course at the same school or at more than one school. So this is not to say that there are nine computerized games or eight functional games.

An interesting comparison can be made of the lower level

courses of elementary accounting and the more advanced courses. In the elementary courses the gaming exercise usually takes place during the last half of the semester or quarter. In the more advanced courses it takes place during the entire semester. Also, the elementary students usually are required to make fewer decisions in the play of the game. In the elementary course the students may make between five and eight decisions while the advanced students make nine or more decisions in the play of a business game. One similarity between upper and lower level courses is that a majority of both require decisions in the game environment to be made only once per week.

Graduate Courses

The application of business gaming has increased in graduate accounting courses as it has at the undergraduate level. Table 12 summarizes information concerning the use of games in accounting courses at the graduate level. In 1962 there was only one graduate accounting course using a business game. The information obtained in this study indicates that the application of gaming has increased since 1962 to at least eight courses. The eight courses represent three distinctively different accounting subjects. These three areas include an introductory accounting course for M.B.A. candidates that do not have a business background, a managerial accounting course and an accounting controls course that is required for all candidates seeking an M.B.A. degree. At the time of the Dale and Klasson study

TABLE 12

INFORMATION ON ACCOUNTING GRADUATE COURSES IN WHICH BUSINESS
GAMES WERE UTILIZED, AS REPORTED BY THE
RESPONDING SCHOOLS OF BUSINESS

Course	Number of Courses	Required Courses for Accountants	Courses not Available for Accountants	Year Offered		Student's Course				
				1	2	Classroom				
						5%	10%	15%	20%	>20%
Introductor to Accounting for M.B.A. ^a	2	0	2	2	0	1	0	0	1	0
Accounting Controls-- M.B.A.	4	1	3	4	0	1	1	1	1	0
Managerial Accounting	2	1	1	2	0	2	0	0	0	0
TOTAL	8 ^b	2	6	8	0	4	1	1	2	0

^aThis course is for graduate students without an undergraduate business degree.

^bTwo graduate schools did not reply to the second questionnaire. Therefore, there are at least nine graduate courses using business games in accounting.

TABLE 12--Continued

Time Devoted to Gaming					Hours of Instructors Time Devoted to Gaming													
<u>Outside Assignments</u>					<u>Class Preparation</u>							<u>Administration</u>						
5%	10%	15%	20%	>20%	$\frac{1}{4}$	$\frac{1}{2}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	>2	$\frac{1}{4}$	$\frac{1}{2}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	>2
1	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
0	2	1	1	0	0	2	1	0	0	0	0	3	0	0	0	0	0	0
1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
2	3	1	2	0	1 ^c	2	2	0	0	0	0	4	0	1	0	0	0	0

^cThree of the schools indicated that the time spent in class preparation and administration was left to the instructor.

the one accounting subject that included a business game was controllership. The application of gaming in this area has been discontinued. However, two graduate schools of business utilizing business games in accounting failed to respond to the follow-up questionnaire. There is a possibility that one of these schools is using gaming in a controllership course.

Graduate students and undergraduate students spend a comparable amount of time in gaming exercises. In six of the eight graduate courses only 15 per cent or less of the classroom time is allocated to gaming. The two remaining courses designate as much as 20 per cent of classroom time to the game. The outside assignment required of graduate students would be expected to be more than the time required of undergraduate students. However, the information obtained indicates that the time allocated to outside assignments is approximately the same for both groups. Six of the eight courses require 15 per cent or less of the course's outside assignments to be associated with the game. The two remaining courses allocated 20 per cent of the classroom time to such activities. The fact that many games are used in both graduate and undergraduate courses is an explanation for the similarity in time devoted to gaming.

The time that an instructor devotes to gaming activities in graduate accounting courses is minimal. For every three hours of classroom time most of the responding schools indicated that their instructors spend no more than an hour in preparation. The time that instructors spend in administering their business games takes

even less time than classroom preparation. A majority of the instructors spend only one-fourth of an hour in the administration of their game.

Tables 13 and 14 summarize information concerning the business games used in accounting graduate courses. There are four different business games used at the graduate level. All of these are used in undergraduate courses with the exception of the non-computer game designed by Miles Kennedy and David Solomons.

Two different games are used at two different schools in an introductory accounting course for M.B.A. students. The computerized functional OPSIM game is applied at the University of Alabama. The non-computer general policy game is applied at the University of Pennsylvania.

Two different business games are used in accounting controls courses and both are applied at different schools. OPSIM mentioned above is used at the University of Alabama and at Louisiana State University. Accounting Information and Business Decisions: A Simulation, general policy manual game, is applied at the University of Alberta and at Ohio State University.

Two schools apply business games in graduate managerial accounting courses. The University of California uses the "A" Game and the University of Pennsylvania uses the Non-Computer Game in this type of course.

An overall view of gaming in graduate accounting courses indicates that half of the courses use a computerized game and half apply

TABLE 13

BUSINESS GAMES BEING UTILIZED IN GRADUATE
ACCOUNTING COURSES AS REPORTED BY THE
RESPONDING SCHOOLS OF BUSINESS

Accounting Courses	Business Game	Authors	Schools
Introduction to Accounting:	(1) The Decision Making Game OPSIM	Bill R. Darden and William H. Lucas	(1) University of Alabama
	(2) The Non-Computer Game	Miles Kennedy and David Solomons	(1) University of Pennsylvania
Accounting Controls:	(1) Accounting Information and Business Decisions: A Simulation	Jack Gray, R. Gene Brown, John J. Willingham and Kenneth S. Johnston	(1) University of Alberta (2) Ohio State University
	(2) The Decision Making Game: OPSIM	Darden and Lucas	(1) University of Alabama (2) Louisiana State University
Managerial Accounting:	(1) "A" Game	Hector R. Anton	(1) University of California
	(2) The Non-Computer Game	Miles Kennedy and David Solomons	(1) University of Pennsylvania

TABLE 14

INFORMATION CONCERNING THE BUSINESS GAMES THAT ARE BEING
USED IN GRADUATE ACCOUNTING COURSES AS REPORTED BY
THE RESPONDING SCHOOLS OF BUSINESS

Course	Administration		Type of Game		When the Game	
	Computer	Manually	General	Func- tional	Entire Semester or Quarter	First Half of the Semester or Quarter
Introduction to Accounting for M.B.A.	1	1	1	1	1	1
Accounting Controls-- M.B.A.	2	2	2	2	2	1
Managerial Accounting	1	1	2	0	1	1
TOTAL	4	4	5	3	4	3

TABLE 14--Continued

is Played	Number of Decisions Made					How Often Decisions are Made			
	Other	1-4	5-8	9-12	>-12	Once Per Week	Twice Per Week	Every Other Week	Other
Last Half of the Semester or Quarter									
0	0	1	0	1	0	1	0	0	1 ^a
1	0	1	1	2	0	2	2	0	0
	0	1	0	0	1	0	1	0	1 ^a
1	0	3	1	3	1	3	3	0	2

^aIn these courses a game is played for four periods in two one and one-half hours sessions.

a manual one. This is in contrast to the undergraduate courses in which most of the games are computerized. Also, in five of the eight graduate courses a general policy game is used while the majority of the undergraduate courses apply functional games. Two possible explanations can be given for the contrast between graduate and undergraduate levels. First, class size may determine the selection of a computerized or a manual game so that time may be saved in gaming administration. Second, the majority of the courses at the graduate level are for M.B.A. students. Therefore, a general policy game would be better for their general business curriculum.

Gaming is used in 87.5 per cent of the graduate accounting courses either during the entire or first half of the semester or quarter. Only one school uses gaming in the last half of the quarter.

The number of decisions that must be made by graduate students in playing business games is different in the various schools. Three schools require from one to four decisions and one school requires from five to eight decisions. These schools play a game during only one-half of the semester or quarter. The schools playing a game during the entire course make more decisions. In three of these schools the students make from nine to twelve decisions and one school requires more than twelve decisions for the semester. The University of Pennsylvania has two graduate accounting courses that require decisions at an odd time during the course. The game is played during two, one-and-one-half-hour sessions in which one to four decisions are required.

The applications of gaming in graduate accounting courses has increased since 1962 but its application in this area continues to be limited. Only six major business schools use games in graduate accounting courses and these courses usually are not designed for accounting majors. Therefore, the exposure of the accounting graduate student to gaming is nil.

Student Requirements

Each team must make certain decisions concerning the operation of a business firm while playing a business game. There are also many additional requirements that are assignable to students. These assignments help integrate the game into the course and give the students an opportunity to apply what they learn from the course. The majority of the schools applying business games in accounting indicated that their students must prepare such assignments as:

1. The preparation of their own financial statements for each period of the play. This assignment helps the student to see the changes in their firm from period to period, to better understand the relationships between the various financial statements and to gain experience in financial statement preparation.
2. The organization of a team report that includes a statement of their firm's goals and the strategies used in attempting to attain the goals.
3. The preparing of a cash budget which is based on the decisions for a certain period. After the results are obtained the teams must

reconcile the cash budget with the cash flows that resulted from their decisions. This assignment encourages an understanding of the flow of cash in their firm's environment.

4. The presentation of a profit plan before the game is begun that includes a breakeven analysis. When the play of the game is completed each team prepares an annual report. The report includes interim statements and a discussion of the differences between their profit plans and their actual results. The school using this assignment has noticed creativity in their students that was not evident prior to using business games.

5. A computation of their firm's contribution margin (selling price minus variable costs) and an explanation of its importance in the operation of their company.

6. The preparation of a management report after the play of the game. The report includes strategies, interim statements, cash budgets and an analysis of their firm. The analysis discusses the firm's condition based on financial statement ratios, trend percentages or common size statements. This assignment gives the student realistic experience in the preparation and analysis of financial statements.

7. The preparing of many special analyses concerning their firm. For example, each team may be required to prepare an analysis concerning the company's breakeven point in units, dollars and a chart, direct costing versus variable costing, cash flows or capital budgeting.

Each of these assignments helps the students to better understand the theory, methods and techniques that they learned in course

lectures and textbooks. The students also become more creative in a more realistic environment.

Reasons for the Limited Use of Gaming in Accounting Education

Various reasons were presented for the omission of gaming exercises in formal accounting education in the first sections of this chapter. However, these opinions were limited to the non-users as well as those schools that had discontinued the use of gaming in accounting. The opinions of accounting educators using games were also sought on this topic. The causes for the omission or limited use of gaming in formal accounting education were similar in some aspects to those previously mentioned. However, some of the accounting educators had additional ideas and these are presented below.

1. Business games are integrative among various disciplines. This is especially true of the general policy game which includes accounting, management, marketing, and finance. This game design is more suitable for the management or business policy course.
2. A business game suitable for specific accounting courses is difficult to find.
3. Accounting educators have a narrow view of the accounting field. They concentrate too much on theory and fail to emphasize the practitioner's point of view. Therefore, any new pedagogical tool that emphasized the application of accounting techniques is considered to be too procedural.

4. When business games became available in business education, the field of accounting already had a teaching technique that had some elements of realism. This technique was accounting's traditional use of problems. Since the use of problems had more realism than the teaching methods of other business disciplines, gaming was not necessary in accounting.
5. Most of the available accounting games do not allow the participants to choose the procedures that they would prefer in generating data. Therefore, business games do not facilitate an appreciation of the advantages and disadvantages of different accounting procedures relative to the decisions that must be made in a realistic environment.
6. The discipline of accounting is tradition oriented. Accounting instructors feel they owe their loyalty to methods and techniques in which they are well versed. Many are afraid that they cannot master the use of business games as a teaching method.
7. Accounting courses have a full content and accounting educators are unwilling to remove any material so that a business game could be utilized.

Educational Value of Business Games in
Formal Accounting Education

The educational value of business gaming in accounting education has not been cited before this study. The accounting instructors using business games were asked to comment on the educational value of gaming in accounting education. These individuals' responses are

are presented below.

1. An interest created by business games results in a more motivated student. Games also encourage the instructors to take a closer look at their course objectives to determine how the course should fit in their accounting curriculum.
2. Gaming is a good technique for presenting many aspects of accounting not revealed in textbook problems. The game can demonstrate the function of accounting in a business firm by placing the students in more realistic conditions. This approach may encourage students in elementary accounting to choose accounting as their major field.
3. A service is provided by a business game that the large problem and practice set provides. They assist the students with many procedural aspects of accounting in an environment that still requires each firm's books to balance. This educational value only can be derived from a manual game in which the students must prepare financial statements based on the results of their decisions.
4. Financial and managerial accounting concepts presented in class lectures are reinforced by gaming exercises.
5. The student is exposed to a business environment that includes decision-making under conditions of uncertainty. For example, if a student is required to prepare a breakeven analysis in a business game that has probability elements, he will soon find that not all costs are either fixed or variable. Some costs will be very difficult to classify so that when a breakeven point is computed for future decisions there will be some elements of uncertainty in the

decisions. This element of uncertainty does not exist in most textbook problems.

6. The dynamic continuous nature of the accounting process in a business is presented in a business game.

7. The realistic environment of a business game provides a laboratory in which to experiment. Students are able to apply a particular method or concept obtained from lectures or textbooks to a realistic situation. Experimentation results when similar methods or concepts are applied to the same situation. The students are then able to analyze the different results and determine possible advantages and disadvantages of each.

8. The absence of a unique optimal strategy in a gaming environment results in a greater emphasis on problem solving ability relative to the highly structured problems of textbooks.

9. The students playing a business game become more imaginative and creative.

10. The accounting student is able to integrate the many functions of a business through gaming exercises. This value is applicable to a general policy game because a functional game would concentrate on only one or maybe two functions.

11. The accounting curriculum of a school can be evaluated by applying games in accounting courses. A business game may point out areas in which students cannot perform. An example would be where a senior class lacked the ability to interpret a simple balance sheet. If a fact of this nature was pointed out there would be an indication of a weakness in the school's teaching methods or curriculum.

Possible Problems Encountered in Integrating
Gaming Into Accounting Curricula

Business games in business school curricula usually begin as a special project of an interested faculty member rather than a program sponsored by a dean or school.⁴ The integration of games into business school curricula has encountered many problems. These include faculty resistance, cost, lack of realistic games, lack of computer facilities, and the omission of material to allow time for a business game.

Faculty and Administrative Resistance

Many faculty members resisted gaming because they could not understand the compromise between realism and practicality for successful gaming exercises. Senior faculty members also remain loyal to other teaching tools because they doubt their ability to master the intricacies of gaming's analytical models or computer programs.⁵

To determine the amount of faculty and administrative resistance in accounting departments, the schools using games were asked if they encountered (1) no resistance (no faculty members opposed), (2) some resistance (10-20 per cent of the faculty members opposed), (3) substantial resistance (30-50 per cent of faculty members

⁴William R. Dill, James R. Jackson, and James W. Sweeney, Conference on Business Games (New Orleans, Louisiana: Tulane University, 1961), p. 28.

⁵Ibid., p. 31.

opposed) or (4) strong resistance (more than 50 per cent of faculty members opposed) in integrating business games into their accounting curricula. Surprisingly, 53.8 per cent of the responding schools indicated no opposition from their faculty members. An additional 34.5 per cent of the responding schools encountered some opposition to gaming in their curricula. Only one school encountered substantial resistance. Therefore, there was remarkably little resistance to the use of business games at the schools currently using gaming in their accounting curricula.

Lack of Realism in Business Games

How realistically or how closely do business games mirror the real world?

Claims of "realism" are seldom encountered in business gaming. The mathematical or logical relationships used to incorporate the effects of price, advertising, and other merchandising variables upon demand for a firm's product, for example, are generally based upon the intuition of the games' developers.⁶

A business game to be effective in business education must bear some resemblance to a general business environment or that of a particular industry. The majority of accounting educators believe that most business games do in fact contain some elements of realism. Only one responding school feels that most games approach realism and one school indicates that business games are realistic. No school states

⁶ Alfred A. Kuehn, "realism in Business Games," in Conference on Business Games, ed. by William R. Dill, James R. Jackson, and James W. Sweeney (New Orleans, Louisiana: Tulane University, 1961), p. 56.

that games are completely unrealistic. These results indicate that accounting educators agree that business games have enough realistic elements to be an effective educational tool.

Lack of Computer Time

The lack of computer facilities has caused a number of schools to omit gaming from their curricula. However, today this seems to be less of a problem. The larger colleges and universities have their own computer complexes and the smaller schools either have smaller computers or the availability of some computer facility. The schools using business games contend that computer facilities are not a problem. Only one school indicates that the availability of computer time is a problem. The remaining schools indicate there is ample computer time available for administration of business games. Therefore, it appears that the computer is no longer a major problem of gaming in accounting education.

Additional Cost of Game Materials

Several out-of-pocket costs are incurred with the use of business games. These costs include computer time, materials, and clerical assistance.

Students incur additional costs that they normally would not when a business game is added to a course. The student must purchase the game material in addition to his textbook and other possible publications. The games currently used in accounting could cost as much as

three dollars. This may not appear to be a large sum, but at many schools students are paying for their own education. Therefore, each additional cost adds to their financial burden. Some faculty members object to gaming for this reason. To alleviate this problem, some schools require only one game manual to be purchased by each participating team.

Eleven or 84.6 per cent of the schools applying gaming in accounting do not consider the additional costs of game materials a problem.

Grading Games

Grading the results of a business game has been a problem since their introduction in business curricula. Some schools have attempted to assign grades to each team while others assign grades to each team member. The problem that grading poses is what to use as a basis for assigning a grade. To establish a basis for grading, one might consider each firm's final results, students' performance on special assignments, or a combination of both.

Students tend to channel their efforts toward those tasks from which they will receive a grade. However, many educators believe that a grade for gaming exercises is not necessary because of the high interest and involvement of the students. In accounting education, most of the game-participating schools use some form of grading. Twelve of the fourteen responding schools use either a direct or indirect method of grading. Three of these schools use

a combination of both. Schools using an indirect method determine a course grade by testing textbook materials which include areas that should be reinforced by the game. Those using a direct evaluation place a grade on the performance in the game and on outside assignments that are associated with the play of the game. Only one school fails to use any evaluation of a student's achievements in playing their business game. Grading of game performance is a difficult problem. Several schools are experimenting with grading at the time of this study.

Elimination of Material

Many accounting courses contain so much material that in many cases full coverage of it is difficult. How, then, is a business game integrated into these courses? Should some of the material be omitted or should the game be added to the existing materials? Ten or 79.6 per cent of the schools using games in accounting state that some materials must be eliminated to properly utilize a business game.

Since the accounting educators generally agree that materials should be eliminated, then the question arises as to what materials should be eliminated. Fifty-five per cent of the schools favoring deletion of materials indicate that problems should be omitted. An additional 36.3 per cent feel that chapter materials should be omitted. The instructor at one school omits a term paper requirement in lieu of the business game. This information indicates that if gaming is used in an accounting course, it should replace problems rather than chapter materials. This information also indicates that gaming is being used

as a supplement to accounting courses.

Advantages and Disadvantages of Utilizing Business
Games in Specific Areas of Accounting

The application of business games in formal accounting education is concentrated in elementary accounting, cost accounting, managerial accounting, and M.B.A. accounting courses. There are reasons for this concentration in these areas as well as for the lack of gaming in the areas of accounting theory, income tax and governmental accounting. Accounting instructors applying games were asked the advantages and disadvantages of gaming in their courses. This information was sought to determine possible reasons for the use or lack of gaming in certain areas of accounting education.

Elementary Accounting

Basically, the advantages and disadvantages of business games in elementary accounting are identical to those discussed as general advantages and disadvantages in chapter four. The general advantages include the increased involvement of students in the course, reinforcement of course materials, and the provision of a good learning experience. Advantages of gaming that specifically relate to the elementary course are:

1. Accounting is presented to the student in a dynamic situation through the application of business games. This approach may encourage many students to select accounting as their area of concentration.
2. The student's appreciation for the uses and deficiencies of

accounting data is enhanced by gaming participation.

3. The student is forced to take a complete look at the accounting process while playing a business game.

4. Intellectual curiosity is stimulated in elementary accounting through the play of games. This interest is not created in traditional teaching methods.

The disadvantages associated with gaming in elementary accounting also include many that generally are associated with business games. For example, gaming is too time consuming, learning benefits do not justify the time that must be spent in gaming, and the business games available for use in accounting lack elements of realism. However, accounting educators point out several disadvantages associated only with elementary accounting courses. These are presented below.

1. The students at the elementary level of accounting have an inadequate knowledge of business in general and especially of accounting. This prevents proper game participation.

2. The available business games are not realistic for accounting education. In the design of business games there are too many external forces that present accounting as only playing a minor role in decision-making. This deficiency makes it more advantageous to discuss broader concepts at the elementary level.

3. It is difficult to include a business game as a part of an accounting course. The students feel that it is something added to the course to increase their work. This feeling results in a resentment toward the game.

4. Gaming in elementary accounting conflicts with the traditional content of the course.
5. At many large colleges and universities the elementary accounting course is taught by graduate assistants and temporary instructors. New instructors each year make it difficult to use a game at this level. Also, these individuals usually are working toward a degree and they devote only a limited amount of time to their teaching. Therefore, a supplementary game would receive less attention than the text material.

Accounting Theory

Generally, all of the responding schools are against the use of business games in accounting theory courses such as intermediate accounting, advanced accounting, and seminars. The general opinion of the responding schools is that the design of a business game is not congruous with the content of these courses. The concensus opinion of accounting educators is that discussion of broad accounting concepts, the analysis of cases, and the use of research projects are better teaching techniques in accounting theory courses.

Cost Accounting and Budgeting

Cost accounting and budgeting could very well be the best suited accounting courses for gaming. The content of these courses fits the design of the games that are designed for use in accounting better than any other course.

The correlation between the course content and the design of business games is an advantage for the application of gaming in these courses. The use of games in these courses also provides the students with a better understanding of the relationships between the accounting figures they generate and the decisions they make from them. This relationship is not as clear in the use of textbook problems. Gaming in this area is also advantageous because the students gain experience in a decision-making course under conditions of uncertainty. Finally, it is a good technique for introducing cost and budgeting students to the concept of simulation.

A few disadvantages are also associated with gaming in cost and budgeting courses. One instructor states that the addition of a game to a cost or budgeting course would be too time consuming. A final opinion is that to add a game in these courses would require the omission of materials. Currently, in a cost or budgeting course there is no material to be omitted without jeopardizing a balanced course.

Auditing and Other Courses

The content of an auditing course does not fit the design of business games, nor is there enough time for one in an auditing course. Therefore, this educational tool has not been applied in this area.

Only two schools indicate that a business game could be utilized in an auditing course. One respondent believes that auditing students could divide themselves into auditing teams and audit the

firms of students playing the game in another course. This procedure would illustrate the interrelationship of the elements involved in the audit.

A second application in auditing would require a new game design to give advanced students experience in auditing a computerized system. In most of the major auditing textbooks only one chapter is related to the topic, and there are only a few publications that discuss the auditing of computerized systems. Students read and hear about the impact of computers on auditing, but their education in this area is lacking. A game designed to represent a complex computerized accounting system would solve this dilemma. The system would be programmed to allow different parameters to assume different characteristics at the instructor's choice. The students would then be required to divide into audit teams and audit the system. The teams may be required to audit through the computer, audit around the computer and so forth to better understand each method. This would definitely be an improvement over the current auditing educational opportunity in this area.

There is only one other course mentioned by the responding schools. The course is income tax and the only comment to be made is that the course does not have time to include a business game.

Future

Ten of the responding schools which apply business games in accounting believe that there will be some increase in their use in

accounting education. Two of the schools feel that there will be a great increase in their use and the remaining two schools feel that there will be no increase of gaming in accounting. One instructor says that there will be an increase, but it will have a pendulum effect. In other words the use of business games will increase for a few years, decline for a while, then rise again.

The schools not applying business games in their accounting curricula support the idea that there will be some increase in their use in the future. Twenty-nine of these schools indicate plans to use games in their curricula in the near future. Therefore, the use of gaming in formal accounting education should rise in the next few years. If gaming is to be successful at many of these schools some educational program for accounting instructors should be offered to instruct them in the aspects of gaming and how it might be used in accounting education. This type of program could be offered by a major accounting association such as the American Accounting Association.

Summary and Conclusions

The information presented in this chapter has re-emphasized that the application of business games in accounting education is limited. Only 18 schools which were members of the American Association of Collegiate Schools of Business are using games in their accounting curricula. The application of gaming at these schools also is limited in terms of the total courses which include a game. A

majority of the schools using games in accounting courses only offer one accounting course that includes a business game.

The reasons are varied as to the limited applications of business games in accounting education. The reasons for this omission in accounting were presented as expressed by non-users of games, discontinued users of games, and users of games. The ideas of these groups can be summarized into thirteen different reasons. These are:

1. Accounting students already take business policy and management courses that use games. Therefore, gaming in accounting would be a duplication of material.
2. There is a lack of faculty interest or qualified faculty to introduce gaming in accounting courses.
3. Accounting courses already are crowded, so there is not sufficient space for gaming in accounting courses.
4. Business games are too costly and time consuming for the educational benefits derived from their use.
5. There is a lack of good accounting oriented games.
6. Many schools are involved in curricula revision, so they lack the time to consider gaming as a teaching method.
7. There appears to be a lack of computer time or facilities at several schools.
8. Faculty members are involved with other educational tools which they believe to be more effective in accounting education.
9. Some instructors believe that gaming is not an effective pedagogical tool.

10. Undergraduate students lack a sufficient background in business to effectively participate in gaming exercises.
11. Accounting educators have a narrow view of the accounting field. Most of them cannot accept applications of accounting techniques as a teaching device.
12. When gaming became available in the field of business, accounting already had an educational technique with elements of realism. The accounting problem was such a technique.
13. The discipline of accounting is tradition oriented.

The majority of accounting instructors believe that elementary accounting, cost accounting, managerial accounting, and M.B.A. accounting courses are best suited for applying games. Their belief is based on the fact that the design of business games fits the content of these courses. There is a lack of gaming applications in the areas of accounting theory, income tax, auditing, and other specialized areas. The reasons for this omission are that the design of games does not fit the content of these courses and accounting instructors believe that other teaching methods are more effective in these courses.

The use of business games in accounting curricula should increase in the near future. This idea is supported by both users and non-users of gaming. Most of the users felt there would be an increase in gaming and twenty-nine of the schools not using business games plan to add them in their accounting curricula. If all of the non-users added gaming to their curricula, then 40 per cent of AACSB schools would be using games in accounting.

The major problem that exists with gaming in accounting education is whether or not it is an effective pedagogical tool. There has never been a scientific evaluation study concerning the effectiveness of gaming in accounting education. This type of study was performed for this paper and is presented in the following chapter.

CHAPTER VI

EVALUATION OF BUSINESS GAMES IN ACCOUNTING EDUCATION

Introduction

The ideas of many accounting educators concerning business games in accounting education were presented in the previous chapters of this study. These ideas were subjective evaluations of gaming as a pedagogical tool because they were based on individuals' personal opinions. An extensive review of the pertinent literature disclosed only subjective evaluations of gaming as an accounting teaching tool as well. This chapter intends to provide evidence which will statistically indicate the effectiveness of gaming as a teaching method in accounting education.

Statistical evidence of the effectiveness of gaming as an accounting tool was obtained through an educational experiment performed at the University of Alabama and the University of Tennessee at Martin. The game, The Decision Making Game, was applied in the last elementary accounting course at both schools in performing this experiment. The course sections at both schools were divided into control and experimental groups to obtain data for the experiment. The experimental group at each school was exposed to a textbook, textbook problems, lectures and a business game. The control groups were exposed only to

the textbook, textbook problems and lectures.

The purpose of this chapter is to answer the following questions:

1. Does a significant difference exist between the total criterion test performance of the students exposed to a business game and conventional teaching methods and the total criterion test performance of students exposed only to conventional teaching methods in presenting certain areas of elementary accounting concepts?
2. Does a significant difference exist between the proportion of correct answers to particular criterion test questions of students exposed to a business game and conventional teaching methods and the proportion of correct answers of students exposed only to conventional teaching methods in presenting certain areas of elementary accounting concepts?

Definitions

Certain terms will be used in this chapter that may need clarification.

Pre-Test. - The examinations given at the University of Alabama and the University of Tennessee at Martin prior to the introduction of the business game to the experimental group. The purpose of the pre-test was to obtain data to determine if the experimental and control groups were comparable and drawn from the same universe.

Criterion Test. - The examinations given at the University of Alabama and the University of Tennessee at Martin to evaluate the

performance of students in the experimental and control groups after the business game was applied in the experimental group. In this study the criterion tests are the final examinations given in the spring of 1969 at both schools in their final elementary accounting course.

Independent Variable. - A variable that is applied in an experiment to observe what changes it causes in other variables that are dependent upon it. In this study the independent variable is the method used to present certain elementary accounting concepts. The independent variable of the experimental groups is the use of a textbook, textbook problems, lectures and a business game. In the control group the independent variable is the use of a textbook, textbook problems and lectures.

Dependent Variable. - A variable whose changes are dependent upon changes in the independent variable. The dependent variable in this study is the scores made by the students of both the control and experimental groups on the criterion test and their performance on certain individual criterion test items.

Significant Difference. - A statistical term that refers to the difference between two values computed from separate samples. The difference is so great between the samples, that the probability is rare that this difference is attributable to chance alone. In this study a difference will be considered significant at the .05 level.

Hypotheses

Hypothesis I. - The difference between the aggregate performance of the experimental and control groups is not significantly

different on the pre-test to indicate that the groups were drawn from different universes.

Hypothesis II. - The difference between the aggregate criterion test performance of students exposed to a business game in addition to conventional teaching methods is significantly greater than the aggregate criterion test performance of students exposed only to conventional teaching methods in presenting certain elementary accounting concepts.

Hypothesis III. - The students exposed to a business game and conventional teaching methods answer correctly a significantly higher proportion of specific criterion test items in comparison to the proportion of correct answers given by students exposed only to conventional teaching methods in presenting certain elementary accounting concepts.

Assumptions

The assumptions made for the statistical tests of this experiment are presented below:

1. The experimental and control groups are drawn from populations which are normally distributed.
2. Variances from group to group are homogeneous within the bounds of random variances.
3. Measures of the dependent variable constitute continuous data with equal intervals.

4. The difference between the experimental and control groups in their performance on the criterion test is attributable to the two methods of accounting instruction.

Description of the Experiment

The idea of statistically testing the effectiveness of gaming as a pedagogical technique in formal accounting education was conceived in the spring of 1968. To implement this idea a trial run was made in the fall of 1968 at the University of Alabama. A business game was used in the second course of elementary accounting. This particular accounting course was chosen for the following reasons:

1. The content of the first elementary accounting course made it unacceptable. Most business games are designed so that a game player must have some knowledge of managerial accounting. The second elementary accounting course introduces the student to managerial accounting. Therefore, the second elementary accounting course is more acceptable than the first course for this study.
2. The more advanced accounting courses would not have a sufficient number of sections for sampling purposes. Assistance in this experiment from other schools would also be more difficult to obtain in the higher level courses.
3. The writer was teaching the second elementary accounting course; therefore, a closer and better co-ordinated study could be conducted.

The trial run in the fall of 1968 resulted in several improvements for the experiment performed in the spring of 1969. These

improvements are the following:

1. A guideline and instruction session for the instructors using the business game.
2. A predetermined number of decisions to be made by the students in playing the game.
3. A designated time for introducing the business game during the semester.
4. Outside assignments which would be appropriate to use with the game.

In the spring of 1969 a business game was formally introduced in the second elementary accounting course at the University of Alabama and the third quarter course at the University of Tennessee at Martin. The remaining discussion in this section describes the experimental and control groups of the experiment, teaching methods used in each group, the tests used at both schools to obtain data for the statistical tests of the experiment and the statistical tests which were applied on the data obtained from the experiment.

Experimental and Control Groups

The original sample of students at the University of Alabama consisted of 380 students enrolled in 12 sections of the second elementary accounting course during the 1969 spring semester. The experimental group was composed of three of these sections and the control group was composed of the remaining nine sections. The assignment of a section to the experimental or control group was determined

by a random selection procedure. A container was prepared with twelve balls representing each section. Each ball had an equal opportunity to be selected and three were drawn from the container by an independent person. The three balls drawn indicated which sections would make up the experimental group.

Students were omitted from the sample for testing purposes if they failed to take both the pre-test and criterion test on the dates they were given. The final sample after these omissions consisted of 289 students. The experimental group contained 75 students and the control group contained 214 students.

The original sample at the University of Tennessee was comprised of 59 students. The students made up three sections of the school's last elementary accounting course taught in the spring of 1969. One section was selected as the experimental group and the remaining two sections composed the control group. The assignment of the sections to the various groups was made by using the same random selection procedure as that used at the University of Alabama. Students were also omitted from each group if they failed to take the pre-test and criterion test on the appointed dates. The final sample included 52 students. The experimental group was composed of 20 students and the control group contained 32 students.

Teaching Methods

Four teaching techniques were applied at both schools in teaching elementary accounting during this experiment. The control

groups were exposed to a traditional elementary accounting textbook and textbook problems in conjunction with lectures. In the experimental groups the students were exposed to a business game in addition to the textbook, textbook problems and lectures.

The Business Game. - The business game chosen for this experiment was The Decision Making Game by Bill R. Darden and William H. Lucas. This particular business game was chosen as the independent variable of this experiment for several reasons.

1. The game provides the students with an overall view of the flow of cash, materials, labor, capital and information through a business firm. This aspect is lacking in most games designed for use in accounting education.
2. The student is exposed to a realistic environment which concentrates on planning and control of internal aspects rather than external aspects such as marketing decisions. Therefore, the game is more accounting oriented than most games designed for accounting education.
3. The design of the game is more realistic than other accounting games. For example, sales are not determined by bids from each team but by demand factors of the products which are designed into the model. These demand factors include seasonal and trend demands and irregularities which are randomly determined by a random number generator. As a result of these demand factors the students are exposed to such realistic problems as stockouts, backorders and backorder cancellations.
4. The manual for the game is adequate for instructors to use with only a minor amount of training.

5. The Decision Making Game is the only computerized accounting game available. Therefore, the administration time required of this game is less than the manual games. Also, the computerized data obtained after each decision is better in quality and quantity than that of the manual games.

6. Finally, the game involves the student in accounting concepts that he will be studying in the second elementary accounting course. He will be able to apply the accounting concepts taught in the course to the realistic environment of the game. These concepts will come from the areas of funds flow, budgeting, break-even analysis, capital budgeting, long-term debt, temporary investments and analysis and interpretation of financial statements.

Textbooks. - A different textbook was used at each school. The University of Alabama used Fundamental Accounting Principles by William W. Pyle and John Arch White. The University of Tennessee at Martin used the text Accounting: The Basis for Business Decisions by Walter B. Meigs and Charles E. Johnson.

Both textbooks are traditional texts for an elementary accounting course. The learning materials presented in these books are:

- (1) Partnership accounting
- (2) Corporation accounting
- (3) Long-term debt
- (4) Investments
- (5) Departmental operations
- (6) Management's use of accounting data

- (7) Manufacturing accounting
- (8) Job-order cost accounting
- (9) Process cost accounting
- (10) Budgeting
- (11) Break-even analysis
- (12) Analysis and interpretation of financial statements
- (13) Funds flow analysis

Textbook Problems. - The textbooks used in this experiment have groups of static problems at the conclusion of each chapter. These problems are used to emphasize the concepts and procedures of each chapter. The co-ordinator of the second elementary accounting course at each school selected certain problems from each chapter to be solved by the control and experimental groups. The problems chosen were those which would present the more important accounting concepts and procedures of each chapter. The number of problems required from each chapter ranged from three to five.

Lectures. - The lecture method was applied in both the experimental and control groups. Guidance for the preparation of lectures was given by the co-ordinator of the course at the University of Alabama. Each instructor of the experiment was given a guideline emphasizing the materials which should be included in lectures and those which should be omitted. This guideline resulted in a uniform presentation of the textbook material.

Classroom Procedures

The treatment of the experimental and control groups was

initiated and maintained according to the lecture and problem guidelines furnished by the course co-ordinator. The textbooks provided the content material for lectures for the entire course in accordance with the lecture guideline. The class time allotted to the course material was the same for both groups.

Identical procedure was maintained for both groups until after the pre-tests were administered. At this time the treatment of the experimental group was altered. The instructors of the experimental groups introduced the business game to their students in accordance with a standardized guideline. The classroom time allotted to the business game was held to a minimum. The instructor allowed five minutes to answer questions concerning problems the students encountered after each game decision. The game required the students to make seven decisions. One decision was made each week for the remainder of the course. The classroom time allotted to the textbook material remained in accordance with the lecture guideline. The only other change between the experimental and control group was the omission of some textbook problems from the experimental group's schedule. This step was taken as a result of the additional outside work required of the students in playing the game. The problems omitted duplicated other required problems and those that could be adapted to the environment of the game.

Certain outside assignments directly related to the course material which would be applied in playing the game were required of

the experimental students. These assignments follow:

1. The preparation of a cash budget prior to a game decision. After the results of the decision were returned, the students reconciled their actual cash flow with the budget they prepared.
2. The determination of the break-even point in dollars and units for both products produced in the game environment.
3. To analyze the current period's financial statements as well as the statements of the prior periods in the play of the game.
4. The preparation of a report that covers:
 - (a) the objectives of the firm.
 - (b) the problem areas encountered and how they were solved during the play of the game.
 - (c) the financial position of the firm in the industry at the end of play.
 - (d) what steps should be taken to improve the financial position in the future.

Tests and Grading

Two tests were administered at each school for the purpose of obtaining data for the statistical tests of this study. The pre-tests were given to both groups prior to the introduction of the game in the experimental groups. The data from these tests will be used to determine if both the control and experimental groups are comparable and are drawn from the same universe. The pre-test at the University of Alabama (Appendix D) was designed to test the students in the areas of

partnership and corporation accounting. The pre-test at the University of Tennessee at Martin (Appendix E) was designed to test the students in the areas of long-term debt, manufacturing accounting, job order cost accounting and process cost accounting.

The criterion tests were administered as the final examinations for the course at each school. The same test given to the experimental groups was also administered to the control groups. The time allotted for the examinations were two hours and thirty minutes allowing all students to complete the examinations.

The criterion test given at the University of Alabama (Appendix D) was a comprehensive examination. The test content is analyzed into nine categories: the computer, partnership accounting, corporation accounting, long-term debt and investments, manufacturing and cost accounting, management's use of accounting data, break-even analysis, funds flow analysis and the analysis of financial statements.

The criterion test administered at the University of Tennessee at Martin was also a comprehensive examination. The test content is analyzed into seven categories: generally accepted accounting principles, manufacturing and cost accounting, departmental accounting, funds flow analysis, long-term debt and investments, taxes and business decisions and consolidated statements.

The grading procedures used on all the examinations were designed to eliminate group identification and any possible grading bias. The pre-tests and criterion tests were mixed in four groups. One group was the pre-test at Alabama, one group the criterion test at Alabama,

another the pre-test at Tennessee and the final group was the criterion test at Tennessee. Each examination was coded by an independent person for later grouping according to the experimental and control groups. The examinations were then graded by a standard key for each examination. Once the examinations were graded the objective questions were completely graded again. The subjective questions were then sampled by re-checking every fifth examination. If a difference was observed in the grading of these questions they were graded a second time. Upon the completion of this grading procedure the examinations were regrouped according to the experimental and control groups.

Statistical Treatment

The statistical treatment of the data will be the same for both schools. A t test was selected to test the first and second hypotheses of the data from each school. These hypotheses restated are:

Hypothesis I. - The difference between the aggregate performance of the experimental and control groups is not significantly different on the pre-test to indicate that the groups were drawn from different universes.

Hypothesis II. - The difference between the aggregate criterion test performance of students exposed to a business game in addition to conventional teaching methods is significantly greater than the aggregate criterion test performance of students exposed only to conventional teaching methods in presenting certain elementary accounting concepts.

The formula used to calculate the t ratio in testing the hypothesis was:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left(\frac{\sum x_1^2 + \sum x_2^2}{n_1 + n_2 - 2} \right) \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

\bar{X}_1 = the mean of the experimental group.

\bar{X}_2 = the mean of the control group.

$\sum x_1^2$ = the sum of the squared deviations from the mean of the experimental group.

$\sum x_2^2$ = the sum of the squared deviations from the mean of the control group.

n_1 = the number of students in the experimental group.

n_2 = the number of students in the control group.

After the t ratio is computed it must be compared with the values presented in a table of students' t distributions at a confidence level of .05. If the null hypothesis can be rejected at this confidence level then the difference between the groups is assumed to be the result of the business game. Since the hypotheses predict the direction of the difference the region of rejection is one-tailed.

The statistical test selected for the third hypothesis is the test of significance for a difference between two sample proportions. The third hypothesis restated is:

Hypothesis III. - The students exposed to a business game and conventional teaching methods answer correctly a significantly higher

Proportion of specific criterion test items in comparison to the proportion of correct answers given by students exposed only to conventional teaching methods in presenting certain elementary accounting concepts.

To test this hypothesis it was necessary to analyze specific questions of the criterion test to determine the number of correct answers to each question by each group. The formulas used in computing the \underline{t} ratio are:

$$\sigma_{p_1 - p_2} = \sqrt{\frac{p_1 q_1}{n_1} + \frac{p_2 q_2}{n_2}}$$

$$t = \frac{p_1 - p_2}{\sigma_{p_1 - p_2}}$$

p_1 = the proportion of correct answers to a specific criterion test question of the experimental group.

p_2 = the proportion of correct answers to a specific criterion test question of the control group.

n_1 = the number of students in the experimental group.

n_2 = the number of students in the control group.

$\sigma_{p_1 - p_2}$ = the standard error of the difference in proportions.

After the \underline{t} ratio is computed it must be compared with the values presented in a table of students' \underline{t} distributions at the confidence level of .05. If the null hypothesis can be rejected at this confidence level then the difference in the proportion of correct answers

between the groups is assumed to be the result of the business game. Since the hypothesis predicts the direction of the difference the region of rejection is one-tailed.

Statistical Results

To statistically test hypotheses a research hypothesis is restated in the form of a null hypothesis. The null hypothesis is the research hypothesis stated in negative terms.

If it is found, on the basis of a statistical test, that there is a significant mean difference, the null hypothesis is rejected. If, on the other hand, it is found that whatever mean difference exists may occur frequently because of mere chance, the null hypothesis is accepted.¹

This procedure is followed in presenting the statistical results of this experiment.

The first hypothesis (page 147) is restated symbolically as:

$$H_1: X_1 \neq X_2$$

The null hypothesis to Hypothesis I is: The difference between the aggregate performance of the experimental and control groups is not significantly different on the pre-test to indicate that the groups were drawn from different universes

$$H_0: X_1 = X_2$$

Hypothesis II (page 147) also can be stated symbolically as

$$H_2: X_1 > X_2$$

The null hypothesis to the second hypothesis is: The aggregate criterion test performance of students exposed to a business game in

¹W. James Polpham, Educational Statistics: Use and Interpretation. (New York, New York: Harper and Row Publishers, 1967), p. 51.

addition to conventional teaching methods is equal to or less than the aggregate criterion test performance of students exposed only to conventional teaching methods in presenting certain elementary accounting concepts.

$$H_0: X_1 \leq X_2$$

The third and final hypothesis (page 147) stated symbolically is as follows:

$$H_3: P_1 > P_2$$

The null hypothesis to the final hypothesis is: The students exposed to a business game and conventional teaching methods answer correctly an equal or significantly lower proportion of specific criterion test items in comparison to the proportion of correct answers given by students exposed only to conventional teaching methods in presenting certain elementary accounting concepts.

$$H_0: P_1 \leq P_2$$

The t test of difference between means was applied to statistically test Hypothesis I and its related null hypothesis. The purpose of the test was to determine if a significant difference existed between the means of the aggregate pre-test scores of the experimental and control groups. Tables 15 and 16 present the computed t ratio and supplementary data necessary for the t test. The final procedure in testing Hypothesis I and the null hypothesis compares the computed t values (Tables 15 and 16) with the theoretical values of the student's t distribution.

TABLE 15

Computed \underline{t} Ratio and Supplementary Data Pertaining to
the Pre-test of the Experimental and Control Groups
at the University of Alabama

GROUPS	MEAN	STANDARD DEVIATION	\underline{t} RATIO
EXPERIMENTAL	62.730	16.404	0.852
CONTROL	60.909	15.765	

TABLE 16

Computed \underline{t} Ratio and Supplementary Data Pertaining to
the Pre-test of the Experimental and Control Groups
at the University of Tennessee at Martin

GROUPS	MEAN	STANDARD DEVIATION	\underline{t} RATIO
EXPERIMENTAL	70.600	14.2805	0.422
CONTROL	68.813	13.9181	

The sample from the University of Alabama contained 289 students. The sample was considered to be large for testing purposes. The critical value of \underline{t} at the .05 level of significance on a one tail test for the Alabama data was 1.645.² This means that for a

²Ibid., p. 398.

significant difference to exist between the experimental and control groups on the pre-test the computed t value (Table 15) must equal or exceed 1.645. The computed t value of the pre-test data from the University of Alabama was only 0.852. Based on these findings there is not sufficient evidence to support Hypothesis I, $H_1: X_1 \neq X_2$. The statistical results then support the null hypothesis, $H_0: X_1 = X_2$.

The same procedure was followed with the pre-test data from the University of Tennessee at Martin. The sample from the Tennessee school contained fifty-two students. The critical t value for this sample with fifty degrees of freedom on a one tail test was 1.678.³ For a significant difference to exist between the experimental and control groups at the Tennessee school the computed t value in Table 16 must equal or exceed 1.678. The computed t value as shown in Table 16 was only 0.422. Therefore, there was not sufficient evidence to support Hypothesis I, $H_1: X_1 \neq X_2$. The statistical results then support the null hypothesis, $H_0: X_1 = X_2$.

Since the groups originated from the same universe, the experiment was set for the introduction of the business game to the experimental group at each school. Following the play of the game the control and experimental groups were given the criterion test

³Ibid.

of their respective schools. The criterion test scores were then tested with the \underline{t} test to determine if a difference existed in the group means. If a significant difference existed between the control and experimental groups after the play of the game, the difference was assumed to be the result of the game.

Hypothesis II, $H_2: X_1 > X_2$, and the related null hypothesis, $H_0: X_1 \leq X_2$, were tested by the \underline{t} test, following the same procedure applied in testing the first hypothesis. Tables 17 and 18 present the computed \underline{t} value and supplementary data necessary for the testing of the hypothesis related to the criterion test. The theoretical or critical values at the .05 level of significance remain the same for the data of each school as that used in testing Hypothesis I. These critical values were 1.645 for the Alabama data and 1.678 for the Tennessee data. Therefore, for a significant difference to exist between the experimental and control groups after the play of the game, the computed \underline{t} values (Tables 17 and 18) must equal or exceed the two theoretical values stated above. The computed \underline{t} value associated with the criterion test at the University of Alabama (Table 17) was only 0.170. Since this value was less than 1.645, Hypothesis II, $H_2: X_1 > X_2$, was not confirmed. The same procedure was followed for the criterion test data at the University of Tennessee at Martin. The computed \underline{t} value (Table 18) for these data was 0.254. Therefore, Hypothesis II, $H_2: X_1 > X_2$, was not confirmed and the null hypothesis, $H_0: X_1 \leq X_2$, was accepted.

TABLE 17

Computed t Ratio and Supplementary Data Pertaining to
the Criterion Test of the Experimental and Control
Groups at the University of Alabama

GROUPS	MEAN	STANDARD DEVIATION	t RATIO
EXPERIMENTAL	63.433	13.7373	0.170
CONTROL	63.105	14.4996	

TABLE 18

Computed t Ratio and Supplementary Data Pertaining to
the Criterion Test of the Experimental and Control
Groups at the University of Tennessee at Martin

GROUPS	MEAN	STANDARD DEVIATION	t RATIO
EXPERIMENTAL	64.000	11.6435	0.254
CONTROL	63.188	10.9586	

These findings indicate that under the conditions of this experiment a business game does not result in any significant improvement in the teaching of certain elementary accounting concepts. However, there might be a significant difference between the experimental and control groups on certain test items or areas of test items. This possibility

results in the testing of Hypothesis III, $H_3: p_1 > p_2$, and the related null hypothesis, $H_0: p_1 \leq p_2$.

A procedure of item analysis was applied to test these hypotheses. This required the selection of certain criterion test items which would be more directly associated with the game. A separate examination was made from the answers given to each test item by the experimental and control groups. The proportion of correct responses to each test item was obtained for each group. Finally, a statistical test of significance was performed on answers to each item by each group.

The test of difference between two sample proportions was applied for testing the final hypotheses. This test was based upon the same principles as the test of difference between two sample means. Therefore, the test of significance was made with the students' \underline{t} distribution. A computed \underline{t} value was obtained for each test item by dividing the difference in proportions by the standard error of the difference in proportions. These values were then compared with the critical value obtained from the students' \underline{t} distribution

Table 19 presents the computed \underline{t} values according to both student groups' responses to forty-six selected criterion test items at the University of Alabama. The \underline{t} values of Table 19 were compared with the theoretical value of the students' \underline{t} distribution. The critical value at the .05 level of significance for a large sample on a one-tail test was 1.645. Therefore, a computed \underline{t} value was significant if it equals or exceeds 1.645.

TABLE 19

Computed t values to Selected Criterion Test Items
at the University of Alabama

TEST ITEM	t VALUE	TEST ITEM	t VALUE
9-1	0.67305	17-5	0.86167
9-2	0.12297	18-1	0.44616
10-1	-0.08493	18-2	0.38583
10-2	-0.85164	18-3	1.87508
10-3	-0.32147	18-4	0.05212
10-4	0.41664	18-5	1.51317
10-5	0.51625	18-6	-0.24450
11-0	-0.05914	19-1	0.00926
12-1	0.63586	19-2	0.43773
12-2	0.87163	20-1	0.76524
12-3	-0.16903	20-2	0.14268
14-1	0.46892	20-3	2.38320
14-2	1.43435	20-4	2.30604
14-3	0.14268	20-5	0.93241
15-1	-0.24245	20-6	1.30156
15-2	-0.28100	21-1	-1.55874
16-1	0.53322	21-2	-1.47218
16-2	-0.61820	21-3	-1.57132
16-3	-1.08171	21-4	-1.72391
17-1	0.98647	21-5	-0.36228
17-2	-0.33920	21-6	-1.32622
17-3	1.00483	21-7	-1.69696
17-4	0.70147	21-8	1.29763

There were only three test items which had a computed \underline{t} value which equaled or exceeded the critical \underline{t} value of 1.645. Therefore, the null hypothesis, $H_0: P_1 \leq P_2$, was rejected and Hypothesis III, $H_3: P_1 > P_2$, was accepted for these test items. These test items and their computed \underline{t} values are shown in Table 20.

TABLE 20

University of Alabama Criterion Test Items which had a Computed \underline{t} value which equaled or exceeded the critical value

TEST ITEM	COMPUTED \underline{t} VALUE
18-3	1.87508
20-3	2.38320
20-4	2.30604

A review of these test items (Appendix D) shows that there were two different types of questions. Test item 18-3 was a question which involved the student's application of his knowledge of funds flow. Test items 20-3 and 20-4 were two of seven questions which dealt with break-even analysis. In the area of break-even analysis it is interesting to note that the experimental group was required to do an extensive outside assignment in the environment of the game.

The remaining test items had a computed \underline{t} value which was below the critical value of 1.645. Consequently, the null hypothesis,

$H_0: P_1 \leq P_2$, was accepted and Hypothesis III, $H_3: P_1 > P_2$, was not confirmed for these test items.

The same procedure was applied to the Tennessee data as that used on the Alabama data in testing Hypothesis III and the related null hypothesis. Table 21 presents the computed \underline{t} values according to both student groups' responses to thirty-two selected criterion test items at the University of Tennessee at Martin. The \underline{t} values of Table 21 were compared with the theoretical value of the students' \underline{t} distribution with fifty degrees of freedom. This value at the .05 level of significance for a one-tailed test was 1.678. Therefore, a computed \underline{t} value was significant if it equals or exceeds 1.678.

As shown in Table 21 the computed \underline{t} values did not exceed the theoretical value of 1.678. Therefore, the null hypothesis, $H_0: P_1 \leq P_2$ was accepted for the test items selected.

Summary and Conclusions

This chapter has presented the research design, assumptions, hypotheses, and statistical results that were necessary in obtaining the final objective of this study. This objective was to determine whether or not gaming is an effective pedagogical tool for accounting education.

The research design for testing business games as a pedagogical tool in accounting was as tight as possible. Examples of steps taken to tighten the research design follow:

TABLE 21

Computed \bar{t} values to selected Criterion Test Items
at the University of Tennessee at Martin

TEST ITEM	\bar{t} VALUE	TEST ITEM	\bar{t} VALUE
II-15	-1.32859	II-41	1.41345
II-20	0.58102	III-A	0.97075
II-21	0.26219	III-B	0.82234
II-25	0.16462	III-C	0.70085
II-26	0.38818	III-D	0.45185
II-28	-0.74025	IV-a	1.06125
II-29	-0.77204	IV-b	-1.23231
II-30	0.70095	IV-c	0.41957
II-31	-0.96018	IV-d	-0.29226
II-32	-1.71237	IV-e	0.85268
II-33	-0.94343	IV-f	0.55824
II-34	-2.02843	IV-g	-0.70095
II-35	-1.09066	IV-h	1.57288
II-37	1.33604	IV-i	-0.97075
II-38	0.81823	IV-j	1.58851
II-40	0.18211	IV-k	-0.18211

1. Randomness was obtained in the selection of the experimental and control groups for the experiment.
2. Consistent treatment of the concepts taught in the sections was obtained by a guideline for class discussion.
3. A statistical t test was applied to determine if the experimental and control groups were comparable prior to the introduction of the business game in the experiment.
4. The examinations used in the experiment were designed to test the objectives of elementary accounting.
5. The examinations were graded several times to remove any grading bias.

There were two tests performed in this chapter to test the effectiveness of a business game as a teaching method in accounting. The first test was a t test to determine if a difference existed between the experimental and control groups after the play of the game. The statistical results of this test on the data from both schools showed that there was no significant difference between the groups as to their performance on the criterion tests. The remaining test was an item analysis of the groups' answers to specific criterion test items. This test was performed to determine if a significant difference existed between the experimental and control groups on certain types of questions or question areas. The results of the final test did not indicate that the experimental students performed significantly better on selected test items or areas. The results of this experiment showed that under the conditions of a traditional elementary accounting course gaming did not improve the students' knowledge of basic accounting concepts. The results were unable to

prove that a business game is a better teaching technique or a worse teaching technique than conventional teaching methods. There are several factors which could be responsible for the results of this experiment and they should be considered in future research. These factors are:

1. The elementary accounting course contains many different topics and each is taught as an independent area rather than a part contributing to a whole. Under these conditions the students probably did not relate the topics taught in the course to the total perspective of the game.
2. The topics presented in elementary accounting are taught as an exact science. Therefore, the students were unable to compromise with the uncertainty of the realistic environment in business gaming.
3. The tests given were designed to measure the objectives of a traditional elementary accounting course. There is a possibility that the game participants gained a better understanding of decision-making which could not be tested within the objectives of the elementary course.
4. Since the instructors were graduate students there could have been a lack of enthusiasm in their classroom discussions of the game.

The information presented in this study is summarized in the following chapter with several recommendations for future research.

CHAPTER VII

FINDINGS AND RECOMMENDATIONS

Findings

The four objectives of this study were:

1. To determine the extent to which business games are being used in formal accounting education.
2. To determine the probable causes for the limited application of business games in formal accounting education.
3. To determine the advantages and disadvantages of applying business games in specific areas of accounting education.
4. To determine whether or not gaming is an effective pedagogical tool for accounting education.

These objectives were attained by: (1) a survey of the literature, (2) questionnaires sent to member schools of the American Association of Collegiate Schools of Business and accounting educators using business games, (3) a review of the existing business games used in accounting education and (4) a statistical test of significance for evaluating business games at the elementary accounting level.

Business games were introduced in accounting curricula in 1959. Their use in accounting education did not surge upward as they did in the areas of management, marketing and business policy. In 1964 as more accounting games came on the market, their use tripled in accounting education. However, in general their application in accounting is

still limited. Currently, there are only eighteen of the 130 member schools of the American Association of Collegiate Schools of Business employing business games in their accounting curricula. However, twenty-nine other schools indicated plans for the introduction of a game in their curricula in the near future.

The schools using business games apply them at both the undergraduate and graduate level. The four different undergraduate courses in which a game is being utilized are: elementary accounting, managerial accounting, cost accounting and budgeting. The majority of these schools only use a game in the elementary accounting course. Therefore, the surge of business gaming in accounting education can be attributed to its use at the elementary accounting level. At the undergraduate level the games are supplements to the courses. The instructors and students spend a minimum of classroom time (5 to 10 per cent) on the game. The outside assignments associated with the game; however, range from 10 to 20 per cent of the total outside assignment time.

The use of business games at the graduate level is represented by three different courses. These courses are an introductory accounting course for M.B.A. candidates without a business background, a managerial accounting course and an accounting controls course. The business game is also used as a supplement in accounting graduate courses and the course time devoted to the business games is minimal.

The utilization of business games in formal accounting education is limited as shown by this study. This limited application

was found in the number of schools, the total number of courses within a school using games and the number of different courses in which games were applied. Classroom time, instructor's time and outside assignments allocated to gaming were also limited.

The second objective, to determine the probable cause for the limited application of gaming in accounting education was attained by information from three sources. These sources were accounting educators who had never used games, educators who had used games but discontinued their use and educators who are currently applying games in their curricula. Several opinions of the three groups overlapped. However, each group presented ideas with considerable merit. The probable causes for the limited application of business games in formal accounting education are:

1. Business games which are suitable for specific accounting courses are not in existence.
2. Accounting educators are too narrow in their viewpoint of accounting education. Their view results in a concentration on theory and this omits the practitioner's viewpoint. Therefore, a new pedagogical technique such as games is considered to be too procedural.
3. When business games were introduced into business education the accounting field already had a realistic teaching tool. The accountants had their textbook problems so games were not necessary in accounting education.
4. Most of the accounting games available do not allow the participants freedom in choosing different accounting methods in the play of

the game. Therefore, a limitation is placed on the game which is similar to the static textbook problems.

5. Accounting courses have a full content; therefore, educators are unwilling to alter courses for the introduction of a new teaching technique.

6. The business games available are too easy and students learn to beat the game. Therefore, the students concentrate on winning and fail to focus their efforts on objectives of the game.

7. There is a lack of computer time available on some campuses for proper administration of the computerized games.

8. Curriculum revision is being undertaken at many schools. Therefore, faculty time is being allocated to this problem rather than new educational techniques.

9. The benefits to be derived from gaming are better suited for teaching in junior colleges rather than four year universities.

10. Accounting students already take business policy courses, management courses or off campus courses which include a business game. Therefore, additional benefits obtained by games in accounting would not be worth the time and costs.

11. Accounting faculties are traditionally oriented. They do not have an interest in the use of business games or new teaching techniques.

12. Several schools are attempting to solve problems encountered in other educational methods. This work does not allow sufficient time for new teaching techniques.

13. Many accounting faculty feel that business games are not effective as a pedagogical tool. They feel that gaming benefits are minimal in comparison with the cost of obtaining these benefits.
14. Many accounting educators are unaware that business games for accounting are available.
15. The limited background of the undergraduate student prevents effective participation in games. Therefore, gaming is not applied in undergraduate accounting courses.

The third objective, to determine the advantages and disadvantages of applying business games in specific areas of accounting, was attained by the follow-up questionnaire and personal interviews. Accounting educators with experience in gaming provided this information. This limitation was applied because these educators had a better grasp of any possible advantages and disadvantages. The response was divided into the areas of elementary accounting, cost and budgeting, accounting theory and auditing and other courses.

The best response was in the area of elementary accounting because most of the gaming experience has been at this level. The advantages of the application of a business game in elementary accounting are as follow:

1. The elementary accounting student is placed in a dynamic realistic environment. The student has never been exposed to this type of experience. This exposure tends to encourage students to select accounting as their major.
2. The business game experience increases the student's appreciation for the uses and deficiencies of accounting data.

3. The student is introduced to a complete accounting process.
4. The business game motivates intellectual curiosity which accounting educators have not found in traditional teaching techniques. Students are constantly researching questions which arise in the play of the game. They anxiously await the results of each decision to determine success or failure of their performance. In the traditional lecture-problem method this curiosity does not exist.

The disadvantages associated with elementary accounting have considerable merit. A summary of these disadvantages are presented below:

1. Elementary accounting students lack the knowledge of accounting and business in general for proper game participation. This is valid reasoning if a general policy game is applied at this level of the curriculum. The student may not have been exposed to areas such as principles of management or marketing which play a significant part in the general policy games. However, if a functional game associated with accounting functions is utilized this reason does not have merit.
2. The design of most business games is not realistic for accounting education. Game designs contain too many external forces that present the accounting field as only playing a minor role in decision making. This negative aspect may discourage students from the field of accounting. Therefore, it may be more advantageous to discuss broader concepts in elementary accounting.
3. The elementary accounting course has a reputation for eliminating students. Therefore, when a game is added the students develop

hostility toward the game and they fail to gain knowledge from this new technique.

4. The business games available conflict with the traditional content of elementary accounting. The content and objectives of elementary accounting are confining. The business game is not necessarily confining. Due to this combination of characteristics the learning rewards of a game are far above the elementary accounting content and do not fall within the objectives of the course.

5. The elementary course instructors at many colleges and universities are graduate assistants and temporary instructors. Each year a new group arrives, discouraging a consistent level of teaching in this course. If a game is used the training process is necessary year after year. With the inconsistent teaching levels a business game would not be very effective.

The current design of business games is better suited to courses in cost accounting and budgeting. The correlation between game designs and the content of these courses represents an advantage for the use of games in these areas. Several other advantages of gaming in these courses are as follow:

1. The students in these courses after playing a business game have a better understanding of the relationships between accounting data and the decisions made from these data. The traditional textbook problems lack this aspect. The problems usually generate data but fail to take the next step of decision-making.
2. If the student is exposed to decision-making in cost or budgeting courses the decisions are usually made under conditions of certainty.

The business game gives the accounting student experience in decision-making under conditions of uncertainty.

3. The business game has an advantage of introducing the cost and budgeting students to the concept of simulation. The idea of models and model building is lacking in the traditional courses.

The disadvantages associated with gaming in cost accounting and budgeting courses deal with time consumption and omission of materials. The time factor would necessitate the omission of materials from the courses. Several educators felt that the omission of materials in cost or budgeting courses would jeopardize the courses.

Accounting educators unanimously agreed that a game was not suitable for courses in intermediate and advanced accounting. This opinion is based on the idea that the design of a business game is more cost accounting oriented rather than financial accounting oriented. This reasoning is valid. There is not one business game that has a design oriented toward financial accounting theory. However, this does not mean that a game could not be designed to fit the content of these courses. In fact there is some research being performed that could result in a financial accounting game.

Auditing is the only other course in which accounting educators believe that games might be advantageous. Although the design of games does not fit this course, educators mention possible ways of using a game in auditing courses. The first idea divides the auditing students into teams. Each team would audit the student game results of another course. This procedure would be more advantageous

than a practice set to the students because they would be auditing a more dynamic set of company records. A second application of gaming in auditing represents a new business game design. The idea was to design a computerized system to be audited by the students. The system would contain several changeable parameters which would expose the students to several realistic auditing problems of a computerized system. Several practicing certified public accountants have supported this idea. Their belief is that this type of simulation will be a contribution to auditing education.

The final objective is the crux of this study. This objective was to perform an experiment which would analyze the relative effectiveness of a business game as a pedagogical tool in formal accounting education. Two schools, the University of Alabama and the University of Tennessee at Martin, were selected for this experiment. The two schools represent one large school with many accounting students and a smaller school with only a few accounting students. The last elementary accounting course was chosen for this experiment. The sections at each school were divided randomly to obtain an experimental and control group. The sample contained 289 students at Alabama and 52 at the Tennessee school. The independent variable for this study was the methods used in teaching certain elementary accounting concepts. For the experimental groups the methods were lectures, textbook, problems and a business game. The traditional lecture, textbook and problem approach was employed in the control groups. The dependent variable was the students' performance on

criterion tests at each school. These tests were designed to test the objectives of the elementary accounting course. Therefore, for a difference to exist between the two teaching approaches on these tests it must fall within the objectives. In other words there could be a difference between the experimental and control groups that the criterion tests may not indicate.

The first hypothesis was tested by comparing the aggregate pre-test performance of the experimental group with the control group. The statistical t test was applied in this test. The results of this test at the .05 level of significance indicated that no significant difference existed between the two groups at either school. If any difference existed between the groups after the game, it must be due to the game.

Hypothesis II, $H_2: X_1 > X_2$, was tested by the same statistical tests used in testing Hypothesis I. However, the test performances were those by each group on the criterion test at each school. The test results at the .05 level of significance again indicated that there was no significant difference between the groups. Therefore, the null hypothesis, $H_0: X_1 \leq X_2$, was accepted. The expectation of the study was that the experimental groups would perform significantly better than the control groups on the criterion tests. However, there was no statistical evidence that there was an increase in the experimental groups' performance after the game.

To test Hypothesis III, $H_3: p_1 > p_2$, a separate t test was performed on each of forty-six Alabama criterion test items and thirty-two Tennessee criterion test items. This test was applied to measure the difference in the proportion of correct answers given on the test items of the experimental and control groups. Only three test items of the Alabama data revealed a significant difference for the experimental group and no test item in the Tennessee data revealed a significant difference for the control group. Most of the statistical results indicated no statistical significant difference between the control and experimental groups.

The aggregate results of this experiment may be interpreted to indicate that the presence of a business game in elementary accounting courses does not create a greater amount of learning than a course with conventional teaching methods. The statistical results of this experiment definitely support this statement. However, these tests were performed based on the objectives of the elementary accounting course. The objectives of this course as well as those of other accounting courses remain static in nature. As a result, accounting instructors test the objectives in a form similar to textbook problems. Therefore, the benefits of games may be long-range or outside the objectives of most accounting courses. If this is the case then accounting educators should review their course objectives and textbooks and attempt to obtain a more dynamic nature to accounting education.

Recommendations

The results as well as the limitations placed on this study imply several points for future research in this area:

1. Additional research which would review the objectives of accounting courses. The research would determine if the viewpoint of accounting educators may be teaching accounting as an exact science which it is not.
2. A research design which would consider the long range benefits of gaming in future accounting courses or in retention of accounting knowledge.
3. A research design to measure the creativity and motivational aspects of gaming in elementary accounting.
4. A research design similar to the design of this study but revise the objectives of elementary accounting so that they are more realistic in nature.
5. A research experiment similar to the design of this study but one which applies a redesigned business game which parallels the content of the elementary accounting courses.

APPENDIXES

APPENDIX A
SURVEY QUESTIONNAIRE

BUSINESS GAMES IN ACCOUNTING CURRICULA

We are making a scientific evaluation of the use of business games in accounting curricula. We earnestly solicit your cooperation in providing us with the following information. A stamped return envelope is enclosed for your convenience. Your assistance is appreciated.

James C. Caldwell
Department of Accounting
University of Alabama

- | | YES | NO |
|--|-----|-----|
| Are any business games being used currently in your accounting curriculum? | () | () |
| A. If yes: | | |
| 1. Are business games a permanent part of the accounting curriculum? | () | () |
| 2. Please list the titles and authors of business games used. | | |
| _____ | | |
| _____ | | |
| _____ | | |
| 3. Are you willing to complete a detailed questionnaire relating to your experience with business games? | () | () |
| 4. Are you willing to discuss personally the role of business games in your accounting curriculum? | () | () |
| B. If no: | | |
| 1. Has a business game been used in any accounting course at your school at any time in the past? | () | () |

a. If yes:

1. What game was used? _____

2. Why was business gaming discontinued?

b. If no:

1. Do you believe that business games
 can be effective as a pedagogical
 tool? () ()

2. List reasons for the omission of
 business games in your accounting
 curriculum.

2. Are you considering using a business game
 in any accounting course in the near
 future? () ()

Questionnaire completed by _____

Title _____

School _____

Do you wish to receive a summary of the results of this
 questionnaire? () ()

APPENDIX B
LISTING OF AMERICAN ASSOCIATION OF
COLLEGIATE SCHOOLS OF BUSINESS MEMBERS

<u>Institution</u>	<u>Responded to Questionnaire</u>
University of Akron	yes
University of Alabama	yes
University of Alberta	yes
University of Arizona	yes
Arizona State University	no
University of Arkansas	yes
The Bernard M. Baruch College, The City University of New York	yes
Baylor University	yes
Boston College	no
Boston University	yes
Bowling Green State University	yes
Brigham Young University	yes
University of California	yes
University of California, Los Angeles	yes
California State College At Fullerton	yes
California State College At Los Angeles	yes
Carnegie-Mellon University	yes
University of Chicago	yes
University of Cincinnati	yes
University of Colorado	yes
Columbia University	yes
University of Connecticut	yes

<u>Institution</u>	<u>Responded to Questionnaire</u>
Cornell University	yes
The Creighton University	yes
Dartmouth College	yes
University of Delaware	yes
University of Denver	yes
DePaul University	no
University of Detroit	yes
Drake University	yes
Drexel Institute of Technology	yes
Duquesne University	no
East Carolina University	yes
Emory University	yes
University of Florida	yes
Florida State University	yes
Fordham University	yes
Fresno State College	yes
University of Georgia	yes
Georgia State College	yes
Harvard University	yes
University of Hawaii	yes
Hofstra University	no
University of Houston	yes
University of Illinois	yes
Indiana University	yes
University of Iowa	yes

<u>Institution</u>	<u>Responded to Questionnaire</u>
University of Kansas	yes
Kent State University	yes
University of Kentucky	no
Lehigh University	yes
Louisiana Polytechnic Institute	yes
Louisiana State University	yes
Loyola University, Chicago	yes
Loyola University, New Orleans	yes
Marquette University	yes
University of Maryland	yes
University of Massachusetts	yes
Massachusetts Institute of Technology	yes
University of Miami	yes
Miami University	yes
The University of Michigan	yes
Michigan State University	yes
University of Minnesota	yes
University of Mississippi	yes
Mississippi State University	yes
University of Missouri-Columbia	yes
University of Montana	yes
University of Nebraska	yes
The University of Nebraska at Omaha	yes
University of Nevada	yes
State University of New York at Buffalo	yes

<u>Institution</u>	<u>Responded to Questionnaire</u>
New York University	yes
University of North Carolina	no
North Texas State University	yes
Northeastern University	yes
Northwestern University	yes
University of Notre Dame	yes
Ohio State University	yes
Ohio University	yes
University of Oklahoma	yes
Oklahoma State University	yes
University of Oregon	yes
Oregon State University	yes
University of Pennsylvania	yes
The Pennsylvania State University	yes
University of Pittsburgh	yes
Purdue University	yes
University of Richmond	yes
The University of Rochester	yes
Roosevelt University	yes
Rutgers-The State University of New Jersey	no
Sacramento State College	yes
St. John's University	no
Saint Louis University	yes
San Diego State College	yes
University of San Francisco	yes

<u>Institution</u>	<u>Responded to Questionnaire</u>
San Francisco State College	yes
San Jose State College	no
University of Santa Clara	no
Seattle University	yes
University of South Carolina	yes
University of South Dakota	yes
University of Southern California	yes
Southern Illinois University	yes
Southern Methodist University	no
Stanford University	yes
Syracuse University	yes
Temple University	yes
University of Tennessee	yes
University of Texas	yes
Texas Christian University	yes
Texas Southern University	yes
Texas Technological College	yes
University of Toledo	yes
Tulane University	yes
University of Tulsa	yes
University of Utah	yes
University of Virginia	yes
Virginia Polytechnic Institute	yes
Wake Forest University	yes
University of Washington	yes

<u>Institution</u>	<u>Responded to Questionnaire</u>
Washington and Lee University	yes
Washington State University	yes
Washington University	yes
West Virginia University	yes
Western Reserve University	yes
Wichita State University	yes
University of Wisconsin	yes
University of Wyoming	yes

APPENDIX C
FOLLOW-UP QUESTIONNAIRE ON THE USE OF
BUSINESS GAMES IN ACCOUNTING CURRICULA

BUSINESS GAMES IN ACCOUNTING CURRICULA

- I. INFORMATION CONCERNING THE COURSES IN WHICH YOU ARE APPLYING BUSINESS GAMES:
- A. What is the name of the accounting course(s) in which you use a business game (e.g., elementary accounting-first semester, budgeting, advanced cost)?
- 1.
 - 2.
- B. What is the text used in the course?
- 1.
 - 2.
- C. Is the course required for accounting majors (circle answer)?
1. Yes.
 2. No.
- D. Is the course an undergraduate or graduate course (circle answer)?
1. Undergraduate
 2. Graduate
- E. In what year is the course(s) taken (circle answer).

1. Undergraduate:

- a. 1
- b. 2
- c. 3
- d. 4

2. Graduate:

- a. 1
- b. 2

F. What percent of the course time is devoted to the game (circle the best answer)?

1. Student's time:

a. Classroom time;

5% 10% 15% 20% 25% 30% 40% Over 40%

b. Outside assignments;

5% 10% 15% 20% 25% 30% 40% Over 40%

2. Instructor's time (hours per week for _____ Hours per week of instruction):

a. Class preparation;

1/4 1/2 1 1-1/4 1-1/2 2 Over 2

b. Administration;

1/4 1/2 1 1-1/4 1-1/2 2 Over 2

G. When did your department start using business games?

II. INFORMATION CONCERNING THE GAME(S) THAT YOU ARE APPLYING IN YOUR ACCOUNTING DEPARTMENT:

A. How is the game that you use administered (circle answer)?

1. Manually.
 2. With a computer.
- B. Is the game a general policy or a functional game (circle answer)?
1. General.
 2. Functional.
- C. If the game is a functional game, what is the area of specialization (e.g., production, inventory control, etc.)?
- D. Indicate how the business game is used in the course(s) in your curriculum in terms of: (1), when the game is played; (2), the number and how often decisions are made; (3), what is required of the student other than making the game decisions.
1. When is the game played (circle answer)?
 - a. Entire semester or quarter.
 - b. First half of the semester or quarter.
 - c. Last half of the semester or quarter.
 - d. Other (explain).
 2. How many decisions are made (circle best answer)?
 - a. 1-4
 - b. 5-8
 - c. 9-12
 - d. More than 12

3. How often are decisions made (circle answer)?

- a. Once per week.
- b. Twice per week.
- c. Every other week.
- d. Other (explain).

4. List student requirements, other than making the game decisions, in the gaming portion of the course (e.g., annual reports, management reports, etc.):

E. What do you consider to be the greatest educational values of business gaming in accounting courses?

III. PROBLEMS THAT OCCUR IN INTRODUCING BUSINESS GAMES IN A CURRICULUM:

Many of the following problems have been associated with business gaming. Please circle the answer that best describes your experience with these problems.

- A. Faculty and administration resistance to business games.
 - 1. No resistance (no members opposed).
 - 2. Some resistance (10-29% of members opposed).
 - 3. Substantial resistance (30-50% of staff opposed).
 - 4. Strong resistance (more than 50% of staff opposed).

- B. The lack of realism in business games.
 - 1. Most games are unrealistic.
 - 2. Most games have some elements of realism.
 - 3. Most games approach realism.
 - 4. Most games are realistic.

- C. The availability of computer time.
 - 1. No time available.
 - 2. Very limited time available.
 - 3. Considerable time available.
 - 4. Unlimited time available.

- D. The additional cost of the game material.
 - 1. Yes it is a problem.
 - 2. No it is not a problem.

- E. How to evaluate a student's achievement in playing a game.
 - 1. No evaluation is used.
 - 2. Indirect evaluation is used (course grade determined by testing textbook materials).
 - 3. Direct evaluation is used (course grade determined in part by performance in the game).

- F. Selection of material to omit from an accounting course to be able to introduce a game in its place.
1. Is there a need to eliminate material?
 - a. Yes.
 - b. No.
 2. What materials should be eliminated?
 - a. Chapter material.
 - b. Problems.
 - c. Other (explain).
- G. List the reasons which you believe have caused more extensive use of business games in other business courses than in accounting courses.

IV. BUSINESS GAMES IN ACCOUNTING COURSES:

Please state your thoughts as to the advantages and disadvantages of applying business games in the following accounting courses.

- A. Elementary accounting (Principles).

B. Accounting theory (Intermediate, Advanced).

C. Cost accounting - Budgeting.

D. Auditing.

E. Other.

V. FUTURE OF BUSINESS GAMES IN ACCOUNTING EDUCATION:

A. What do you see as the future of business games in accounting education (circle answer)?

1. Decline in their use.
2. No increase in their use.
3. Some increase in their use.
4. Great increase in their use.

QUESTIONNAIRE COMPLETED BY _____

SCHOOL _____

APPENDIX D
UNIVERSITY OF ALABAMA
EXAMINATIONS

PRE-TEST

1. The Capital Balance of Riley, Stark, and Thomas are \$20,000, \$15,000, and \$8,000 respectively. They share profit and losses in the ratio of 4:3:2. Present the journal entries to record Riley's retirement under each of the following conditions:
 - 1.1 Riley is to receive \$8,000 in partnership cash and a note for the remainder of his equity of \$12,000.
 - 1.2 Same as above except that, the note is for \$17,000.
 - 1.3 Riley sells $\frac{1}{2}$ of his interest to Stark for \$11,000 and $\frac{1}{2}$ of his interest to Thomas for \$12,000.
 - 1.4 Riley withdraws and takes \$15,000 of partnership cash.

2. Adams and Jones are partners sharing profits and losses in the ratio of 3:2. The partnership books are closed on June 30 and the balance sheet at that date is as follows:

Adams and Jones
Balance Sheet
June 30, 1969

Assets

Cash		\$14,000
Accounts Receivable	\$4,500	
Allowance for Bad Debts	500	4,000
Merchandise Inventory		12,000
Building	25,000	
Accumulated Depreciation	5,000	20,000
Land		5,000
Total Assets		\$55,000

Capital

Adams, Capital	\$30,000	
Jones, Capital	25,000	
Total Capital		\$55,000

On that date the partners decide to reorganize their firm into a corporation. The corporation is authorized to issue 20,000 shares of \$5 par value common stock.

Prepare entries in general journal form to revalue the assets as follows:

- 2.1 The \$200 account receivable of Druid Sales is known to be uncollectible and is to be written off as a bad debt. After the write-off the allowance for bad debts is to be decreased to 5% of the remaining accounts receivable.
 - 2.2 The recorded value of the building is to be increased to its replacement cost, \$30,000, and the accumulated depreciation is to be increased to show the building one-fourth depreciated.
 - 2.3 The merchandise inventory is to be written down to \$10,000.
 - 2.4 The gain or loss on revaluation is to be divided in accordance with the original partnership agreement.
 - 2.5 The partners are to receive stock at par value for their capital balances (be sure to give each only full shares) and the remainder is to be withdrawn in cash (if necessary).
- 3.
- 3.1 Briefly define and distinguish stock dividends and stock splits.
 - 3.2 Briefly define and distinguish stock authorized, stock issued and stock outstanding.
4. Prepare a proper accounting entry for each of the following events, in general journal form on the records of The Happy Lotus Import Co., Inc.
- 4.1 While in New Orleans last month the president's car caught fire. The Imperial is carried on the company records at \$6,000. Accumulated depreciation at the date of the fire was not recorded but should have been \$200. Proceeds from a New Orleans junk dealer for salvage from the auto amounted to \$20.

- 4.2 The company stockholders' equity accounts had the following balances after entry (4.1) was recorded.

Common Stock, \$2 par value	\$200,000
Contributed Capital in Excess of par value	490,000
Retained Earnings	2,000

Yesterday the board of directors (which includes the stockholders holding 51% of the outstanding stock) declared a cash dividend of \$1 per share.

- 4.3 Today the City of Tuscaloosa, eager for new industries to locate in that metropolis, gave the company one acre of land fronting on By-pass 11. The city acquired the land for back taxes in 1931 for \$75. The company was offered \$10,000 for the land one hour after receiving title. Prepare entry on books of company to record land.
5. Using the information contained below, answer the questions by filling in the blanks.

Munche Corporation
Trial Balance After Closing
December 31, 1968

Various Assets (details omitted)	\$942,000	
Treasury Stock (100 shares)	5,000	
Premium on stock issued		\$ 30,000
Stock dividend declared, par value		15,000
Premium on stock dividend		6,000
Capital stock, common, par \$50		500,000
Reserve for depreciation		60,000
Reserve for uncollectible accounts		12,000
Reserve for treasury stock		5,000
Reserve for contingencies		100,000
Reserve for Federal income taxes		37,000
Retained earnings, unappropriated		87,000
Various liabilities (details omitted)		95,000
Totals	<u>\$947,000</u>	<u>\$947,000</u>

- 5.1 The total stockholders' equity of the corporation is _____.
- 5.2 The total appropriated retained earnings is _____.
- 5.3 If the treasury shares were retired by formal action of the directors, the effect on total stockholders' equity would be _____ (Increase, Decrease, or No Change).

6. The Id Efficiency Corporation has had outstanding since it was organized 100,000 shares of \$5 par value common stock and 1,000 shares of \$100 par value, 6 percent preferred stock. The current year's and two prior years' dividends have not been paid on the preferred stock. However, the company has recently prospered, and the board of directors wants to know how much cash will be required for dividends if \$.50 per share is paid on the common stock.

REQUIRED: Fill in the blanks showing the amount of cash required for dividends to each class of stockholders under each of the following assumptions: (Show computations)

	Cash Required	
	Preferred	Common
6.1 The preferred stock is noncumulative and nonparticipating	\$ _____	\$ _____
6.2 The preferred stock is cumulative and nonparticipating	\$ _____	\$ _____
6.3 The preferred stock is cumulative and fully participating	\$ _____	\$ _____
6.4 The preferred stock is noncumulative and fully participating	\$ _____	\$ _____

7. Jones Corporation has 10,000 shares of \$10 par common stock outstanding. Prepare the necessary journal entries for the following transactions.

- 7.1 Acquire 1,000 shares of Treasury Stock for \$12 a share.
- 7.2 Sold 200 shares of Treasury Stock at \$2 above par value per share.
- 7.3 Sold 200 shares of Treasury Stock at \$14 a share.
- 7.4 Sold 200 shares of Treasury Stock at \$9 a share.

8. Complete the following statements by circling the letter of the correct answer or answers.

8.1 The declaration of a stock dividend

- A. Decreases stockholders' equity and increases current liabilities
- B. Has no effect on assets, liabilities or total stockholders' equity
- C. Decreases stockholders' equity and assets
- D. Requires only a memorandum entry
- E. None of the above

8.2 According to the AICPA, a 10% stock dividend requires

- A. Earned surplus to be capitalized at the fair market value of the stock
- B. A memorandum entry to be made
- C. Requires earned surplus to be capitalized at the stock's redemption value
- D. Requires earned surplus to be capitalized at the stock's par value
- E. None of the above

8.3 To record the authorization of common stock

- A. Debit common stock to be issued and credit common stock authorized
- B. Debit cash and credit common stock
- C. Debit accounts receivable and credit common stock authorized
- D. Make a memorandum entry
- E. None of the above

8.4 To record a stock split

- A. Debit retained earnings and credit stock split-up
- B. Debit retained earnings and credit common stock
- C. Make a memorandum entry
- D. Debit retained earnings and credit stock distributable
- E. None of the above

- 8.5 Stock with a stated value is
- Par value stock
 - No-par value
 - Redemption value stock
 - Appraisal stock
 - None of the above
- 8.6 Unpaid common stock subscriptions are shown on the balance sheet as
- Earned surplus
 - Intangible asset
 - Current asset
 - Contributed capital
 - None of the above
- 8.7 The amount of a stock dividend distributable is shown on the
- Income statement as an expense
 - Balance sheet as a current liability
 - Balance sheet in the retained earnings section
 - Balance sheet in the contributed capital section
 - None of the above
- 8.8 A balance in the premium on common stock account shows
- Common stock was sold at a profit
 - Common stock is no-par stock
 - Common stock was sold at a loss
 - Common stock was sold at a price greater than par
 - None of the above
9. A company has the following accounts on its books

Accumulated Depreciation	\$ 25,000
Reserve for Bonded Indebtedness	40,000
Common Stock	200,000
Reserve for Contingencies	10,000
Capital from Sale of Treasury Stock	5,000
Retained Earnings, Unappropriated	60,000
Reserve for Treasury Stock Purchased	15,000
Premium on Common Stock	20,000
Reserve for Plant Expansion	25,000

What is the amount of the company's retained earnings?
\$ _____

10.

10.1 The ABC corporation has accepted subscriptions for their common stock for 10,000 shares on December 1, 1968, for \$120,000. On March 25, 1969, the full amount was collected. Make the entry to record the subscription on December 1, 1968, and that required to record the collection and issue on March 25, 1969, under each of the following assumptions.

10.11 Common stock is \$10 par

10.12 Common stock has a stated value of \$5

10.13 Common stock is true no-par

10.2 Where does the "Common Stock Subscribed" appear on the balance sheet at December 31, 1968?

11.

11.1 What are organization costs? List several and discuss how they are classified on the balance sheet and how they are disposed of (if they are disposed of).

11.2 What is "Par value"? How is it established and how is it used?

12. Prepare a schedule showing the book value per share of the preferred and common stock:

Stockholders' Investment:

Preferred stock, \$100 par/share, 6% cumulative and nonparticipating, 2,500 shares issued and outstanding	\$250,000*
Common stock, \$10 par value, 50,000 shares issued and outstanding	500,000
Retained earnings	200,000
Total Capital	\$950,000

13. On March 25, 1969, the CPA Corporation exchanged 7,000 shares of no-par common stock for an office building and the land on which it is erected. The land has an assessed value of \$4,000 for property tax purposes, was purchased in 1956 for \$9,000, and is estimated to have a current market value of \$15,000. The office building was constructed in 1966 at a cost of \$50,000. However, Mr. Rosen, the owner and builder, was able at the time of construction to get materials cheap since his brother owned a building supply company; therefore, it is estimated that the building would have cost \$60,000 had the materials been purchased at the regular prices. Total depreciation in the amount of \$15,000 has been taken by Mr. Rosen since the building was completed. Last week Mr. Rosen had an opportunity to sell the land and building at the current market price of \$100,000.

Prepare the journal entry on the CPA Corporation's books to record the exchange of common stock for the land and building.

*Two years' dividends are in arrears on the preferred stock.

CRITERION TEST

1. Complete the following sentences:

- 1.1 _____ is the only language that can be executed by the computer.
- 1.2 _____ refers to programming aids furnished to users which include symbolic assembly systems and compilers as well as library routines, utility programs, etc.
- 1.3 Testing of the instructions to eliminate errors in procedures and logic is called _____.
- 1.4 The four major components of an EDP system are _____, _____, _____, and _____.
- 1.5 The words and symbols of the FORTRAN language are usually classified into three categories. These categories are _____, _____, and _____.

2. Name the following program flowchart symbols.

2.1

2.2

3. Stanley Watts contributed land and a building valued at \$60,000 to a partnership. The partnership assumed a mortgage of \$20,000. The credit to Watts' capital account to record his investment would total \$_____.

4. Shortly after its formation, the Patty Company issued 15 shares of its \$100 par value common stock to the corporation's lawyer for his legal advice in getting the corporation into operation and securing its charter. The attorney's bill for his services in this matter amounted to \$1,000. Journalize the entry to record this transaction.
5. Abbott and Barker entered into a partnership. Abbott invested \$9,000, Barker invested \$7,000. They agreed to share profits and losses $\frac{3}{5}$ and $\frac{2}{5}$ respectively. Their business lost heavily, and at the end of the year they decided to liquidate. After converting all the partnership assets to cash and paying all creditor claims, \$5,000 of the partnership cash remained. How much cash would each partner receive? Show your computations.

Abbott _____

Barker _____

6. The MMM Corporation has outstanding 10,000 shares of \$10 par value 5% preferred stock and 10,000 shares of \$10 par value common stock. The preferred stock is cumulative and non-participating. No dividends were paid during the previous year or so far this year on either common or preferred stock. If a dividend of \$13,000 is declared, the common stockholders would receive dividends of:
- a. \$3,000 (show computations)
 b. \$4,000
 c. \$6,500
 d. \$8,000
 e. None of the above
7. For each of the following stock transactions of the Do Bell Company indicate the accounts that should be debited and which accounts should be credited by inserting the number associated with each account title.
1. Cash
 2. Subscriptions Receivable - Common
 3. Subscriptions Receivable - Preferred
 4. Common stock subscribed
 5. Preferred stock subscribed
 6. Paid-in excess of par value
 7. Premium on preferred stock
 8. Stock Dividend Declared

9. Contributed capital from stock dividend
10. Retained earnings
11. Some other account
12. Common stock
13. Preferred stock

	<u>Debit</u>	<u>Credit</u>
a. On June 1, 1969 the company received subscriptions for 1,000 shares of no par value common stock at \$10 per share 10% of which was received in cash.	_____	_____
b. On July 1, \$5,000 was received as full payment of subscribed stock and the stock was issued.	_____	_____
c. On September 1, the board of directors declared a stock dividend, the total number of shares to be distributed to the stockholders amounted to 500 shares. The market value of the stock of that date was \$15 per share.	_____	_____

8. The following accounts are listed from the accounts of Curry Corporation:

1. Cash
2. Common Stock (\$10 par)
3. Premium on Common Stock
4. Donated Capital
5. Contributed capital, Treasury stock transactions
6. Treasury Stock
7. Retained Earnings (unappropriated)
8. Retained Earnings (appropriated)
9. Land
10. Building

Using these account numbers, indicate the proper debits and credits for the following transaction:

	<u>Debit</u>	<u>Credit</u>
8.1 Received a building site as a donation from the city of Tuscaloosa.	_____	_____
8.2 Purchased 1,000 shares of their own stock at \$12 per share.	_____	_____

- 8.3 Appropriated retained earnings to cover the treasury stock holdings _____
- 8.4 Sold the 1,000 shares of treasury stock at \$13 per share. _____
9. The Bonner Corporation issued \$1,500,000 of 10-year, 4% bonds dated April 1, 1969. Interest is payable semi-annually on April 1 and October 1. Assuming that the entire issue was sold on July 1 for \$1,429,800 plus accrued interest. Fill in the following:
- _____ 9.1 The amount of cash received on July 1.
- _____ 9.2 The amount of discount on the bond issue. Show calculations.
10. Circle the most appropriate answer.
- 10.1 Unsecured bonds are called
- A. Collateral trust bonds
 - B. Serial bonds
 - C. Debentures
 - D. Registered bonds
 - E. None of the above
- 10.2 When the market rate of interest is below the contract rate of interest the entry to record a bond sale on an interest date would include.
- A. Debit cash, debit discount on bonds payable, credit bonds payable
 - B. Debit cash, credit discount on bonds payable, credit bonds payable
 - C. Debit cash, debit premium on bonds payable, credit bonds payable
 - D. Debit cash, credit premium on bonds payable, credit bonds payable
 - E. None of the above
- 10.3 Temporary investments are shown on the balance sheet as
- A. Same as long term investments
 - B. Intangible asset
 - C. Current asset
 - D. Deferred charges
 - E. None of the above

- 10.4 The entry to amortize a discount on bonds payable and record interest payment would include:
- Debit bond interest expense, debit discount on bonds payable, credit cash
 - Debit bond interest expense, credit discount on bonds payable, credit cash
 - Debit bonds payable, debit interest expense, credit cash
 - Debit bond interest expense, credit cash
 - None of the above
- 10.5 Discount on bonds payable is shown on the balance sheet as
- Asset with debit balance
 - Credit to short term liability
 - Reduction of retained earnings
 - Not shown at all on balance sheet
 - None of above
11. The manufacturing statement of the Signature Company showed the following cost:
- | | |
|----------------|----------|
| Materials | \$40,000 |
| Direct labor | 30,000 |
| Overhead costs | 60,000 |
- If the company's overhead rate was based on direct labor cost, what was the overhead rate? _____ Show computations.
12. What three inventory accounts would appear in the ledger of a manufacturing company that would not appear in the ledger of a merchandising company?
- _____
 - _____
 - _____
13. Journalize the following transactions of the Brown Manufacturing Company which uses a job order cost system.
- 13.1 Materials and supplies were requisitioned for direct and indirect use.

- 13.2 Factory overhead was applied to job during the period.
- 13.3 Jobs were completed during the period.
14. The Pearson Manufacturing Company used a process cost system and has the following accounts.
- A. Accounts Payable
 - B. Accounts Receivable
 - C. Cost of Goods Sold
 - D. Materials and Supplies
 - E. Power Department
 - F. Prepaid Expenses
 - G. Product X
 - H. Product Y
 - I. Sales
 - J. Goods in Process, Dept. 1
 - K. Goods in Process, Dept. 2

Journalize the following transactions by indicating the debits and credits in each case using the appropriate letter.

	<u>Debit</u>	<u>Credit</u>
14.1 Materials and supplies requisitioned by Power Dept., Dept. 1 and Dept. 2	_____	_____
14.2 Costs transferred from Dept. 1 to Product X and Dept. 2	_____	_____
14.3 Costs transferred from Dept. 2 to Product Y	_____	_____

15.

- 15.1 What is the average amount invested in a machine that costs \$12,000, has an estimated five-year service life, and an estimated \$1,500 trade in value? Show computations.

The average amount invested: \$ _____

- 15.2 What would be the payback period for the Investment in a new machine that cost \$16,000, had an eight year service life and no salvage value. It is estimated that the annual net profit after taxes will be \$1,800. Show computations.

Payback period: _____ years.

16.

16.1 In the replacement decision, the original cost of the old machine is (an:)

- A. Sunk cost
- B. Opportunity cost
- C. Out-of-pocket cost
- D. Incremental cost
- E. None of the above

16.2 A cost which is relevant to the replacement of the old machine is the:

- A. Original cost of the old machine
- B. Book value of the old machine.
- C. Scrap value of the old machine
- D. None of the above
- E. All of the above (i.e., A, B, & C)

16.3 The Morrison Company is considering the possibility of expanding its facilities beyond the present capacity of 80,000 units of a product each year. The product sells for \$8.50 per unit. Cost estimates prepared on the assumption of a production of 80,000 units reveal the following:

Direct Material	\$1.00
Direct labor	2.50
Variable Overhead	1.50
Fixed Overhead	<u>2.00</u>
Total	<u>\$7.00</u>

By investing in new equipment, the company could produce an additional 20,000 units per year. If the investment is made, fixed overhead costs will be increased by \$100,000 and the variable overhead cost per unit will be decreased 10%. Show computations.

The incremental cost of producing the additional 20,000 units is:

- A. \$100,000
- B. 185,000
- C. 197,000
- D. 240,000
- E. None of the above

17. Indicate whether the breakeven volume of revenue is increased, decreased, or unchanged by the following changes:

	Increase	Decrease	Unchanged
17.1 Increase in selling price	_____	_____	_____
17.2 Decrease in Income taxes	_____	_____	_____
17.3 Increase in dividends paid	_____	_____	_____
17.4 Decrease in labor wages	_____	_____	_____
17.5 Increase in advertised outlays	_____	_____	_____

18. Show the effects of the following on funds flow (working capital concept) by placing the most appropriate of the following numbers indicating where the item would appear on the working papers for funds flow analysis:

1. Funds provided
2. Funds applied
3. Neither of the above

18.1 _____ Store equipment was purchased for \$6,000 cash.

18.2 _____ A cash dividend was declared for \$12,000.

18.3 _____ Fully depreciated store equipment that cost \$1,000 was discarded and its cost and accumulated depreciation was removed from the books.

18.4 _____ Net income for year, \$15,000.

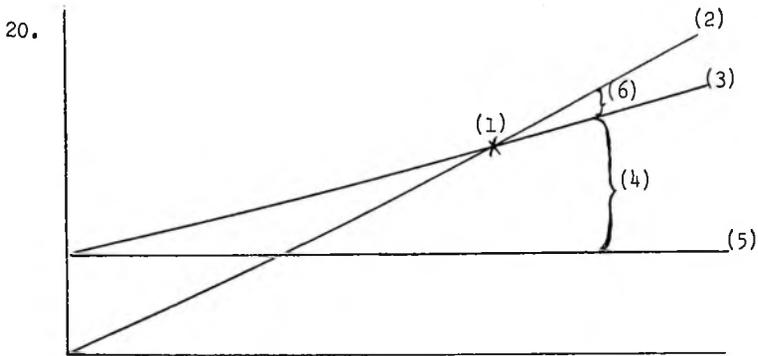
18.5 _____ Land was donated to the company which had \$4,000 fair market value.

18.6 _____ Six hundred shares of common stock were issued at \$10 per share.

19. The XYZ Company desires to earn \$10,000 after-tax income. The tax rate applicable to XYZ Company is 50% of the before-tax net income. The selling price per unit is \$10 while the variable cost per unit is \$6. The fixed costs amount to \$100,000. Circle the correct answer or answers.

- A. Sales must be \$300,000 to obtain the desired net income.
 B. The break-even point in units for the XYZ Company is 25,000 units.
 C. The break-even point is \$125,000 in sales.
 D. 40,000 units must be sold to obtain the desired net income.
 E. None of the above.

Show computations.



Name the pre-numbered items on the graph in the following provided spaces.

- 20.1 _____
 20.2 _____
 20.3 _____
 20.4 _____
 20.5 _____
 20.6 _____

21. Match the following ratio, turnovers, etc., with the formulas given. Place the proper letter in the space provided.

- A. Turnover of accounts receivable
- B. Current ratio
- C. Pledged fixed assets to long-term liabilities
- D. Turnover of merchandise inventory
- E. Rate earned on total assets
- F. Earnings per share of common stock
- G. Acid test ratio
- H. Times fixed interest charges earned
- I. Net income to owner's equity
- J. Days' sales uncollected

- _____ 21.1 $\frac{\text{Net Income}}{\text{Owners' equity}}$
- _____ 21.2 $\frac{\text{Accounts Receivable} \times 365}{\text{Charge Sales}}$
- _____ 21.3 $\frac{\text{Current Assets}}{\text{Current Liabilities}}$
- _____ 21.4 $\frac{\text{Sales}}{\text{Accounts Receivable}}$
- _____ 21.5 $\frac{\text{Net income before deducting taxes \& interest charges}}{\text{Fixed Interest Charges}}$
- _____ 21.6 $\frac{\text{Book value of pledged fixed assets}}{\text{Long-term Liabilities}}$
- _____ 21.7 $\frac{\text{Quick Assets}}{\text{Current Liabilities}}$
- _____ 21.8 $\frac{\text{Cost of Goods Sold}}{\text{Average Merchandise Inventory}}$

APPENDIX E
UNIVERSITY OF TENNESSEE AT
MARTIN
EXAMINATIONS

PRE-TEST

- I. On December 9, 1966, Key Corporation authorized \$1,000,000 of 4 per cent, ten-year bonds to be issued January 1, 1967, with interest payable each January 1 and July 1. On January 1, 1967, the bonds were issued at 102.

REQUIRED:

Journalize the following transactions involving the bonds:

- (a) The entry of January 1, 1967, to record the issuance.
- (b) The entry of July 1, 1967, to record the payment of interest with any necessary amortization.
- (c) The adjusting entry at the end of the annual accounting period on December 31, 1967, for accrued interest and any related amortization.
- (d) The entry to close the bond interest expenses account on December 31, 1967.
- (e) The entry to pay the interest on January 1, 1968.
- (f) The entry to retire one-half of the bond issue on January 1, 1973, for a net cash outlay of \$508,000.

- II. Presented below are amounts from the trial balance of the Hoyt Company as of December 31, 1970, with supplementary data. Using this data you are requested to:

1. Prepare a statement of the cost of goods manufactured.
2. Prepare complete closing entries.

Sales	\$50,000	Taxes	\$ 2,000
Sales returns	800	Depreciation-factory	5,000
Direct labor	15,000	Indirect labor	3,000
Raw material inventory		Raw matl. purchases	25,000
January 1	10,000	Freight in on raw matl.	500
Selling expenses	3,000	Work in process,	
General & adm. exp.	2,000	Jan. 1	3,800
Superintendence (factory)	800	Heat, light & power	3,000
Finished goods, Jan. 1	5,000	Bond int. expense	1,200
		Loss on sale of	
		machinery	600

Supplementary data: Inventories on December 31, 1970, raw materials, \$12,000; work in process, \$8,500; finished goods, \$14,000. Taxes should be divided as follows: $\frac{4}{5}$ to factory and $\frac{1}{5}$ to sales department. Heat, light and power expense should be divided $\frac{4}{5}$ to factory and $\frac{1}{10}$ each to the selling and administrative departments.

- III. Presented below are data relative to the operations of a company which uses a job order cost accounting system with perpetual inventories and a predetermined overhead application rate.

Raw material inventory, January 1, 1970	\$20,000
Raw materials purchased during January	40,000
Work in process inventory, January 1, 1970 (one incomplete job, Job No. 1)	4,000

Manufacturing costs incurred during January, by jobs:

	Job No. 1	Job No. 2	Job No. 3	Total
Materials issued	\$ 4,000	\$ 8,000	\$ 6,000	\$18,000
Direct labor	8,000	16,000	12,000	36,000
Factory overhead applied	8,000	16,000	12,000	36,000
	<u>\$20,000</u>	<u>\$40,000</u>	<u>\$30,000</u>	<u>\$90,000</u>

Job No. 1 was started in December 1969 and was finished during January 1970 and transferred to the warehouse. It has not been sold.

Job No. 2 was started in January 1970, finished in January 1970, and has been sold for \$60,000 cash.

Job No. 3 was started in January 1970 but is still unfinished.

Using this data prepare entries for the following in general journal form:

1. Purchase of raw materials on account
 2. Issuance of direct materials to jobs
 3. Direct labor costs paid in cash (ignore withholdings)
 4. Application of manufacturing overhead to jobs
 5. Completion of jobs
 6. Sale of job number 2
 7. Cost of sales for the period
- IV. Rail Manufacturing Company manufactures one product which passes through two manufacturing departments. Production and manufacturing costs for the month of June, 1968 were as follows:

	<u>Department A</u>	<u>Department B</u>
Production:		
Units in process, beginning of month	-0-	-0-
Units started	\$ 10,000	\$ 9,400
Units completed and transferred	9,400	9,400
Units in process, end of month--1/2 complete as to materials, direct labor, and manufacturing overhead	600	-0-
Manufacturing costs:		
Materials	\$ 19,400	\$ 5,640
Direct labor	24,250	42,300
Manufacturing overhead	14,550	28,200
TOTAL	\$ 58,200	\$ 76,140

REQUIRED:

- (1) Equivalent production for departments A and B for June, 1968.
- (2) Unit cost of departments A and B for June, 1968.
- (3) Goods in process inventory--Department A--June 30, 1968.

CRITERION TEST

- I. 1. Complete the statements below, using the following information: On January 2, 1968, Company P acquired 80% of the \$200,000 total stockholders' equity of Company S for \$168,000. On that date, the retained earnings of Company S amounted to \$80,000. As of December 31, 1968, the reported net income of Company S was \$20,000. During the year Company S declared and paid a dividend of \$12,000.
- a. Excess of cost over book value of interest in subsidiary

- b. Portion of subsidiary's retained earnings to be eliminated in consolidated working papers for 1968 _____

- c. If Company P had reported net income of \$40,000, consolidated net income for 1968 would be _____

- d. Total minority interest in Company S as of December 31, 1968, would be _____

2. Assuming the R Company owns 75% of the outstanding stock of S Company and that the balance sheet date occurs one year after acquisition, complete the following balance sheet working papers.

R AND S COMPANIES

Working Papers--Consolidated Balance Sheet
End of Year 1 (One Year after Acquisition)

	R Company	S Company	Intercompany Eliminations		Consolidated balance sheet
			DR	CR	
Cash	38,000	16,000			
Accounts receivable	22,000	5,000			
Dividends receivable	3,000				
Inventories	55,000	12,000			
Land		10,000			
Buildings		120,000			
Accumulated depreciation		(48,000)			
Investment in S Company	56,000				
Totals	<u>174,000</u>	<u>115,000</u>			
Accounts payable	26,000	20,000			
Dividends payable	12,000	4,000			
Notes payable	6,000	23,000			
Capital stock--R	100,000				
Capital stock--S		50,000			
Beginning retained earnings--R	18,000				
Beginning retained earnings--S		10,000			
Net Income--R	24,000				
Net income--S		16,000			
Dividends--R	(12,000)				
Dividends--S		(8,000)			
Minority interest--S					
Totals					

II. Select the answer you think will best complete each of the following statements and insert the corresponding letter in the space provided.

- _____ 1. The entry to eliminate the parent's investment against the subsidiary's equity is determined at the (a) date of acquisition, (b) current balance sheet date, (c) end of the first year of operations.
- _____ 2. A minority interest arises when (a) a subsidiary issues stock to its parent company, (b) a parent acquires less than 100% control of a subsidiary company, (c) the cost of an investment exceeds the book value of the subsidiary.
- _____ 3. The eliminating entry to cancel out any intercompany debt between affiliated companies requires a debit to the specific liability and a credit to (a) retained earnings, (b) the related asset, (c) the current period's net income.
- _____ 4. When a parent company carries its investment at cost, it will take up as income (a) the total reported net income of the subsidiary, (b) only its percentage of the subsidiary's net income, (c) only its percentage of dividends declared by the subsidiary, (d) none of these.
- _____ 5. Consolidated net income (controlling interest) is the sum of the parent's net income plus the (a) subsidiary's net income, (b) subsidiary's net income after eliminating any intercompany revenue and expense items, (c) subsidiary's net income after intercompany eliminations and minority interest deductions.
- _____ 6. As a result of a dividend declaration by a subsidiary company, the ownership equity of the outside (minority) stockholders of the subsidiary will (a) be decreased, (b) remain unchanged, (c) be increased.
- _____ 7. The minority interest will be reflected in the consolidated balance sheet as (a) a liability, (b) a deduction from owner's equity, (c) a separate item in the owner's equity section, (d) not shown.
- _____ 8. If a parent company pays less than book value for its interest in a subsidiary, there is evidence that asset values are (a) undervalued, (b) overvalued, (c) correctly stated but goodwill exists.

- _____9. In order to qualify as "generally accepted," an accounting principle or rule must (a) be approved by the Securities and Exchange Commission, (b) receive substantial authoritative support, (c) be included in the authoritative list published for that purpose.
- _____10. Accounting measurements are based on exchange prices generated by (a) past exchanges, (b) present exchanges, (c) future exchanges, (d) all of these.
- _____11. The going concern assumption refers to (a) a successful business entity, (b) the assumption that an accounting entity will continue in operation for an indefinite period of time, (c) a liquidation concept.
- _____12. Objectivity relates to (a) ability to measure precisely accounting data, (b) measurements which allow no degree of latitude in quality of evidence, (c) unbiased measurements which are subject to verification by independent experts.
- _____13. Acquisition cost is used as a basis for measuring (a) all assets of an accounting entity, (b) cash and secondary cash reserves, (c) assets other than cash and claims to cash.
- _____14. Revenue may appropriately be measured (a) during production, (b) when production is completed, (c) when sale or delivery of product is made or services are rendered, (d) when cash is collected from customers, (e) at all the above times.
- _____15. Costs incurred by a business which cannot be directly related to the product or service output of the firm are known as (a) period costs, (b) product costs, (c) deferred costs.
- _____16. When a productive asset changes in value while it is in service, the accountant ordinarily (a) gives no recognition to the change since no gain or loss has been realized, (b) records a loss but does not recognize unrealized gain, (c) gives recognition to either a gain or loss, whichever occurs.
- _____17. The problem of allocating purchase discounts to departments can best be solved by (a) distributing the discount on the basis of departmental purchases, (b) recording purchases net of discounts, (c) dividing the discount taken in proportion to the amount billed to each department.

- _____18. Total sales for each department can be obtained from the (a) cash receipts journal, (b) sales invoices, (c) cash register tapes, (d) sales journal.
- _____19. Accounting expenses of a firm would be classified by function as (a) building expense, (b) buying expense, (c) advertising and promotion, (d) administrative expense, (e) sales force expense.
- _____20. Expenses not readily identifiable with the activities of any given department are known as (a) direct expenses, (b) administrative expenses, (c) indirect expenses, (d) selling expenses.
- _____21. The basic criteria for making most expense allocations are (a) the dollar amounts involved, (b) their relative benefits and frequency of incurrence, (c) their functional classification.
- _____22. In the work sheet, the nondepartmental column is used to record (a) common costs, (b) direct expenses, (c) joint costs, (d) indirect expenses.
- _____23. If all expenses are allocated by departments, the working papers will show (a) no column for nondepartmental items, (b) total contribution to overhead in the nondepartmental column, (c) indirect expenses in the nondepartmental column.
- _____24. To determine departmental cost of sales, it is necessary to accumulate by departments (a) only purchases and related contra accounts, (b) all cost and expense items, (c) purchases and related contra accounts plus inventories and transportation charges.
- _____25. Departmental accounting information may be used by management as a basis for (a) allocating resources and effort, (b) taking remedial action, (c) pricing decisions, (d) all of the above.
- _____26. The debit balance of the Manufacturing account before being closed to the Income Summary account represents the (a) cost of goods sold, (b) total manufacturing cost, (c) cost of goods manufactured.
- _____27. On the working papers, the beginning inventory of goods in process will appear in the (a) debit side of the Income Statement columns, (b) debit side of the Manufacturing columns, (c) credit side of the Manufacturing columns.

- _____28. Costs that are charged to Expense in the period in which they are incurred are called (a) product costs, (b) direct costs, (c) period costs.
- _____29. Units completed and ready for sale to customers are carried in the (a) Cost of Goods Sold account, (b) Finished Goods Inventory account, (c) Cost of Goods Manufactured account.
- _____30. The concept of treating all costs relating to the manufacturing function as product costs is known as (a) absorption costing, (b) variable costing, (c) indirect costing.
- _____31. Factory overhead costs include (a) all costs except direct material and direct labor, (b) only those costs directly related to units of product, (c) all factory costs except direct material and direct labor.
- _____32. In comparing income statements of merchandising and manufacturing concerns, the basic difference lies in the (a) cost of goods sold section, (b) sales section, (c) operating expense section.
- _____33. The sum of raw materials used, direct labor, and factory overhead represents (a) cost of goods sold, (b) cost of goods manufactured, (c) total manufacturing costs, (d) none of these.
- _____34. A predetermined factory overhead rate is computed by using (a) historical costs, (b) estimated costs, (c) average costs, (d) none of these.
- _____35. Departments which do not handle or process the raw materials or work in process are called (a) producing departments, (b) sales departments, (c) control departments, (d) service departments.
- _____36. The basis for entry in the job cost sheets for labor is the (a) payroll summary sheet, (b) labor time ticket, (c) Factory Labor account.
- _____37. A job order cost system is normally used when (a) a single product is manufactured, (b) the least amount of detailed information is needed, (c) the specific lot of product can be identified.
- _____38. The more acceptable basis for charging factory overhead to jobs is (a) direct material and direct labor, (b) total actual overhead, (c) direct labor hours or direct labor cost.

- _____ 39. The subsidiary ledger records for Goods in Process under a job order cost system are (a) the process cost accounts, (b) the job cost sheets, (c) the processing costs, (d) none of these.
- _____ 40. Variable costing will cause net income to be larger than full costing when inventories are (a) increasing, (b) the same, (c) decreasing, (d) none of these.
- _____ 41. Under a job order cost system, a credit balance in the Factory Overhead account at the end of an accounting period indicates that (a) actual expenses exceed overhead applied, (b) overhead applied was greater than actual expense, (c) the correct amount of overhead was applied but there are still jobs in process.
- _____ 42. If revenue is within the control of a taxpayer under the cash basis of accounting even though not received, it is said to be (a) unearned revenue, (b) constructively received, (c) subject to verification before being included in gross income.
- _____ 43. A cash-basis taxpayer may deduct expenses paid in advance (a) if prior permission is secured from the government, (b) in the year of payment whether incurred or not, (c) only when they are incurred.
- _____ 44. Medical expenses of individuals are deductible, subject to certain limits, to the extent that they (a) do not exceed 10% of adjusted gross income, (b) exceed 1% of adjusted gross income, (c) exceed 3% of adjusted gross income.
- _____ 45. Income splitting allows a married couple to file a joint return and pay (a) double the tax on one-half of their combined taxable income, (b) a tax on one-half of their combined taxable income, (c) their tax on an installment basis.
- _____ 46. If the net long-term capital gain exceeds a net short-term capital loss by \$680, (a) \$680 is included in adjusted gross income, (b) \$340 is included in adjusted gross income, (c) \$340 is carried over to the next taxable year.
- _____ 47. Included among the common tax credits which may be taken by the taxpayer is the credit for (a) interest on state bonds, (b) social security benefits, (c) retirement income, (d) none of these.

- _____ 48. The liability for property taxes should be recognized and recorded on (a) the assessment date, (b) the lien date, (c) the payment date, (d) none of these.
- _____ 49. One of the following is not considered by law to be a taxable entity: (a) corporations, (b) estates, (c) individuals, (d) partnerships, (e) trusts.
- _____ 50. The net operating loss carry-over is applicable to the (a) corporation only, (b) preceding three years, then to the succeeding five years, (c) preceding two years, then to the succeeding five years.
- _____ 51. One of the following items is not a proper deduction in arriving at adjusted gross income: (a) expenses attributable to rents and royalties, (b) employees' expenses, (c) expenses related to the production of nonbusiness income, (d) business expenses.
- _____ 52. The maximum standard deduction is equal to (a) \$1,000, (b) 3% of adjusted gross income, (c) 10% of adjusted gross income, (d) 10% of adjusted gross income or \$1,000, whichever is less, or \$200 plus \$100 for each personal exemption.

III. The following Goods in Process account, taken from the records of the Arch Manufacturing Company, reflects the May charges for one of its processing departments.

Cutting Department: Goods in Process

Inventory, May 1	7,375
Materials	18,400
Direct Labor	22,500
Factory Overhead (90% of Direct Labor	20,250)

The production report shows that there were 5,000 units in process May 1, 40% complete as to processing costs and 100% complete as to material. There were 10,000 units in process on May 31, 70% complete as to material and 50% complete as to processing costs. During the month, 20,000 units were completed and transferred to finished goods.

Compute the following:

	<u>Material</u>	<u>Labor and Overhead</u>
A. Equivalent production units	_____	_____
B. Unit cost for the period	_____	_____
C. Value of goods in process May 31	_____	_____
D. Cost of units completed and transferred out	_____	_____

- IV. Indicate the effect of each of the following transactions on working capital by placing a check mark in the appropriate column.

WORKING CAPITAL RESULT

	<u>Increase</u>	<u>Decrease</u>	<u>No Effect</u>
a. Marketable securities sold in excess of cost.	_____	_____	_____
b. Machinery purchased for cash.	_____	_____	_____
c. Goodwill written off to retained earnings.	_____	_____	_____
d. Paid current installment of long-term notes.	_____	_____	_____
e. Declared 10% stock dividend.	_____	_____	_____
f. Issued capital stock in excess of par.	_____	_____	_____
g. Paid cash dividend previously declared.	_____	_____	_____
h. Issued capital stock in payment for land acquired.	_____	_____	_____
i. Collections on accounts receivable.	_____	_____	_____

IV. (Continued)

j. Net loss reported for the year.	_____	_____	_____
k. Depreciation recorded for the year.	_____	_____	_____

- V. On July 1, 1968, the Riddle Company purchased \$50,000 of 5% bonds of Happy Valley Corporation, payable January 1, 1978, with interest payable January 1 and July 1. Purchase price was 96 plus commission of \$250.

Complete the following journal entries:

1968

July 1 Purchased \$50,000 of 5% bonds of Happy Valley Corporation at 96 plus commission of \$250.

Dec. 31 Accrue interest earned to end of the year.

1969

Jan. 1 Received semiannual bond interest on Happy Valley bonds.

Apr. 1 Record interest earned on Happy Valley Corporation bonds sold today.

Apr. 1 Record sale of Happy Valley Corporation bonds at 97 and accrued interest.

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