A METHOD FOR IMPROVING THE PERCEPTION OF REALITY AND UNDERSTANDING OF THE POPULATION PROBLEM IN THE COLLEGE CLASSROOM: A SIMULATION GAME

DISSERTATION

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DOCTOR OF EDUCATION

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The purpose of this study is the development of an educational simulation game for use in college classes. The simulation game is based on selected aspects of the population problem.

The following individuals agreed to validate the objectives and evaluate the simulation game: Randall Anderson, Val E. Arnsdorf, Angus M. Gunn, George A. Schnell, Gary R. Shirts, Paul A. Twelker.

The panel approved or rejected objectives on the basis of their significance as goals for college students. Twelve objectives were approved by a majority of the panel. Upon completion of the exercise, students should be able to compute population increases, to predict population sizes, and to identify birth and death rates that cause a population to increase, decrease, or remain stable. Students should also be able to describe how the following factors affect population size: cultural and religious beliefs, pressure for economic growth, investments of capital, and financial losses. Students should understand the problems of governing a country with a rapidly growing population as compared
to problems in governing a country with slower population growth, and they should recognize how rapid population growth can affect the quality of life. Students should recognize decreased birth rates, increased death rates, and increased economic production as possible solutions to the population problem. Finally, students should personalize the population problem and make commitments in seeking and participating in its solutions.

A simulation game based upon the objectives was played, modified, and played again by various groups, until a satisfactory model was achieved.

The "Population Game" places a team of two students in the position of managing a country. There are roles for twenty different countries; each country has the same population and capital, but they do have different birth and death rates, which result in different population increases. Students are required to make decisions concerning investments, resource exploration, and savings. Depending upon their philosophy and that of their country, they can also make investments to change their birth and death rates, thus changing their population increase. After students have determined where they will invest their capital, they draw a factor card for each investment. The figures on the factor cards are based on world increases and losses in those categories during the last decade. In general, as the potential for profit increases, the potential for loss .
also increases. After students have calculated their profits or losses, they must determine their population for the coming year. The game cycle is then repeated for six additional rounds, or years.

The simulation game was sent to the panel members for their evaluation, using the Curriculum Materials Analysis System. All members of the panel approved the simulation game.

On the basis of the panel's evaluations, it is concluded that the simulation game is applicable to a wide range of educational levels.

From the results of the study, the following inferences are made: the simulation game provides prospective teachers with an opportunity to become acquainted with an educational technique used to present academic material; simulation games are a serious educational technique; teachers are encouraged to modify the simulation in appropriate ways.
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CHAPTER I
INTRODUCTION

One of the difficulties in classroom discussions of the population problem is the gap between theory and reality. Students are unable to perceive the effects of birth rates, death rates, migrations, and the interrelationship of these factors to the economic realm. The complexities of the problem are so vast that they become incomprehensible.

Since simulation games have provided a degree of realism in other areas, the potential exists that they can provide this reality in the understanding of the present state and projected future of the human population.

Statement of the Problem

The problem of this study concerns the population problem--its complexities, its interrelationships, and its lack of reality for college students.

Purpose of the Study

The purpose of this study is the development of an educational simulation game for use in college classes. The simulation game is based on selected aspects of the population problem.
Background and Significance

Education is faced with a diversity of problems in trying to develop appropriate curriculums that will help an individual to prepare himself for the present and future. What type of education is relevant? One approach has been suggested by Boyer, who says,

I will define an education as being relevant when it has a vital connection to human life—either to the conditions which sustain life or to the conditions which give life meaning. An education that contributes to the knowledge of health, food production, nutrition, population control, and war prevention is the kind of education which can help sustain life (1, p. 259).

Whitehead (13, p. 18), in agreement, says that there is only one subject matter for education, and that is Life in all of its manifestations.

One of the major problems facing mankind is the growing number of people and the effect of this growth on all other aspects of human life. The world's population in 1970 was estimated to be 3.6 billion and increasing at approximately 2.1 per cent per year. In 1970 this meant an increase of approximately 208,000 people per day, or seventy-six million for the year. If this trend continues, by the year 2000 there will be about seven billion humans. The magnitude and complexities of the problem of an apparently infinite population in a finite world have caused concern. The question is, "How can education help with the solution or at least with the realization of the seriousness of the problem?" As Lucas states,
unless students learn--from kindergarten to graduate school--that the quantitative pressures of population are effecting the quality of human existence, they will be unprepared to deal with the world as it is (10, p. 181).

How do we as educators help students to prepare themselves for the world? Pestlozzi (8, p. 475) argues that clear thinking is dependent on accurate observation, and that words can have no meaning unless they are related to and perceived by the senses. Similarly Woodruff (14) stresses that concept formation occurs exclusively through direct sense perception of real objects into meaningful patterns or concepts, and those concepts are tested empirically in adjustive situations. How does a teacher dealing with the population problem help students develop concepts? How does a student observe the increasing pressure of mankind? How does he observe the interrelatedness of increasing population to the other problems facing mankind? How does the situation become real? How does the reality of the subject enter the classroom?

There is no one method of teaching that will solve this or any other problem for every student in every subject. The teacher needs to develop a number of techniques and approaches to ensure reaching the largest number of students. Eble comments,

I could say that teachers (myself included) tend to talk too much; that teaching is too often the mere filling of the 50-minute hour. . . . There is wide agreement on the particulars of effective teaching: an ability to make abstract ideas clear; to organize
Educational simulations are one of the techniques that may help a teacher to become more effective.

Simulations appear to have some particular assets that may be beneficial to the study of the population problem, specifically the problem of the lack of reality. Simulations may be one way of providing a part of that reality. Gunn stresses the fact that

... the fundamental advantage of educational simulations is their ability to act as a bridge linking the real world with our abstract ideas of reality. Direct study of the environment by the inexperienced usually fails to secure the kind of clear thinking necessary for decision-making. The jungle of sights and sounds hides its secrets. All of the facts, processes, and strategies that the student should know can be better understood in the context of a simulation (7, p. 349).

Coleman (3, p. 29), supporting a similar point of view, has said that there are apparently certain aspects of simulations that especially facilitate learning, such as their ability to focus attention, their requirement for action rather than merely passive observation, their abstraction of simple elements from the complex confusion of reality, and the intrinsic rewards they hold for mastery. Duke has stated that "the most significant advantage is that gaming-simulation rapidly enhances the sophistication of the players regarding the factors at work and the relationships between the key roles in the real world (5, p. iii)." Simulations appear to have three claims to educational value: (1) they provide an abstraction
of reality, (2) they increase students' interests and motivation, and (3) they provide an insight into the decision-making processes.

The preceding review has shown that the study of population is considered to be a necessity by a number of authors. One problem in classroom discussions of population problems is the lack of reality in these discussions. Simulation games have been described as a significant educational technique that provides an abstraction or simplification of reality.

This study deals with population problems in the context of a simulation game. It is significant in three aspects:

(1) It deals with a problem of great importance, the present and future of human life.

(2) It utilizes the technique of simulation that has established a degree of educational success, having been effective in providing a bridge linking abstract concepts and reality.

(3) It provides the teacher with one additional option from which to choose when attempting to deal with the population problem in the classroom.

**Definition of Terms**

For this study the following definitions have been used:

**Model** - A simplified structuring of reality which presents significant features or relationships in a generalized form (2, p. 22).
Overpopulation Problem - A situation in which the number of people has outgrown the ability of man, interacting with his environment, to support that number of people.

Simulation Games - "The creation of realistic games to be played by participants in order to provide them with life-like problem solving experiences . . . (4, p. 23)."

Instrument

The Curriculum Materials Analysis System (See Appendix B) was developed in 1967 by Morrissett and Stevens, staff members of the Social Science Education Consortium. The Curriculum Materials Analysis System has subsequently been revised and has become one of the Social Science Education Consortium's major projects.

The Curriculum Materials Analysis System consists of six major sections:

Descriptive Characteristics. This section calls for the analyst to describe the salient characteristics of the curriculum materials. Responses are elicited to questions concerning materials available, sources of materials, teaching time required, style . . . .

Rationale and Objectives is a category that calls for the analysis of two related areas. The analyst determines why the materials were developed including the criteria for selection and ordering of content and processes. He also discovers the expected outcomes of the material, both general and specific.

1The Social Science Education Consortium is located at Boulder, Colorado, and is funded by the Office of Education and the National Science Foundation. Its goal is the improvement of social science programs.
Antecedent Conditions. This section specifies the particular conditions in which the materials are most likely to be successful. The conditions refer to types of students, teachers, administrations, school facilities, and communities.

Content deals with all the hoped-for changes in the knowledge, attitudes, and behavior of the students.

Instructional Theory and Teaching Strategies. This section provides the analyst with guides to analyze the implicit and/or explicit learning theory on which the curriculum materials are based. The analyst also seeks the relationship between learning theory and the teaching strategies which are specified in the program.

Overall Judgments is a section which calls for the reporting of evaluations made by other users of the materials, by other analysts who looked at the materials, and by the analyst himself. To this point the analyst has been reporting his analytical observations; now he is asked to evaluate (9, p. 2).

The principal uses of the Curriculum Materials Analysis System can be grouped into four major categories: (1) curriculum materials evaluation, (2) curriculum materials selection, (3) classroom implementation, revision and adaptation of materials, and (4) teacher education. In this case, the Curriculum Materials Analysis System will be used for curriculum materials evaluation. It has been used to evaluate materials produced in over forty curriculum projects. Some examples are The High School Geography Project, Boulder, Colorado; Anthropology Curriculum Project, Athens, Georgia; and The Harvard Social Science Project.

The Curriculum Materials Analysis System has been used in a variety of situations. Some examples are the annual meeting of the National Council for Social Studies, 1967; Title III centers, workshops and the Experienced Teacher Fellowship Program at Purdue University and the University
of Colorado; The Carnegie-Mellon NDEA History Institute for Curriculum Specialists.

The rationale for use of the Curriculum Materials Analysis System date from statements made by Stufflebean and Stake in which they described and encouraged a more complete concept of evaluation. "Stufflebean referred to context, input, process and product stages in his evaluation model. Stake drew a distinction between antecedent, transaction and outcome data (12, p. 208)." (See Figure 1)

![Fig. 1--Basic descriptive model of the teaching-learning process (11, p. 238).](image)

These Inputs or Antecedents can be subdivided into Student, Teacher, Materials, and Situation. (See Figure 2)

![Fig. 2--Descriptive model with inputs elaborated (11, p. 239)
"Having elaborated the inputs, we may wish to focus on a particular input to provide an evaluative frame of reference (11, p. 240)." (See Figure 3)

Antecedent Conditions

\begin{itemize}
  \item Student
  \item Teacher
  \item Situation
\end{itemize}

Focus

- Materials
- Transactions
- Outcomes

Fig. 3--Descriptive model with focus on materials (11, p. 241)

The reason for analyzing materials directly rather than testing them in the classroom and observing the outcomes is to achieve economy and effectiveness. The trip through transactions and outcomes is expensive; and, in view of the great complexity of attributing particular outcomes to particular inputs, it often gives inconclusive results. It is true that the final proof of the pudding (the materials) must be in the eating (the outcomes); but short of final proof it may arrive at as many plausible hypotheses and tentative conclusions as possible via the shorter route of materials analysis (11, pp. 244-45).

Procedures

The following steps were taken in the completion of this study: (See Figure 4, page 11)

1. A review of the simulation game and the geographic literature on models and simulation games was completed. The population literature was used as background material for the development of the simulation game.
2. A panel composed of five members who are experienced in the areas of population and/or simulation games was selected, with the approval of the chairman and minor professor of the doctoral advisory committee. The panel validated the objectives and evaluated the simulation game.

3. From an analysis of the literature, objectives for the simulation game were written.

4. The objectives were submitted to the panel for their approval or rejection, depending on whether the objectives would be meaningful for college freshmen to achieve. When at least ten objectives were approved by three or more panel members, the approved objectives were used as the basis for the creation of the simulation game.

5. A simulation game was developed.

6. The simulation game was played, modified, and played again, until a satisfactory model was developed. The following groups have used the simulation game:
   a. a small group of faculty members with experience in teaching courses involving various aspects of the population problem
   b. a small group of college students
   c. a large group of college students
   d. a college class, with the simulation game being administered by a faculty member who was not familiar with its development.

The simulation game in final form was produced.
8. The simulation game was evaluated by the panel, using the Curriculum Materials Analysis System. When three or more panel members believed the simulation game had achieved the desired objectives, the simulation game was considered to have the panel's approval.

Fig. 4--Flow Chart of Procedures
CHAPTER BIBLIOGRAPHY


CHAPTER II

REVIEW OF THE LITERATURE

Before a simulation game can be designed, a model of that which is being simulated must be constructed. Twelker (20, p. 68) states that a simulation game can only be as good as the model upon which it is based. It is therefore necessary to describe the theory of models. In this case, because of the nature of the project, models are dealt with from a geographic viewpoint.

Theory of Models

Man's natural instinct as he looks at the complexities of the world is to try to develop a simplified and intelligible picture of that world. Apostel (2, p. 15) states that the mind decomposes the real world into a series of simplified systems and thus achieves in one act an overview of the essential characteristics of a domain.

The mind needs to see the system in opposition and distinction to all others; therefore the separating of the system from others is made more complete than it is in reality. The system is viewed from a certain scale; details that are too microscopical or too global are of no interest to us. Therefore they are left out. The system is known or controlled within certain limits of approximation. Therefore effects that do not reach this level of approximation are neglected. The system is studied with a certain purpose in mind; everything that does not affect this purpose is eliminated (2, pp. 15-18).
These simplified abstracted statements of reality are termed models. According to the geographers Chorley and Haggett (6, p. 22), a model is a simplified structuring of reality which presents supposedly significant features or relationships in a generalized form. Models are valuable in that they obscure incidental details and allow fundamental aspects of reality to appear.

Historical Development of Models

The use of models in geography has a long history, but, as shall become obvious later, they have recently received a new emphasis. Perhaps the oldest and most common models are the globe and the map; they are simplified representations of reality—the earth or a portion thereof. Cole and King (7) have classified the globe and the map as scale models. There are, however, other types of models, a few of which are cited.

Von Thünen's model, described in his book Der Isolierte Staat, 1826, was based on his analysis of the estates in Mecklenburg, Germany, where he lived. The underlying assumptions of the model were: (1) the existence of an isolated region, (2) one central city as the sole market, (3) a uniform plain surrounding the city, (4) only one mode of transport, the horse and cart, (5) the plain inhabited by farmers supplying the city, and (6) the maximizing of profits by the farmers, with automatic adjustment to the needs of the central
market. The model, which consists of concentric circles of development, has been dramatically affected by a variety of technological developments, yet, according to Chorley and Haggett (6, pp. 444-445), there are two areas in which the model is still applicable: (1) With improvements in transportation, the radius of the land use zones has become greater, but the concentric zones are still recognizable—though now on a continental scale. (2) In the less developed countries, the conditions may still be similar to those in Mecklenburg, and there are several cases cited in geographical literature—Prothero, 1957; Waibel, 1958—in which land use around a settlement is directly related to the distance from the settlement.

The German geographer Christaller, 1933, developed a model to help explain the size, number, and distribution of market towns in southern Germany. He believed that there is some ordering principle governing their distribution and size. The model had the following basic assumptions: (1) a uniform distribution of population and purchasing power, (2) uniform terrain and resource location, and (3) equal transport facility in all directions. In this idealized situation, Christaller's model indicated that regular spaced hexagonal shaped trade areas would develop. The model has undergone extensive modification over the years particularly by Lösch, 1954, who extended and elaborated the model to make it more nearly represent patterns in the real world.
Building upon these early models—particularly those of Christaller and Lösch, Berry and Garrison in 1958 created the first formal model in geography. The model sought to provide an explanation of the urban rank-size relationship. In 1964, Berry developed a model to explain the larger relationship between systems of cities. In 1967, Berry and Hudson developed a model to explain the spacing and varying sizes of market centers acting as centers for retail distribution.

Models and model building have spread to every area of the field; it is, therefore, not a new technique, but it has received new emphasis.

Theory of Games

Spencer, in his book *The Principles of Psychology* (22, pp. 629-30), expresses a point of view concerning play and games that has been characterized as the surplus energy theory. According to this theory, play and games are engaged in by man when he does not expend all of his strength and energy in supplying his basic needs. In other words, man's surplus energy is used to play games, and Spencer views games as non-essential, useless, and uncalled-for activity.

Dewey (10) agrees with Spencer to a degree, in that he sees play and games as a means by which man consumes energy he has not used in his work. However, Dewey expresses his view in a different way. He sees work as not fully utilizing all of man's impulses and instincts, and thus man participates in play and games. To Dewey this presents a balanced
way for man to fulfill all of his needs; thus play and games have value.

According to Simmel (21, p. 50), the games that people play over and over again represent important real-life situations or problems, so that in playing them people are actually practicing real life without the fear of having to pay real life consequences. In conclusion, he says games are sociologically interesting because they are played in society and that, with the game, people are actually playing society. Groos (13, p. 35) also sees play and games as practice for all later adult activities, but he carries the theme farther, in that he claims play and games are an "instinctive activity" so important to man's development that nature has set aside a certain portion of life, childhood, for these activities. Boocock (3, p. 55) and others criticize Groos for implying that every play activity and every type of game is matched by a similar real life activity and for stating that play and games are limited to childhood. Boocock questions Groos' failure to explain why adults participate in play and games. Tansey and Unwin summarize the most prevalent view when they state, "... games may be regarded as a special invention in which children or adults practice with the components of life itself, a kind of play within the larger play of life itself (23, pp. 20-21)."

Knight raises a question about the interest that play and games generate. As he puts it, "... the game provides
an objective, capturing an opponent's pieces, moving a ball across a mark or whatever and for some reason achieving that becomes the aim and goal of being (17, p. 53)." Huzinga, in Homo Ludens (15), says that the reason for the high degree of interest in games is that games reflect the society that produces them, yet are free from many of the restrictions of that society. In a sense they are simplified reflections of life. Huzinga (15) views games as having great value; in fact, he says games are one of the main bases of civilization.

Dewey (9, p. 229) encourages the inclusion of games in the school curriculum, not on the basis of "temporary expediency" or "momentary agreeableness," but on "intellectual and social" grounds. According to Boocock (3, pp. 56-57), Dewey does not see work and play as opposites, as many people do, since both require activity and since it is a necessity that students actively participate in their own learning. Techniques such as simulation games, which encourage active participation of students in their own learning, may be valuable. Boocock also claims that Dewey's general educational philosophy forms the basis upon which most simulation games are designed.

The core principles of the technique, the active and simultaneous participation of all students in an educational game, with the teacher in the role of aid rather than judge; the internal rather than external locus of rewards, and thus motivation, in a game; and the linking of the students to the outside world through the simulated environment, which, by reproducing the conditions of real life within the classroom allows him
to practice taking the kinds of roles and making the kinds of decisions he will face in his own later life—can all be traced to one or another of Dewey's works (3, p. 57).

Walford, in writing about games in geography, says, "... simulation games combine acceptable educational techniques with relevant subject matter in an atmosphere of informality and enjoyment (25, p. 31)." Educational games, according to Walford, are simplifications of reality, and this technique is valuable in that it aids students in understanding the "basic dynamic processes uncluttered by the background noises of transitory or irrelevant materials." Walford also claims importance for the technique, in that games in which groups of pupils need to discuss and make decisions are practical and simple examples of the kind of democratic procedures which Dewey thinks are important. The need for cooperation among pupils is given a chance to make itself clear at an easy and practical level in simulation games. Finally, Walford claims that the opportunity for role-playing which is presented in many simulation games helps in development of the imagination of the individual.

Proponents of the technique vary in their theories as to why the use of simulation games has value. According to Tansey and Unwin, simulation games take learning out of the abstract and make it a "practical and participatory activity (23, p. 25)." Simulation games enable participants to learn facts, skills, processes, alternatives, and strategies by practicing them. To Tansey and Unwin the most important
aspect of simulation games is that they enable the participants to be actively involved in whatever situation is being discussed.

To Boocock and Coleman (4, p. 224), the most important aspect of simulation games is that experiments conducted to determine their results have found them to be highly motivating to students.

Coleman (8, p. 328) says that students grow up never having an opportunity to practice facing many of the difficult problems they will have to confront as adults. Simulation games can be used in schools, as they have in other areas, to provide this practice.

Historical Development of Games

Are educational simulation games a new technique? Yes and no--the concept of gaming has an ancient as well as a modern origin. The following review explores both aspects, with particular reference to their impact on educational games. Selected war, business, and educational games are described in detail.

**War Games**

According to Carlson (5, p. 3), war gaming has been traced back to chess, which probably originated in ancient India. The early Indian game of chess consisted of elephants, horses, chariots, and infantry. Griffin (12) states that the pieces used in the original Indian game represent the same
four elements of their army, and the supporting frame of the chessboard employed today symbolizes the walls of a fortified city.

Lacking the opportunities to practice their trade except during times of war, military officers, from their experiences with chess, developed war games. The first such game, according to Griffin (12), was the "King's Game," or "military chess," developed in 1644 for the Prussian general staff. The game was designed to give military officers a vehicle for "practicing war and tactical maneuvers." In 1798, the "Neue Kriegspiel," a true war game, was developed. Instead of a board, the game used a map divided into 3,600 squares, each with distinctive topographical features, on which game pieces were moved to represent troop and cavalry maneuvers (18).

By the end of the nineteenth century, war games had been divided into two types: rigid and free. Both types are described by Raser (18, pp. 46-47).

The rigid type was played with very detailed rules. The game required careful preparation, complex charts and tables to cover any eventuality which might be turned up by the dice. Such games were highly abstract and were generally considered to be academic exercises.

The free type had an element of realism as the essential ingredient and was played by large groups of military personnel, controlled more or less subjectively by umpires.
From Prussia, war games spread during the nineteenth century to England, France, Austria-Hungary, Russia, Italy, Turkey, Japan, and the United States. In this century, war games were used on a limited basis in World War I. The Germans used them as a means of rehearsing their 1918 spring offensive. During World War II, their use was widespread. Preliminary studies based on war games were used by the Germans in planning the invasions of France in 1940, of the Ukraine in 1941, and the potential invasion of England. Both American and Japanese military planners used war games prior to and during World War II. Fleet Admiral Chester W. Nimitz declared in 1960 that:

the war with Japan had been re-enacted in the game rooms . . . by so many people in so many different ways that nothing that happened during the war was a surprise--absolutely nothing except the Kamikaze tactics towards the end of the war . . . (5, p. 5).

After World War II, because of the computer, the scope and complexity of war games were greatly expanded. One example is a game developed by Raytheon Company for the Joint War Games Agency of the Joint Chiefs of Staff. The game, Technological, Economic, Military and Political Evaluation Routine is described by Griffin (12) as an ambitious attempt into gaming political, economic, and psychological events, among other things, for as many as thirty-nine nations simultaneously. The designers did not claim predictive capabilities for their model, known as TEMPER. They hoped, however, to achieve good qualitative results on the
basis of alternative assumptions, providing material for fur-
thether analysis. TEMPER is now obsolete and has been replaced
by more complex and comprehensive models.

**Business Games**

The concept of gaming as used by the military was adopted by the American Management Association, and in 1956, the first business game, Top Management Decision Simulation, was developed. The simulation game is described by Raser:

The AMA game consists of five teams of five players each; each team represents the officers of a different firm manufacturing a similar product, competitively sold in a common market. Each play period represents three months and involves six basic decisions regarding selling prices, marketing budgets, research and development expenditures, rates of production, plant capacity, and the purchase information about competitors' behavior. All financial transactions are represented by cash flow, and budgets can be changed only within a limited range, to simulate the difficulty of sudden drastic switches in management policy (18, p. 54).

The development of business games proceeded rapidly, and by 1966, more than one hundred had been produced. Some games, such as Boeing's Operation Interlock, Esso's Petroleum Industry Simulation, Herron's Executive Action Simulation, and Vance's Management Decision Simulation, did not require the use of a computer. More complex games, utilizing computers, were developed by Westinghouse Electric Corporation, The University of Washington, Pillsbury Mills, the University of Oklahoma, and Indiana University. The most complex simulation developed to date is the Carnegie Tech Management Game. It is described by Robinson:
It consists of three teams of five to ten players, each team representing a detergent company. Teams make one hundred to three hundred decisions every "month" for future operations of their firms. Decisions cover raw material orders, additions to the work force and overtime to expedite production, inventory, marketing, advertising, and consumer survey. When the decisions have been made, they are entered in a computer that contains a model of the economy, industry, and company. The computer determines, according to this model, the outcomes of each company's decisions. Results are then reported, and teams begin a new period of decision making (19, p. 89).

Recently, simulation games have been used in graduate level business schools, notably Harvard, as a supplement to the traditional method of training potential business executives. As Raser (18, p. 55) points out, reactions among both business executives and educators range from intense enthusiasm to equally intense skepticism, though, if frequency of use is any indicator, enthusiasts far outnumber skeptics.

**Educational Games**

Educational games, according to Carlson (5, p. 22) are a product of a number of factors: the long rich history of war gaming, business games, and, recently, the growing appreciation by educators of a link between play, games, and learning. Walford (25, pp. 27-28) agrees with Carlson but includes an additional source. He traces simulation games back to the nineteenth century and the educational trend in entertainment that was available to children during the Victorian Age. He provides two examples of this point: (1) the jigsaw puzzle invented in the eighteenth century by a firm of cartographers, and originally called the "dissected map," and
(2) the "Eccentric Excursion to the Chinese Empire," developed in 1843. The latter game included four contestants--a "pedestrian, a steamboat, a train and a futuristic aeroplane."

Simulation games in education have grown in number, in the subject matter with which they deal, and in the educational level to which they are directed. Verification of this can be found by reviewing both the "Occasional Newsletter," published by Simile II, and Zuckerman and Horn's *The Guide to Simulation Games for Education and Training* (20; 26). Both of these publications list hundreds of simulation games for a variety of subject areas and educational levels.

The first published work about simulation games in education describes a project known as the *Jefferson Township School District* (23, p. 9). The simulation game was designed to evaluate the administrative performance and the personality traits of its participants. A real school system was intensively studied and the job behavior of over two hundred elementary principals was analyzed. The reactions of these principals provided normative data so that the administrative potential of future simulation participants could be evaluated.

Johns Hopkins' Department of Social Relations, financed by Carnegie grants, has, since the early 1960's, been developing simulation games. One of their most successful games, *Life Career*, is described by Carlson (5, p. 18) as a
game in which a boy or girl must weave his or her way through the occupational structure.

The High School Geography Project has developed a number of simulation games that emphasize the concepts and skills necessary for geographical analysis. Because of the project's significance to geographic education in general and its influence on the conceptual development of this study, four of the simulation games, Farming, Metfab, Section, and the United States-Canada Boundary Dispute, is described in detail.

Farming was developed by Duane Knos when he was at the University of Kansas. It is an agricultural investment game. Set in the hypothetical area of Settler County, actually a real area in western Kansas, the game has students assume the role of farmers and make decisions as to how to manage their land. The action of the game spans three different periods of American history. During the homestead period from 1880 to 1883, the farmer decides how to allocate his 160 acres among various grain and livestock uses, and invest his $1500 of capital. The student then receives an outcome card which tells him how his investments fared. A lack of rain, for example, may have produced serious losses. Students discuss with their neighbors the reasons for their successes and failures, and thereby learn through experience. Two other periods are involved—the agricultural boom resulting from the increased demand for food production during 1919-1921 and the drought and depression years of 1933-1935. Students make investments and receive return for each of these periods (16, p. 415).

Metfab was developed by Howard Stafford of the University of Cincinnati. It is a location decision game in which students must decide in which of the 25 largest metropolitan centers of the United States to locate a factory. Designed for the ninth grade level, the game calls for five student groups, each representing the management of the company. Students play the roles of president, sales manager, and treasurer. The teacher meanwhile serves as research consultant. Utilizing data such as potential markets, railway freight
rates, labor productivity and costs, corporate taxes, and bank deposits in each of the metropolitan areas, each student analyzes his particular area of concern in helping the company to reach a decision on the location which will maximize the company's profits (16, p. 414).

Section was developed by Abt Associates in collaboration with Roger Kasperson of Michigan State University. Section provides students with an understanding of the conflicts of interests among the sections of a political territory as they are expressed in the political process. Students actually experience this conflict as they deal with each other as citizens of the hypothetical state, Midland, U.S.A. Midland is composed of a capital district and four sections—a farming region, a growing industrial region, a declining industrial region, and a rural underdeveloped region. Conflict occurs at two levels—individuals compete as private citizens to obtain objectives suggested in their roles, and sections compete for governmental programs beneficial to their citizens. A team of students, composed of private individuals and a political leader, represents each section before the State Legislature, which allocates funds among alternative projects (16, pp. 415-16).

The U.S.-Canada Boundary Dispute was developed by Roger Kasperson of Michigan State University and Julian Minghi of the University of British Columbia. The game simulates a boundary dispute based on an actual controversy over Point Roberts, a peninsula on the Washington-British Columbia boundary. The class is divided into six major groups—a Canadian team, a group of Canadian citizens, a United States team, a group of United States citizens, the International Joint Commission (composed of two representatives from each country), and an Arbitration Committee (composed of representatives from three neutral countries). In addition, either a student or the teacher acts as political moderator. A taped news broadcast introduces students to the boundary dispute. A handbook of source materials—containing actual newspaper clippings, speeches of political officials, maps and tables of pertinent information, and simulated interviews with parties concerned—provides the student with ample resources. The national teams then prepare and present their sides of the case to the International Joint Commission. Both in preparing cases and during the debate, individual citizens interact with their political representatives. Next, the International Joint Commission presents its report, and the national teams make tactical moves (e.g., closing a portion of the boundary). If the boundary is in fact closed, time is
allocated for one class where students engage in role playing to illustrate the differing impact of this action upon local individuals. Finally, the Arbitration Committee presents a compromise plan and the teams attempt to settle the dispute (16, pp. 418-19).

Simulation games have also had an impact on higher education. The following two games were developed for college level students and have been described by Raser.

*Inter-Nation Simulation* was developed by Professors Harold Guetzkow, Richard Snyder, and Chadwick A. Alger at Northwestern University. The game is an attempt to build a comprehensive man-machine simulation of the international system. The *Inter-Nation Simulation* (usually called simply "the INS") was designed as a generalized model of national and international politics. Human decision-makers or players worry about consumer-goods levels, national defense, public opinion, elections, revolutions, and democratic values, and at the same time engage in the international politics of trade, negotiation, threat activities. Though the INS is still frequently used in more or less its original state, it has continually been improved. Its latest form, the *International Processes Simulation*, combines an elaborate computer routine with human players who engage in a wide variety of political activities ranging from propaganda manipulation of dissident internal minorities to international business competition (18, p. 57).

*SIMSOC* was developed by William Gamson at the University of Michigan. The game, designed primarily for undergraduate teaching, is loosely based on the Parsonian AGIL concept of sociology—a general theory of social action. Only a minimum of structure is introduced into the game, and the focus of interest is on the emergent social structure and process as they evolve from the interactions of the players with the developing structure and with each other. Players try to achieve their individual social objectives, private objectives, and formal political objectives. The game incorporates resources, private interests, public programs, private consumption, franchises, police forces, geographic regions, and four national indicators—food and energy supply, standard of living, social cohesion, and public commitment (18, p. 59).

As can be seen from the preceding review, simulation games have a rich and varied history. They deal with a
multitude of subjects on many different education levels. Carlson (5, p. 14) believes that it is in the schools where simulation games are most varied and where, ultimately, their use may prove most rewarding.

**Game Design**

Boocock observes that "Game design is not only not a science, it is hardly a craft, but rather an art in the sense that we have no explicit rules to transmit (5, p. 136)." Because there are no generally accepted rules for the design of simulation games it is necessary to review the recommended rules of various simulation game designers.

Abt (1, pp. 104-109) uses an eight step method of design. (1) Decide what situation, problem, or material is to be simulated. (2) Identify the principal actors, which might be individuals, organizations, or nations. (3) Determine the objectives of the actors. (4) Determine what resources the actors should have available to help them achieve their objectives. Resources in this sense include money, time, energy, good will, or anything else the designer wishes. (5) Establish a win criteria. (6) Determine the possible interactions between actors, resources, and the situation or problem that is being simulated. These aspects are usually outlined in the rules. (7) Analyze the over-all structure—is it too broad, narrow, simple, complex—and make any necessary adjustments. (8) Design the physical format and materials needed to make the game operate.
Gunn (14, pp. 340-341) proposes the following procedure: (1) Identify the outcomes. "Outcomes are related to place, time, or function and so the identification of the bounds that mark the where, when and what is the starting point in the process of analysis." Analysis includes the following aspects: decision-making components, roles and objectives of each player, the way in which various decisions might affect the total outcomes, the success a player could achieve, and the resources available to a player. (2) Plan the simulation game step by step. This includes the description of each role, the possible interaction between players and the sequence of events. (3) Determine the game's physical factors--things such as boards, cards, die, and so on. (4) Make numerous try-outs of the simulation game. In summary, Gunn recommends that simulation games should deal with one topic, which he feels will increase understanding even though it is at the expense of a more comprehensive coverage of a theme.

Tansey and Unwin (23, pp. 54-56) recommend two basic steps, each with a number of sub-steps, in their design procedure. (1) Determine the following aspects: educational objectives, factual material, type of game, length, number of players, and the restrictions that will be imposed. (2) Analyze the following aspects: the form or the sequence of the game, the information supplied to the players, and the method by which this information will be presented. In
summary, Tansey and Unwin state that in stage two the designer must be sure about the essential features he is trying to communicate, and he must make a truly critical analysis of his teaching objective.

Walford (25, pp. 110-116) develops the following approach: (1) Identify the concepts of processes that will be emphasized. (2) Identify the context and the scope of the simulation game. (3) Determine the amount of equipment needed, the restrictions to be placed on the participants, and the amount of competitiveness between participants. (4) Identify the participants in the simulation game. (5) State the objectives of the participants. (6) Delimit the interaction between participants. (7) Combine the objectives, participants, and the interaction between participants into a simulation game. This, according to Walford, is the most difficult step; it is, in a sense, putting all of the preceding material together into a working unit. (8) Develop the constraints or restrictions that will be placed upon participants. (9) State the rules, the how-to-play sequence. Some developers combine steps (8) and (9) into a one-step development of the rule. (10) Compare the game to reality; how does the game compare to what one is attempting to simulate?

The most complete and detailed system of simulation game design is developed by Paul A. Twelker. The Twelker (24, pp. 64-70) system is as follows: (1) Define the instructional problem. What is the problem? What are
the proposed solutions to the problem? (2) Describe the operational educational system. A game that works well in one educational situation will not necessarily work well in a different situation. The designer should explore the special characteristics of the educational situation for which the simulation game is being designed. (3) Relate any special characteristics discovered in Step two to the problem. (4) Develop behavioral objectives for the simulation game. (5) Generate criterion measures for the behavioral objectives. (6) Determine the appropriateness of the simulation game. This step encourages the designer to review what has been determined so far and to relate that to the advantages and the disadvantages of simulation games. Twelker says it is possible after this review that the project will no longer be deemed advisable and will be ended. (7) Determine the type of simulation, if the decision in Step six is to continue. (8) Develop specifications for the simulation game. This step consists of developing a model of reality upon which the simulation will be built. This is a critical step as the simulation game can only be as good as the model upon which it is based. (9) Develop the simulation game prototype. This step consists of putting all of the previous steps together into a working unit. (10) Try the simulation game prototype. (11) Modify as needed after each tryout. (12) Conduct field trials. (13) Make modifications in the prototype as deemed appropriate from field trials.
The preceding review of design techniques has demonstrated that there are no generally agreed to procedures that all game designers follow. The Twelker system, because of its comprehensiveness and the fact that it needed the least modification for this study, is used in the development of the simulation game described in Chapter III.
CHAPTER BIBLIOGRAPHY


CHAPTER III

DEVELOPMENT OF THE "POPULATION GAME"

The procedure for the development of this simulation game is outlined on pages 9-11 and is a modification of the Twelker system described in the previous chapter. This chapter deals in detail with those modified procedures in the development of this simulation game.

Development

An in depth review of population and simulation game literature was initiated. The review had the following goals:

A. To provide a base of knowledge in the areas of population education and simulation games. Included in this aspect was the writer's attendance at a simulation game design workshop sponsored by Simile II in La Jolla, California.

B. To identify the various techniques that other simulation games and designers have used.

C. To identify, in the opinion of various authors, significant educational objectives for the simulation game to strive to achieve. The following are those educational objectives:

1. State the yearly percentage increase in the world's food production during the last decade.

2. State the yearly percentage increase in the world's industrial production during the last decade.
3. State what data are needed to compute population increase.

4. Compute population increases and make predictions about future population sizes, when given birth and death-rate figures.

5. Identify at least one combination of birth and death rates that cause a population to decrease, remain stable, increase.

6. Describe the characteristics of developed and developing countries relative to their differing birth rates, death rates, and population increases.

7. Write a statement describing the effects that cultural and religious beliefs can have on population growth.

8. Compute the per capita income for a country when given gross national product and population figures.

9. Describe the pressures for continuous economic growth when an attempt is made to increase per capita income in countries with rapidly growing populations, as compared to countries with more slowly growing populations.

10. Describe the economic effect of investing capital to reduce the population growth rate in countries with rapidly growing populations, as compared to countries with more slowly growing populations.

11. Describe the effect that a financial loss can have on countries with rapidly growing populations,
as compared to countries with more slowly growing populations.

12. Discuss the effect that the rapidly growing world's population may have on the quality of life in the future.

13. Identify and evaluate decreased birth rates, increased economic production, and increased death rates as possible solutions to the world's population problems.

14. Explain why it is important for individuals to personalize the world's population problems and to make commitments in seeking and participating in the solutions.

15. Describe what it must be like to be in leadership and decision-making positions for countries with rapidly growing populations, as compared to those for countries with more slowly growing populations.

16. Display a high degree of interest and motivation by asking questions about various aspects of the world's population problems.

D. To identify validators for the educational objectives and evaluators for the simulation game. These individuals were selected on the basis outlined in Step 2, page 10. This step stipulated that the panel members would be experienced in the areas of population and/or simulation games and would be subject to the approval of the doctoral committee chairman and minor advisor. Experience in this case was determined by articles and/or books published on population and/or
simulation games. The following list of people met the criteria established and agreed to participate:

1. Randall C. Anderson, Professor of Social Science and Social Studies Education, Kansas State Teachers College, Emporia, Kansas.

2. Val E. Arnsdorf, Director of the Population Curriculum Study, University of Delaware, Newark, Delaware.

3. Angus M. Gunn, Department of Geography, University of British Columbia, Vancouver, British Columbia, Canada.

4. George A. Schnell, Professor of Geography and Chairman, State University College, New Paltz, New York.

5. Gary R. Shirts, Director of Simile II, La Jolla, California.

6. Paul A. Twelker, Director of Teaching Research, Oregon State University, Corvallis, Oregon.

The next step was to validate the educational objectives which developed out of the review of literature. As stipulated in Step 4, page 10, at least ten objectives must be approved by a majority of the panel members. The educational objectives were sent to Randall C. Anderson, Val E. Arnsdorf, Angus M. Gunn, George A. Schnell, Paul A. Twelker. The following are the objectives that were
approved by the panel (See Appendix A for a coded list of the panel members' validations):

1. State what data are needed to compute population increase.

2. Compute population increases and make predictions about future population sizes, when given birth and death-rate figures.

3. Identify at least one combination of birth and death rates that cause a population to decrease, remain stable, increase.

4. Describe the characteristics of developed and developing countries relative to their differing birth rates, death rates, and population increases.

5. Write a statement describing the effects that cultural and religious beliefs can have on population growth.

6. Describe the pressures for continuous economic growth when an attempt is made to increase per capita income in countries with rapidly growing populations, as compared to those for countries with more slowly growing populations.

7. Describe the economic effect of investing capital to reduce the population growth rate in countries with rapidly growing populations, as compared to countries with more slowly growing populations.

8. Describe the effect that a financial loss can have on countries with rapidly growing populations, as compared to countries with more slowly growing populations.
9. Discuss the effect that the rapidly growing population may have on the quality of life in the future.

10. Identify and evaluate decreased birth rates, increased economic production, and increased death rates as possible solutions to the world's population problems.

11. Explain why it is important for individuals to personalize the world's population problems and to make commitments in seeking and participating in the solutions.

12. Describe what it must be like to be in leadership and decision-making positions for countries with rapidly growing populations, as compared to countries with more slowly growing populations.

The basic format of the simulation game had by now taken shape, and the process of trying to combine all of the aspects into a working unit was begun. The initial model of the simulation game was crude and extremely complex. Modifications were made. The model was then played by eleven different groups, and it was modified each time. When a satisfactory simulation game was achieved, the procedure as outlined in Step 6, page 10, was followed. This procedure states that various groups will play the simulation game, and the necessary modifications will be made.

From observations, discussions, and written evaluations, the following reactions of students emerged as the most common.
1. When a group of students were told that they were going to play a simulation game, they were interested and eager to get started.

2. On a few occasions, a class was not available, and volunteers had to be used. In every case, there were sufficient numbers of students willing to play the simulation game, with some students playing it two or three times.

3. Students seemed to find the simulation game difficult and demanding, especially in the first few years of the game.

4. The students seemed to think they had achieved some insight into what it would be like to be in a leadership position of a country. They also agreed that it would be an extremely difficult job.

5. Students felt they had learned a lot, and, when verbally questioned, using the simulation game objectives as discussion questions, they were able to satisfactorily answer them.

6. Students were constantly amazed at how rapidly the population of a country could increase.

The simulation game was then sent to the following people for their evaluation using the Curriculum Materials Analysis System: Val E. Arnsdorf, Angus M. Gunn, George A. Schnell, Gary R. Shirts, Paul A. Twelker. As stipulated in Step 8, page 11, three or more members of the panel must approve the simulation game in order for it to be considered
satisfactory. The following members approved the simulation game (See Appendix B for the panel members' actual evaluations):

1. Val E. Arnsdorf
2. Angus M. Gunn
3. George A. Schnell
4. Gary R. Shirts
5. Paul A. Twelker

The Population Game

The following material is contained in the Teacher's Manual. It includes all the materials of a classroom set, but it does not contain the quantity of materials necessary for classroom use.

Teacher's Manual

Introduction.-- ... unless students learn--from kindergarten to graduate school--that the quantitative pressures of population are effecting the quality of human existence, they will be unprepared to deal with the world as it is (5, p. 181).

How do we as educators attempt to deal with this problem? One way may be through simulation games.

... the fundamental advantage of educational simulations is their ability to act as a bridge linking the real world with our abstract ideas of reality. Direct study of the environment by the inexperienced usually fails to secure the kind of clear thinking necessary for decision-making. The jungle of sights and sounds hides its secrets. All the facts, processes, and strategies that the student should know can be better understood in the context of a simulation (3, p. 349).

The "Population Game" is a simulation game that deals with selected aspects of the population problem.
Educational Objectives.--Upon completion of this exercise students should be able to:

1. State what data are needed to compute population increase.

2. Compute population increases and make predictions about future population sizes, when given birth and death-rate figures.

3. Identify at least one combination of birth and death rates that cause a population to decrease, remain stable, increase.

4. Describe the characteristics of developed and developing countries relative to their differing birth rates, death rates, and population increases.

5. Write a statement describing the effects that cultural and religious beliefs can have on population growth.

6. Describe the pressures for continuous economic growth when an attempt is made to increase per capita income in countries with rapidly growing populations, as compared to those for countries with more slowly growing populations.

7. Describe the economic effect of investing capital to reduce the population growth rate in countries with rapidly growing populations, as compared to countries with more slowly growing populations.

8. Describe the effect that a financial loss can have on countries with rapidly growing populations, as compared to countries with more slowly growing populations.
9. Discuss the effect that the rapidly growing population may have on the quality of life in the future.

10. Identify and evaluate decreased birth rates, increased economic production, and increased death rates as possible solutions to the world's population problems.

11. Explain why it is important for individuals to personalize the world's population problems and to make commitments in seeking and participating in the solutions.

12. Describe what it must be like to be in leadership and decision-making positions for countries with rapidly growing populations, as compared to those for countries with more slowly growing populations.

Instructions.—There are twenty different countries in each exercise. Divide the class into twenty teams; one to three member teams have been used, preferably boy-girl teams. You should allow at least five, fifty-minute class periods to complete the exercise.

Give each team the following materials:  I. YOUR COUNTRY; II. YEARS 1-7; III. RESULTS OF YOUR ADMINISTRATION; IV. WORLD COUNCIL MEETING REQUEST; V. LOAN AGREEMENT. These materials are explained below:

I. YOUR COUNTRY (See pages 60 to 66)

To familiarize yourself with the countries, their variations and the students' role, see Country 1, page 60; Country 9, page 62; and Country 14, page 64.
All countries start with the same population, 1000, and capital, $52,000. Countries differ in their birth and death rates; this difference results in different population increases and in the number of students they have.

II. YEARS 1-7 (See pages 66 to 70)
(YEAR 1, page 66, has been completed to provide an example of the procedure. The example is based on Country 9.) Note the capital and population figures. The number of students can be found on the YOUR COUNTRY form, page 62. Investments can be made in the following categories:

1. **Agriculture** People must have agricultural products to survive. An investment of $25 for each person each year will ensure that they have these products. The yearly agricultural investment is determined by multiplying the number of people in the country by $25. Additional capital may be invested; profits range from a 9% increase to a 3% decrease for an average increase of 3%.

2. **Industry** People can survive without industrial products but they will live better if they have them. It requires an investment of $20 for each person each year to ensure that they have these products. The yearly industrial investment is determined by multiplying
the number of people in the country by $20. Additional capital may be invested; profits range from an 11% increase to a 5% decrease for an average increase of 5%.

3. **Education**  A country can survive without an education program but it will function better with one. It costs $15 each year to keep a student in school. The yearly educational investment is determined by multiplying the number of students by $15. Additional capital could be invested but there will be no increase. If an administration during its seven year term supports over 90% of its students, it will receive a bonus of up to $5000. See the RESULTS OF YOUR ADMINISTRATION form, page 70.

4. **Foreign Investment**  Capital may be invested in other countries. Profits range from a 13% increase to a 7% decrease for an average increase of 7%. The smallest amount that can be invested is $500.

5. **Resource Exploration**  Capital may be invested in the search for resources. Profits range from a 15% increase to a 9% decrease for an average increase of 9%. The smallest amount that can be invested is $1000.

6. **Savings**  This is a safe investment--no loss, no gain.
7. **Birth Rate**  Investment here depends on the team's philosophy and the attitude of its country. It costs $50 for each point the birth rate is reduced. For example, if a birth rate is reduced from 40 to 39, it would cost $50. This would reduce next year's population by one person. Maintaining a reduced birth rate requires a $50 investment for each point each year or it will rise to the original level.

8. **Death Rate**  Investment here operates in the same way as explained in the birth rate section, the difference being you are reducing the death rate which adds one person to next year's population.

9. **World Council**  You need to designate someone to serve as President, preferably someone not managing a country. If no one is available you may serve in this capacity. Give the following materials to the President: DUTIES OF THE PRESIDENT, WORLD POPULATION GRAPH, WORLD COUNCIL MEMBERS, WORLD COUNCIL LOAN AGREEMENT. The membership fee for seven years is $600. A country must join during YEAR 1 or not at all. Membership enables a country to request a loan from the council at an interest rate of 2% per year. See the WORLD COUNCIL MEETING REQUEST form for the loan procedure.
The investments have been completed. Add and enter the amount on the Total Investment blank. The amount invested must equal the amount of capital. Profits or losses are determined in four steps:

1. There are four factors decks containing twenty-four cards each. The decks are structured in the following manner:

**AGRICULTURE**

Factor:

- .03 -.01 1.01 1.03 1.05 1.07 1.09

Number of cards with that factor:

2 2 2 12 2 2 2

**INDUSTRY**

Factor:

- .05 -.03 -.01 1.01 1.03 1.05 1.07 1.09 1.11

Number of cards with that factor:

1 1 1 1 2 12 2 2 2

**FOREIGN INVESTMENT**

Factor:

- .07 -.05 -.03 -.01 1.01 1.03 1.05 1.07 1.09 1.11 1.13

Number of cards with that factor:

1 1 1 1 1 1 1 1 12 1 2 2

**RESOURCE EXPLORATION**

Factor:

- .09 -.07 -.05 -.03 -.01 1.01 1.03 1.05 1.07 1.09 1.11 1.13 1.15

Number of cards with that factor:

1 1 1 1 1 1 1 1 12 1 1 1

As you can see there is a 50% chance of drawing a 3% increase card in AGRICULTURE, a 5% card in INDUSTRY, a 7% card in FOREIGN INVESTMENT, and a 9% card
in RESOURCE EXPLORATION, and there is a 50% chance of drawing a card with a larger or a smaller factor. Note that as profits increase, losses increase. Shuffle each deck thoroughly. Draw a FACTOR CARD for each investment and enter the results in the FACTOR column.

2. Multiply the investment by the factor and enter the results in the PROFIT column. If the factor has a decimal, mark off the same number of places in the product. If the factor has a minus sign, multiply; then subtract the product from the investment.

Example: INVESTMENT FACTOR PROFIT

\[
\begin{array}{ccc}
20,000 & \times & 1.03 = \\
20,000 & \times & -.03 = (20,000-600) = 19,400
\end{array}
\]

3. There are twenty-four cards in the YEARLY CHANCE CARD deck. Fifty per cent of the cards state that something positive has happened to the country and they should add anywhere from $250 to $1500 to their profits. Fifty per cent of the cards state that something negative has happened to the country and they should deduct anywhere from $250 to $1500 from their profits. Draw a YEARLY CHANCE CARD and enter the results in the blank.

4. Add the profits and enter in the TOTAL PROFITS blank. This is the amount of capital the country has for next year.
To determine the population and the number of students their country will have next year, teams need to complete the POPULATION AND NUMBER OF STUDENTS FOR YEAR 2 section located at the bottom of YEAR 1, page 67. Follow the directions given there. See the YOUR COUNTRY form VITAL STATISTICS section for an example of the computations, page 62. YEAR 1 has been completed. Repeat the same process for each of the following years.

III. RESULTS OF YOUR ADMINISTRATION (See page 70)
The form compares the country before the team's administration to the country after its administration. It asks the team to describe the advantages and disadvantages of the country and its administration. Based on the results, it asks if the team thinks it would be re-elected.

IV. WORLD COUNCIL MEETING REQUEST (See page 72)
Members of the council may request a loan anytime. They may make as many loans as they want. To request a loan a country would fill out the form, turn it in to the President and he would call a meeting. If a country receives a loan they should enter the amount in the LOAN section of the year during which the loan occurred. The LOAN section is located at the top of the page, YEARS 2-7, page 68.

V. LOAN AGREEMENT (See page 73)
A country may borrow or lend money to any other country anytime. If a loan is made, then this form must
be filled out. If a country borrows or lends money, it must enter the amount in the LOAN section of the year during which the loan occurred. The LOAN section is located at the top of the page, YEARS 2-7, page 68.

The country, or countries, that best fulfills its campaign promises is the winner.

**Summary discussions.**--This is an extremely important part of a simulation game and should not be neglected. The teacher is encouraged to develop a list of discussion questions while the simulation game is being played. These questions may come from questions, comments and ideas raised by students or from his observation of the activity.

Students seem to be interested, first of all, in talking about their country, about what happened to it, and about the simulation game itself. This interest should be utilized by the teacher's initial questions. Gradually the focus of the discussion should be shifted from the simulation game to real countries--what has or may happen to them; the world--what has or may happen to it; and whatever aspect of the population problem the students seem to be interested in. The following are some questions the teacher may want to use:

1. Who won? Why did they win? What strategy did they follow?

2. Which teams thought they would be re-elected? Why?
Which teams thought they would not be re-elected? Why?

3. What was your country like? What advantages did your country have? What disadvantages did your country have?

4. What would have happened to your country if the exercise had continued for another seven years? Why?

5. If you were going to play the simulation game again, would you do anything differently? What? Why?

6. If you had the opportunity to revise the simulation game, what would you change? Why? How would you make the simulation game more realistic?

7. Are there countries in the world like your country? If so, where are they located? What advice would you give to the leaders of these countries? Why?

8. How were decisions made in your country? What things did you take into consideration when making decisions? Is there any relationship between decision-making in your country and in a real country? If so, how? Why?

9. Is there a world population problem? If yes or no, how do you know? What evidence do you have?

10. If there is a population problem, are there any solutions? What are they? Will they be used?
Student's instructions.--Make sure you have the following forms: I. YOUR COUNTRY; II. YEARS 1-7; III. RESULTS OF YOUR ADMINISTRATION; IV. WORLD COUNCIL MEETING REQUEST; V. LOAN AGREEMENT.

I. YOUR COUNTRY

The form describes you and your country. Play the roles and act as you think people from that country would act. You made certain promises during the campaign; you must fulfill them.

All countries start with the same population, 1000, and capital, $52,000. Countries differ in their birth and death rates; these differences result in different population increases and in the number of students they have.

II. YEARS 1-7

Turn to YEAR 1. Note the capital and population figures. The number of students can be found on the YOUR COUNTRY form.

You are ready to invest. You can do so in the following categories:

1. Agriculture People must have agricultural products to survive. An investment of $25 for each person each year will ensure that they have these products. The yearly agricultural investment is determined by multiplying the number of people in your country by $25. Additional capital may be
invested; profits range from a 9% increase to a 3% decrease for an average increase of 3%.

2. **Industry** People can survive without industrial products but they will live better if they have them. It requires an investment of $20 for each person each year to ensure that they have these products. The yearly industrial investment is determined by multiplying the number of people in your country by $20. Additional capital may be invested; profits range from an 11% increase to a 5% decrease for an average increase of 5%.

3. **Education** A country can survive without an education program, but it will function better with one. It costs $15 each year to keep a student in school. The yearly educational investment is determined by multiplying the number of students by $15. Additional capital could be invested but there will be no increase. If during your administration you support over 90% of your students, you will receive a bonus of up to $5000. See RESULTS OF YOUR ADMINISTRATION form.

4. **Foreign Investment** Capital may be invested in other countries. Profits range from a 13% increase to a 7% decrease for an average increase of 7%. The smallest amount you can invest is $500.
5. **Resource Exploration** Capital may be invested in the search for resources. Profits range from a 15% increase to a 9% decrease for an average increase of 9%. The smallest amount you can invest is $1000.

6. **Savings** This is a safe investment—no loss, no gain.

7. **Birth Rate** Investment here depends on your philosophy and the attitude of your country. It costs $50 for each point you reduce the birth rate. For example, if your birth rate is 40 and you wish to reduce it to 39, it would cost $50, which would reduce your next year's population by one person. If you wish to maintain a reduced birth rate, it would require a $50 investment for each point each year or it will rise to the original level.

8. **Death Rate** Investment here operates in the same way as explained in the birth rate section, the only difference is that you are reducing the death rate, which adds one person to next year's population.

9. **World Council** The membership fee for seven years is $600. You must join the first year or not at all. Membership enables you to request a loan from the council at an interest rate of 2% per year. See the WORLD COUNCIL MEETING REQUEST form for the procedure.
You have completed the investments. Add and enter the amount in the Total Investment blank. The amount invested must equal the amount of capital.

You are ready to determine profits. This is accomplished in four steps:

1. Draw a FACTOR CARD for each investment and enter the results in the FACTOR column.

2. Multiply the investment by the factor and enter the results in the PROFIT column. If the factor has a decimal, mark off the same number of places in the product. If the factor has a minus sign, multiply; then, subtract the product from the investment.

Example: INVESTMENT  FACTOR    PROFIT
   20,000     1.03 =  20,600
   20,000     -.03 = (20,000-600) = 19,400

3. Draw a YEARLY CHANCE CARD and enter the results in the blank. Note whether you are to add or deduct the amount.

4. Add the profits and enter in the TOTAL PROFITS blank. This is the amount of capital you have for next year.

You are ready to determine next year's population and the number of students you will have. Follow the directions given on the form. See YOUR COUNTRY form VITAL STATISTICS section for an example of the computations.
You have completed YEAR 1. Repeat the same process for each of the following years.

III. RESULTS OF YOUR ADMINISTRATION
The form compares your country before your administration to your country after your administration. It asks you to describe the advantages and disadvantages of your country and your administration. Based on the results, it asks if you think you would be re-elected.

IV. WORLD COUNCIL MEETING REQUEST
Members of the council may request a loan anytime. You may make as many requests as you want and the council may grant as many loans as it wants. Fill out the form, turn it into the president and he will call a meeting. If you receive a loan enter the amount in the LOAN section of the year during which the loan occurred. The LOAN section is located at the top of the page, YEARS 2-7.

V. LOAN AGREEMENT
A country may borrow or lend money to any other country any time. If a loan is made fill out the LOAN AGREEMENT form. If you do borrow or lend money, enter the amount in the LOAN section of the year during which the loan occurred. The LOAN section is located at the top of the page, YEARS 2-7.

The country that best fulfills its campaign promises is the winner.
Your Country # 1. You have been elected to serve a seven year term as economic planners. During the campaign you said that you would raise the standard of living, which you said meant that everyone would have agricultural and industrial products, that all students would be educated, and that you would raise the per capita income which is presently $52 per person. Your task is to fulfill those campaign promises. If you fail you will not be re-elected, and you want to be re-elected. If in any given year five or more percent of your population dies because of a lack of agricultural products, a revolt will take place, your administration will end, and for you the game is over.

The World Council has released statistics on economic growth, population, and the number of school-age children for all countries. Economic growth during the last decade has ranged from 0 to 8% per year for an average increase of 4%. Population statistics and the number of school-age children are shown below. Note your country in relationship to other countries.

\(^1\)In a classroom set of the "Population Game" there would be a separate YOUR COUNTRY sheet for each of the twenty countries. Only the three different role variations have been included here. Countries 1-8 have identical roles except that they do differ in their birth rates, death rates, population increases, and percentages of students, as shown in the figures on page 61.
Your country has always been a member of the World Council. So far it has never requested or received economic assistance from the Council. The welfare of your country's present and future population depends upon you, and you have said that you will not let them down.

**Your country's vital statistics.--POPULATION**

1. The population of your country for YEAR 1 1000

2. The birth rate is 14 per 1000 (BR) 14

3. The death rate is 11 per 1000 (DR) 11

4. Population increase during YEAR 1 (BR minus DR) \( \frac{3}{3} \) (This increase of 3 represents a percentage of .3% or .003)

---

\[ \text{The asterisk designates your country.} \]
5. The population of your country for YEAR 2 would be 1003 unless you make some adjustment in the birth or death rates during the investment period for YEAR 1. If you do adjust the rates, duplicate this procedure using the new rates.

\[
\begin{align*}
\text{1000} & \times 0.003 = 3 \\
\text{1000} & + 3 = \text{1003}
\end{align*}
\]

EDUCATION

1. The population of your country for YEAR 1
2. 17% of your population is of school-age
3. Total number of school-age students for YEAR 2 = \( \text{170} \)
4. For succeeding years continue to use 17% and the new population for that year.

Your Country # 93.--You have been elected to serve a seven year term as economic planners. During the campaign you said that you would raise the standard of living, which you said meant that everyone would have agricultural and industrial products, that all students would be educated, and that you would raise the per capita income which is presently $52 per person. Your task is to fulfill those campaign promises. If you fail you will not be re-elected, and you want to be re-elected. If in any given year five or more percent of your population dies because of a lack of agricultural products, a revolt will take place, your administration will end, and for you the game is over.

The World Council has released statistics on economic growth, population and the number of school-age children for all countries. Economic growth during the last decade has ranged from 0 to 8% per year for an average increase of 4%.

\(^3\)Countries 9-13, 17 and 18 have identical roles except they do differ in their birth rates, death rates, population increases, and percentages of students, as shown in the figures on page 63.
Population statistics and the number of school-age children are shown below. Note your country in relationship to other countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Birth Rate</th>
<th>Death Rate</th>
<th>Increase Per Year</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
<td>11</td>
<td>3</td>
<td>170</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>13</td>
<td>4</td>
<td>190</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>12</td>
<td>5</td>
<td>180</td>
</tr>
<tr>
<td>4</td>
<td>19</td>
<td>11</td>
<td>8</td>
<td>200</td>
</tr>
<tr>
<td>5</td>
<td>19</td>
<td>10</td>
<td>9</td>
<td>200</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>9</td>
<td>10</td>
<td>240</td>
</tr>
<tr>
<td>7</td>
<td>19</td>
<td>8</td>
<td>11</td>
<td>200</td>
</tr>
<tr>
<td>8</td>
<td>23</td>
<td>8</td>
<td>15</td>
<td>230</td>
</tr>
<tr>
<td>9++</td>
<td>40</td>
<td>22</td>
<td>18</td>
<td>340</td>
</tr>
<tr>
<td>10</td>
<td>28</td>
<td>9</td>
<td>19</td>
<td>300</td>
</tr>
</tbody>
</table>

The people of your country have always had and enjoyed large families. Children form a very important part of family life. Your country has always been a member of the World Council. So far it has never requested or received economic assistance from the Council. The welfare of your country's present and future population depends upon you, and you have said that you will not let them down.

*The asterisk designates your country.
Your country's vital statistics.--POPULATION

1. The population of your country for YEAR 1 1000
2. The birth rate is 40 per 1000 (BR) 40
3. The death rate is 22 per 1000 (DR) 22
4. Population increase during YEAR 1 (BR minus DR) 18
   (This increase of 18 represents a percentage of 1.8% or .018.)
5. The population of your country for YEAR 2
   would be 1018 unless you make some adjustment
   in the birth or death rates during
   the investment period for YEAR 1. If you do
   adjust the rates, duplicate this procedure using the new rates.

EDUCATION

1. The population of your country for YEAR 1 1000
2. 34% of your population is of school-age x .34
3. Total number of school-age students for YEAR 2 = \frac{x \cdot .34}{340}
4. For succeeding years continue to use 34% and the new population for that year.

Your Country # 145.--You have been elected to serve a seven year term as economic planners. During the campaign you said that you would raise the standard of living, which you said meant that everyone would have agricultural and industrial products, that all students would be educated, and that you would raise the per capita income which is presently $52 per person. Your task is to fulfill these campaign promises. If you fail you will not be re-elected, and you want to be re-elected. If in any given year five or more percent of your population dies because of a lack of agricultural products, a revolt will take

5Countries 14-16, 19 and 20 have identical roles except they do differ in their birth rates, death rates, population increases, and percentages of students, as shown in the figures on page 65.
place, your administration will end, and for you the game is over.

The World Council has released statistics on economic growth, population and the number of school-age children for all countries. Economic growth during the last decade has ranged from 0 to 8% per year for an average increase of 4%. Population statistics and the number of school-age children are shown below. Note your country in relationship to other countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Birth Rate</th>
<th>Death Rate</th>
<th>Increase Per Year</th>
<th>Number of Students</th>
<th>Country</th>
<th>Birth Rate</th>
<th>Death Rate</th>
<th>Increase Per Year</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
<td>11</td>
<td>3</td>
<td>170</td>
<td>11</td>
<td>49</td>
<td>28</td>
<td>21</td>
<td>340</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>13</td>
<td>4</td>
<td>190</td>
<td>12</td>
<td>34</td>
<td>11</td>
<td>23</td>
<td>320</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>12</td>
<td>5</td>
<td>180</td>
<td>13</td>
<td>44</td>
<td>20</td>
<td>24</td>
<td>350</td>
</tr>
<tr>
<td>4</td>
<td>19</td>
<td>11</td>
<td>8</td>
<td>200</td>
<td>14**6</td>
<td>39</td>
<td>11</td>
<td>28</td>
<td>340</td>
</tr>
<tr>
<td>5</td>
<td>19</td>
<td>10</td>
<td>9</td>
<td>200</td>
<td>15</td>
<td>49</td>
<td>20</td>
<td>29</td>
<td>360</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>9</td>
<td>10</td>
<td>240</td>
<td>16</td>
<td>50</td>
<td>20</td>
<td>30</td>
<td>350</td>
</tr>
<tr>
<td>7</td>
<td>19</td>
<td>8</td>
<td>11</td>
<td>200</td>
<td>17</td>
<td>45</td>
<td>13</td>
<td>32</td>
<td>370</td>
</tr>
<tr>
<td>8</td>
<td>23</td>
<td>8</td>
<td>15</td>
<td>230</td>
<td>18</td>
<td>46</td>
<td>13</td>
<td>33</td>
<td>340</td>
</tr>
<tr>
<td>9</td>
<td>40</td>
<td>22</td>
<td>18</td>
<td>340</td>
<td>19</td>
<td>48</td>
<td>14</td>
<td>34</td>
<td>330</td>
</tr>
<tr>
<td>10</td>
<td>28</td>
<td>9</td>
<td>19</td>
<td>300</td>
<td>20</td>
<td>46</td>
<td>8</td>
<td>38</td>
<td>380</td>
</tr>
</tbody>
</table>

*The asterisk designates your country.*
The people of your country have always had and enjoyed large families. The predominant religion of the country discourages the use of artificial means of birth control, and abortion is illegal. Your country has always been a member of the World Council. So far it has received assistance from the Council on two different occasions. The welfare of your country's present and future population depends upon you, and you have said you will not let them down.

Your country's vital statistics.—POPULATION

1. The population of your country for YEAR 1 1000
2. The birth rate is 39 per 1000 (BR) 39
3. The death rate is 11 per 1000 (DR) 11
4. Population increase during YEAR 1 (BR minus DR) \( \frac{28}{28} \)
   (This increase of 28 represents a percentage of 2.8% or .028)
5. The population of your country for YEAR 2 would be 1028 unless you make some adjustment in the birth or death rates during the investment period for YEAR 1. If you do adjust the rates, duplicate this procedure using the new rates.

   \[
   \frac{1000}{1028} = \frac{28}{28} + 28
   \]

EDUCATION

1. The population of your country for YEAR 1 1000
2. 34% of your population is of school-age \( \times 0.34 \)
3. The total number of school-age students for YEAR 2 \( \frac{340}{340} \)
4. For succeeding years continue to use 34% and the new population for that year

Years 1-7.--

YEARS 1-7

Country Number _______

Your Names _______________
### YEAR 1

<table>
<thead>
<tr>
<th>Capital</th>
<th>Population</th>
<th>Number of Students</th>
<th>INVESTMENT (X)</th>
<th>FACTOR ((=))</th>
<th>PROFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$52,000</td>
<td>1000</td>
<td>340</td>
<td>Agriculture</td>
<td>$25,000</td>
<td>1.03</td>
</tr>
<tr>
<td>1. $25 per person</td>
<td></td>
<td></td>
<td>Industry</td>
<td>$20,000</td>
<td>1.05</td>
</tr>
<tr>
<td>2. $20 per person</td>
<td></td>
<td></td>
<td>Education</td>
<td>$5,100</td>
<td>1</td>
</tr>
<tr>
<td>3. $15 per student</td>
<td></td>
<td></td>
<td>Foreign Investment</td>
<td>$1,100</td>
<td>1.07</td>
</tr>
<tr>
<td>4. Minimum $500</td>
<td></td>
<td></td>
<td>Resource Exploration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Minimum $1000</td>
<td></td>
<td></td>
<td>Savings</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>6. Investment</td>
<td></td>
<td></td>
<td>Birth Rate</td>
<td>$200</td>
<td></td>
</tr>
<tr>
<td>7. $50 per point reduced</td>
<td></td>
<td></td>
<td>Death Rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. $50 per point reduced</td>
<td></td>
<td></td>
<td>World Council</td>
<td>$600</td>
<td></td>
</tr>
<tr>
<td>9. Membership $600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Investment: $25,000 + $20,000 + $5,100 + $1,100 = $52,200

YEARNLY CHANGE CARD (Add or Deduct, amount shown on the card): $250

TOTAL PROFITS: $53,277

### POPULATION AND NUMBER OF STUDENTS FOR YEAR 2

1. Population for YEAR 1 1000, minus the number of people not supported with an Agriculture investment, 0 = 1000
2. BR 40, minus the number of points you reduced it in the Birth Rate section during YEAR 1, = 36

3. DR 22, minus the number of points you reduced it in the Death Rate section during YEAR 1, = 22

4. Population increase, BR minus DR (Move decimal 3 places to left) = 14

5. Population for YEAR 2 (Multiply Line 4 times Line 1; add the product to Line 1) = 1014

6. Percent of population of school-age = .34

7. Number of students for YEAR 2 (Multiply Line 6 times Line 5) = 345

YEAR 2

<table>
<thead>
<tr>
<th>Capital</th>
<th>Population</th>
<th>Number of Students</th>
</tr>
</thead>
</table>

LOANS

World Council (Amount borrowed)

Other Countries (Amount borrowed or amount loaned)

New Capital (Add amount borrowed or subtract amount loaned from Capital above)

In a classroom set of the "Population Game" there would be five additional sheets identical to this one, entitled YEARS 3,4,5,6,7.
<table>
<thead>
<tr>
<th>Investment</th>
<th>Factor</th>
<th>Profits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>$25 per person</td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>$20 per person</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>$15 per student</td>
<td>1</td>
</tr>
<tr>
<td>Foreign Investment</td>
<td>Minimum $500</td>
<td></td>
</tr>
<tr>
<td>Resource Exploration</td>
<td>Minimum $1000</td>
<td></td>
</tr>
<tr>
<td>Savings</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Birth Rate</td>
<td>$50 per point</td>
<td></td>
</tr>
<tr>
<td>Reduced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death Rate</td>
<td>$50 per point</td>
<td></td>
</tr>
<tr>
<td>Reduced</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Investment...

YEARLY CHANCE CARD (Add or Deduct, amount shown on the card)...

TOTAL PROFITS...

POPULATION AND NUMBER OF STUDENTS FOR YEAR 3

1. Population for YEAR 2, minus the number of people not supported with an Agriculture investment, =

2. BR, minus the number of points you reduced it in the Birth Rate section during YEAR 2, =

3. DR, minus the number of points you reduced it in the Death Rate section during YEAR 2, =
4. Population increase, BR minus DR (Move the decimal 3 places to left) . . . . . . . =

5. Population for YEAR 3 (Multiply Line 4 times Line 1; add the product to Line 1) . . . =

6. Percent of population of school-age . . . . =

7. Number of students for YEAR 3 (Multiply Line 6 times Line 5) . . . . . . . . . . . =

RESULTS OF YOUR ADMINISTRATION

1. TOTAL PROFITS at the end of YEAR 7 . . . . . . . .

2. Loan Payment
   a. World Council . . . Paid______
   b. Other Countries . . . Paid______ . . Received______
   c. Total Paid. . . . . . . . . Total Received______

3. PROFITS (Subtract Total Paid from Line 1; Add Total Received to Line 1) . . . . . . . . . . .

4. Education
   a. Total number of students (YEARS 1-7). . . . .
   b. Number supported (YEARS 1-7) . . . . . .
   c. % supported (Divide b by a) . . . . . .
   d. Compare % to chart below and enter value______

   100-98% . $5000
   97-95% . $3000
   94-92% . $2000
   91-90% . $1000

5. TOTAL PROFITS (Line 4d plus Line 3) . . . . . . . .

6. Population for YEAR 8 . . . . . . . . . . .

7. Per Capita Income (Divide Line 5 by Line 6). . . . . .
8. Comparison of Your Country BEFORE you took control and AFTER seven years of Your Administration:

<table>
<thead>
<tr>
<th></th>
<th>BEFORE</th>
<th>AFTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>$52</td>
<td></td>
</tr>
<tr>
<td>Number of people not supported with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture investment</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Industry investment</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Education investment</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

9. What was the major advantage of:
   Your Country?
   Your Administration?

10. What was the major disadvantage of:
    Your Country?
    Your Administration?

11. You are going to run for re-election. You must run on the record of Your Administration. Will you be re-elected?
    YES_________    NO_________
TO: President of the World Council

PURPOSE: Our Country, number __, requests a meeting of the World Council during YEAR 1 2 3 4 5 6 7 (circle one)

Fill in the following information:

Capital ............................................
Population ........................................
Per Capita Income ................................
Birth Rate ........................................
Death Rate ........................................
Population Increase ............................
Number of Students .............................

AMOUNT REQUESTED ................................

What will the money be spent for?

________________________________________________________________________

THIS SECTION TO BE COMPLETED BY THE WORLD COUNCIL PRESIDENT

What action do you recommend the Council take?

1. If a loan is granted, complete the WORLD COUNCIL LOAN AGREEMENT form.

2. The interest rate is 2% per year.

3. All loans must be repaid at the end of YEAR 7.
LOAN AGREEMENT

Country number ____ agrees to lend $____ at an interest rate of ____% per year to country number ___. The loan was taken out during YEAR ___.

SIGNATURES

BORROWER ____________________________

LENDER ____________________________

1. The interest rate is determined by the countries making this agreement.

2. The LOAN AGREEMENT should be held by the country lending the money until paid.

3. Loans must be repaid at the end of YEAR 7.

DUTIES OF THE PRESIDENT

1. Fill out the WORLD COUNCIL MEMBERS sheet. This is for your information so you will know who has joined and the amount of membership dues you have collected.

2. Survey each country each year to find out the number of people in each country, total these figures and enter the results on the WORLD POPULATION GRAPH. Place the graph in a prominent place so all countries can see the results.

3. When a country wants to call a meeting of the World Council, it must fill out a WORLD COUNCIL MEETING REQUEST form
and turn it in to you. If there are no requests for a meeting, no meeting is held. If there is a request, call a meeting immediately. Only members can attend.

4. When a request is turned in to you, review it and make a recommendation as to what you think the World Council should do.

5. The World Council has $5000 plus the membership fees available for loans.

6. If a loan is given by the World Council, you must complete the WORLD COUNCIL LOAN AGREEMENT form. The agreement should be held by you until paid. All loans must be repaid at the end of YEAR 7. The World Council interest rate is 2% per year.

7. At the meeting do the following:
   a. Call the meeting to order.
   b. Read the requests you have received and your recommendations.
   c. Ask the council what it wishes to do about the requests.
   d. Any action taken by the council requires that a motion be made, seconded, discussion held, and voted upon. A majority vote is required to approve a motion.
   e. When all business is completed adjourn the meeting.

----------------------------------------
WORLD COUNCIL MEMBERS

<table>
<thead>
<tr>
<th>Country Number</th>
<th>Names of Team Members</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Country Number

Names of Team Members

Number of countries that joined \[ \times \$600 = \$_ \] + 
\$5000 = \$_ TOTAL CAPITAL OF THE WORLD COUNCIL

---

WORLD COUNCIL LOAN AGREEMENT

The World Council agrees to lend \$_ at an interest rate of 2\% per year to country number ___. The loan was taken out during YEAR ___.

SIGNATURES

BORROWER


PRESIDENT


1. This agreement will be held by the President until paid.

2. All loans must be repaid at the end of YEAR 7.

---

\*In a classroom set of the "Population Game" there would be sufficient blanks on the WORLD COUNCIL MEMBERS sheet for all 20 countries to join if they so desired.
CHAPTER BIBLIOGRAPHY


CHAPTER IV

SUMMARY, CONCLUSIONS, RECOMMENDATIONS,
AND INFERENCE

Summary

The purpose of the study was to develop a college level simulation game dealing with selected aspects of the population problem.

From a review of population education and simulation game literature, sixteen educational objectives were generated. The review of literature also served to identify potential members of the panel of experts, individuals who were selected on the basis of their experience in the areas of population and/or simulation game materials. The panel members were subject to the approval of the doctoral advisory committee chairman and minor professor. Sixteen educational objectives were sent to the panel members for validation. The panel was asked to approve or reject each objective on the basis that it would be a significant objective for college students to achieve. Of the sixteen objectives sent to the panel members, the following twelve were approved:

1. State what data are needed to compute population increase.
2. Compute population increases and make predictions about future population sizes, when given birth and death-rate figures.

3. Identify at least one combination of birth and death rates that cause a population to decrease, remain stable, increase.

4. Describe the characteristics of developed and developing countries relative to their differing birth rates, death rates, and population increases.

5. Write a statement describing the effects that cultural and religious beliefs can have on population growth.

6. Describe the pressures for continuous economic growth when attempting to increase per capita income in countries with rapidly growing populations as compared to countries with more slowly growing populations.

7. Describe the economic effect of investing capital to reduce the population growth rate in countries with rapidly growing populations as compared to countries with more slowly growing populations.

8. Describe the effect that a financial loss can have on countries with rapidly growing populations as compared to countries with more slowly growing populations.

9. Discuss the effect that the rapidly growing population may have on the quality of life in the future.
10. Identify and evaluate decreased birth rates, increased economic production, and increased death rates, as possible solutions to the world's population problems.

11. Explain why it is important for individuals to personalize the world's population problems and to make commitments for seeking and participating in the solutions.

12. Describe what it must be like to be in leadership and decision-making positions for countries with rapidly growing populations as compared to those for countries with more slowly growing populations.

A simulation game was developed based upon the approved objectives and was played by the following groups: a small group of faculty members experienced in population and/or simulation game materials, a small group of college students, a large group of college students, and a large group of college students with the game being administered by a faculty member not familiar with the game's development. After each group had played it, the simulation game was modified until a satisfactory model was achieved; then it was sent to the following panel members for their evaluations: Val E. Arnsdorf, Angus M. Gunn, George A. Schnell, Gary R. Shirts, and Paul A. Twelker. The panel evaluated the simulation game using the Curriculum Materials Analysis System. All members of the panel approved the simulation game.
Conclusions

On the basis of the evaluations by the panel of experts the following conclusions are offered:

1. A simulation game was developed and approved.

2. In the opinion of the panel, the simulation game appeared to be applicable to a wide range of educational levels.

3. During its development the simulation game was played only by college students. It probably would be useable with senior high school students, but because of its level of difficulty its effectiveness would be questionable with younger students.

Recommendations

The following recommendations are based upon the evaluations of the panel of experts. It is not immediately clear how all of these recommendations could be accomplished or if it is possible to accomplish them. An effective simulation game has a delicate balance that can easily be upset. For example, it is possible to improve one aspect and adversely affect another aspect. This does not mean a simulation game should not be subject to change. On the contrary, the games should never be considered finished or completed. They should constantly be modified and changed, but care must be taken in making these modifications. In this case,
the entire simulation game should be reviewed, and an effort should be made to include as many of the following recommendations as possible:

1. Increase the affective content of the simulation game.

2. Provide a greater opportunity for students to develop their values and encourage them to take a positive and committed stand on those values.

3. Develop greater variability in the types of materials used.

4. Simplify and reduce the calculations required.

5. Reduce the role that chance plays in determining the outcomes.


7. Simplify the description in the Teacher's Manual of how the simulation game operates and add a suggested reading list.

Although the panel did not recommend a testing program, one should be undertaken to evaluate all aspects of the simulation game.

Inferences

1. Many college students in the field of geography will eventually become teachers; this is especially true of those students attending small colleges, primarily for teacher
education. It is important for prospective teachers to experience the kinds of things their future students will experience. Simulation games have made some impact on elementary and secondary schools, and this simulation game, the "Population Game," can provide at least a part of this needed experience to future teachers.

2. Simulation games can be a satisfactory method of presenting serious and important academic material in an enjoyable manner.

3. Some students and teachers have a tendency to think of simulation games as fun, something for Friday afternoon. When students begin to exhibit serious problem solving attitudes, this tendency begins to change, and simulation games begin to be viewed as a significant educational technique.

4. This simulation game is flexible enough to allow other aspects to be added. Some of these might be: immigration, emigration, environmental issues, pollution problems, and resource utilization. It would also be possible to vary the number of people on the team, to record the team's discussions at the beginning and at the end of the game to see if any attitudinal changes could be detected. Teachers using this exercise are encouraged to modify it in whatever direction seems appropriate.

5. The simulation game appears to be most effective when it is played during a continuous uninterrupted session.
APPENDIX A

VALIDATION OF BEHAVIORAL OBJECTIVES

<table>
<thead>
<tr>
<th>Behavioral Objective</th>
<th>Approve</th>
<th>Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. State the yearly percentage increase in the world's food production during the last decade.</td>
<td>A, B</td>
<td>C, D, E</td>
</tr>
<tr>
<td>2. State the yearly percentage increase in the world's industrial production during the last decade.</td>
<td>A, B</td>
<td>C, D, E</td>
</tr>
<tr>
<td>3. State what data are needed to compute population increase.</td>
<td>A, B, C, D</td>
<td>E</td>
</tr>
<tr>
<td>4. Compute population increases and make predictions about future population sizes, when given birth and death-rate figures.</td>
<td>A, B, C, D, E</td>
<td></td>
</tr>
<tr>
<td>5. Identify at least one combination of birth and death rates that cause a population to decrease, remain stable, increase.</td>
<td>A, B, C, D, E</td>
<td></td>
</tr>
<tr>
<td>6. Describe the characteristics of developed and developing countries relative to their differing birth rates, death rates, and population increases.</td>
<td>A, B, C, D</td>
<td>E</td>
</tr>
</tbody>
</table>

1The following code, A, B, C, D, E, has been used instead of the names of the validators.
<table>
<thead>
<tr>
<th>Behavioral Objective</th>
<th>Approve</th>
<th>Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Write a statement describing the effects that cultural and religious beliefs can have on population growth.</td>
<td>A, B, C, D, E</td>
<td></td>
</tr>
<tr>
<td>8. Compute the per capita income for a country when given gross national product and population figures.</td>
<td>B, D</td>
<td>A, C, E</td>
</tr>
<tr>
<td>9. Describe the pressures for continuous economic growth when attempting to increase per capita income in countries with rapidly growing populations, as compared to those for countries with more slowly growing populations.</td>
<td>A, B, C, D, E</td>
<td></td>
</tr>
<tr>
<td>10. Describe the economic effect of investing capital to reduce the population growth rate in countries with rapidly growing populations, as compared to countries with more slowly growing populations.</td>
<td>A, B, C, D, E</td>
<td></td>
</tr>
<tr>
<td>11. Describe the effect that a financial loss can have on countries with rapidly growing populations, as compared to countries with more slowly growing populations.</td>
<td>A, B, C, D, E</td>
<td></td>
</tr>
<tr>
<td>12. Discuss the effect that the rapidly growing world's population may have on the quality of life in the future.</td>
<td>B, C, D, E</td>
<td>A</td>
</tr>
<tr>
<td>13. Identify and evaluate decreased birth rates, increased economic production, and increased death rates as possible solutions to the world's population problems.</td>
<td>A, C, D, E</td>
<td>B</td>
</tr>
<tr>
<td>Behavioral Objective</td>
<td>Approve</td>
<td>Reject</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>14. Explain why it is important for individuals to personalize the world's population problems and to make commitments in seeking and participating in the solutions.</td>
<td>B, C,</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>D, E</td>
<td></td>
</tr>
<tr>
<td>15. Describe what it must be like to be in leadership and decision making positions, as compared to those for countries with more slowly growing populations.</td>
<td>A, C,</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>D, E</td>
<td></td>
</tr>
<tr>
<td>16. Display a high degree of interest and motivation by asking questions about various aspects of the world's population problems.</td>
<td>A, E</td>
<td>B, C,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
</tr>
</tbody>
</table>
APPENDIX B

CURRICULUM MATERIALS ANALYSIS SYSTEM

1.0 Product Characteristics

Information. This section gives a general overview of the curriculum materials, including a complete description of the physical characteristics and a brief description of selected substantive characteristics.

Instruction. After completing the entire analysis, write and insert here an overview of the entire analysis in not more than 100 words. The overview should be both selected, pointing to the most important characteristics of the materials as the analyst sees them, and succinct.

Twelker--The simulation exercise includes a teachers guide, and student materials. The exercise uses chance in a questionable way.

1.1 Subject Content

This topic is treated very briefly here. See Section 3.0, Content, for elaboration; see also Section 6.0, Evaluation.

1.1-Q1 Indicate the discipline or disciplines most prominent, mark them "1," "2," "3," in order of prominence; or, if they cannot be distinguished, mark them all "1." If

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more than three disciplines are prominent, mark either "interdisciplinary" or "multidisciplinary."

Anthropology- Arnsdorf, Gunn, Shirts, Twelker
Economics- Arnsdorf, Gunn
Geography- Arnsdorf, Gunn
History- Arnsdorf, Shirts, Twelker
Political Sci.- Arnsdorf, Shirts, Twelker
Psychology- Arnsdorf, Shirts
Sociology- Arnsdorf, Shirts
Social Psych.- Arnsdorf, Schnell
Interdisc.- Arnsdorf, Schnell
Multidisc.- Arnsdorf, Schnell

See narrative (SN)
Not applicable Unavailable (NA) (UA)

1.1-Q2 In general, how sound is the substantive content of these materials? Mark the scale according to your best overall judgment. Note: The scale shown below right is an abbreviation of the scale in 1.1-Q1.

Gunn--The degree of soundness is easy to recognize, and I have accorded it high status. However, the validity of the total data provided in terms of disciplines priorities remain unclear.

In the Scaled Responses, the following abbreviations were used in place of the evaluators' full names: Dr. Val E. Arnsdorf - Ar.; Dr. Angus M. Gunn - Gu.; Dr. George A. Schnell - Sc.; Dr. Gary R. Shirts - Sh.; Dr. Paul A. Twelker - Tw.
1.2 Intended Uses

Much of the content of this section is elaborated in Section 5.0, Antecedent Conditions.

1.2-Q1 For what grade level or levels are these materials most appropriate, according to the author?

<table>
<thead>
<tr>
<th>Grade level(s)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Junior-Senior</td>
<td>High School-Arnsdorf</td>
<td>High School- Schnell</td>
<td>9th grade- Gunn</td>
</tr>
</tbody>
</table>

Gunn--I am sure this is highly appropriate and probably most useful at the grade nine level. However, like all good simulations it is probably usable from grade seven to undergraduate level.

Twelker--If the audience is specified it's not easily found.

1.2-Q2 Are there any particular kinds of students, teachers, schools, or communities for which these materials would be especially suitable or unsuitable--for example, students from particular ethnic groups, teachers without much background in social science, schools with or without flexible facilities, and communities that are or are not politically conservative. If "yes," elaborate.

<table>
<thead>
<tr>
<th>Tw., Ar., Gu., Sc., Sh.</th>
<th>Yes</th>
<th>No</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2-Tw.</td>
<td>3-Sc.</td>
<td>SN</td>
<td>NA</td>
<td>UA</td>
</tr>
</tbody>
</table>

Schnell--Of general interest
Twelker--Students with above average math ability and an interest in math computations.

1.2-Q3 What does the author consider the most appropriate length of time, in weeks or years, for the whole set of
materials? Circle "weeks" or "years" according to which unit is used.

1 week- Arnsdorf, Twelker
2 weeks-Gunn

Gunn--This is almost impossible to answer without some try-outs with students.

Schnell--The length of time seems to be extremely variable--this could be an effective activity for a short period, say 2 weeks, or much longer.

1.3 Printed Materials and Other Media

Note that this section refers to the specific materials and media covered in this analysis. Other materials and media which belong to the same curriculum package but which are not covered in this analysis should be described briefly below.

1.3-Q1 Check which of the following items are available and are covered in this analysis:

Student Text- Arnsdorf, Gunn
Other printed student materials- Arnsdorf, Gunn, Schnell, Shirts, Twelker
Teacher's Guide- Arnsdorf, Gunn, Schnell, Shirts, Twelker
Other printed materials-
Media other than printed materials-
Tests- 4-Gu. 4-Tw.

1.3-Q2 Are there other materials and media which are closely related to the materials which have been analyzed but which are not included in this analysis? If so, describe them briefly.
1.3-Q3 What is your general overall judgment of the physical and technical (not substantive) quality of the materials, including all media? (For an overall judgment of the substantive quality of the materials, see 1.1-Q2).

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>SN</td>
<td>NA</td>
<td>UA</td>
</tr>
</tbody>
</table>

1.3-Q4 As compared with the average cost of supplying curriculum materials for a social studies class at the grade level(s) for which these materials are intended, how are the costs of these materials?

<table>
<thead>
<tr>
<th>Sh.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN</td>
</tr>
</tbody>
</table>

1.4 Dominant Instructional Characteristics

To the extent that materials can influence the course of learning activities, give your best judgments as to the probable effects of these materials in shaping the following dimensions of learning. The use of various teaching strategies is treated much more fully in Section 4.0, Learning Theory and Teaching Strategies.

1.4-Q Describe the dominant types of teaching and learning activities that are prescribed or suggested by these materials.

<table>
<thead>
<tr>
<th>Tw.</th>
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<tbody>
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<td>SN</td>
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</tbody>
</table>

Arnsdorf--Simulation, problem-solving, role-playing.
Gunn--Inquiry of a conventional closed-system type.
Schnell--Handling of data, exercise in decision making, the arithmetics of population change.
Shirts--Simulation and gaming.
Twelker--A simulation exercise that involves a series of decision-making activities separated by feedback to participants where chance plays a crucial role.

1.5 Performance Data Availability

This section gives very brief information on performance data derived from classroom use of the materials. Section 6.0 includes more detailed data.

1.5-Q1 How much information on performance results of these materials is available?

<table>
<thead>
<tr>
<th>Ar.</th>
<th>SN</th>
<th>Sh.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>NA</td>
<td>UA</td>
</tr>
<tr>
<td>1</td>
<td>NA</td>
<td>UA</td>
</tr>
<tr>
<td>2</td>
<td>NA</td>
<td>UA</td>
</tr>
<tr>
<td>3</td>
<td>NA</td>
<td>UA</td>
</tr>
<tr>
<td>4</td>
<td>NA</td>
<td>UA</td>
</tr>
<tr>
<td>5</td>
<td>NA</td>
<td>UA</td>
</tr>
<tr>
<td>6</td>
<td>NA</td>
<td>UA</td>
</tr>
</tbody>
</table>

1.5-Q2 If data are available, how unfavorable or favorable are they with respect to the intended results?

<table>
<thead>
<tr>
<th>Sh.</th>
<th>SN</th>
<th>NA</th>
<th>UA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very unfavorable</td>
<td>Moderate</td>
<td>Very favorable</td>
<td></td>
</tr>
<tr>
<td>Moderately favorable</td>
<td>Very favorable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.6 References

References cited in this section refer only or primarily to information about the materials themselves. Section 7.32 gives references to the curriculum development project and Section 8.4 cites references which the analyst has found useful in understanding the analysis system and applying it to the materials.

1.6-Q List the one or two most useful references which give information about the materials in addition to the information found in the materials themselves. Give proper
bibliographic references, including prices and how the references can be found or obtained.

2.0 Rationale and Objectives

Information. A rationale is a philosophic position on education held by a curriculum developer. It consists of the assumptions and goals which the developer uses as guides and criteria for the selection and ordering of objectives, content, strategies, and evaluation processes in the curriculum. The assumptions include assumptions about the nature of the individual, of society, and of the relationship between the individual and society; also assumptions about the nature of knowledge and values. To the extent that a curriculum is embodied in materials, the rationale also supplies guides and criteria for the materials.

Objectives of curriculum materials are statements that indicate the ways in which students are expected to change their thinking, values, and actions as a result of using the materials. Objectives range from very general to very specific and include both substantive and methodological objectives. Specific objectives are sometimes stated in the form of "behavioral," or "performance," objectives.

Instructions. With respect to all parts of the CMAS, the evidence for answers to questions may be explicitly stated in the materials or other sources, or it may be implicit and necessitate the making of inferences by the analyst, or there
may be no evidence at all on which to base an answer. Many of the questions on rationale may put a severe strain on the inferential powers of the analyst and some may have to go unanswered.

After completing Section 2.0, write and insert here an abstract of the section in not more than 100 words. The abstract may contain both descriptive and evaluative statements.

Twelker—The objectives covered are mainly cognitive. The objectives fail to identify the target population, the conditions under which evaluation is performed, and the degree of attainment desired. Because of these shortcomings, the behavior statements are ill-defined and vague.

2.0-Q1 Can the author's rationale be found explicitly and clearly in the materials or in other sources available to the analyst? Can it be found implicitly? Does it seem that no rationale exists? Indicate your answer on the following scale.

<table>
<thead>
<tr>
<th>Tw.</th>
<th>Sh.</th>
<th>Ar. Sc.</th>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Non-existent or impossible to discover
Implicit and fairly clear
Explicit and very clear

2.0-Q2 How clear is the author in setting forth his objectives?

<table>
<thead>
<tr>
<th>Gu.</th>
<th>Sc.</th>
<th>Sh.</th>
<th>Ar. Tw.</th>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Very obscure
Fairly clear
Very clear
2.0-Q3 To what extent do you, the analyst, agree with the author's rationale and objectives?

<table>
<thead>
<tr>
<th>Ar.</th>
<th>3-Gu.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sc.</td>
<td>Tw.</td>
</tr>
<tr>
<td>Gu.</td>
<td>Sh.</td>
</tr>
<tr>
<td>Tw.</td>
<td>4-Sh.</td>
</tr>
</tbody>
</table>

0 1 2 3 4 5 6 7 SN NA UA C

Gunn--My feeling is that knowledge and skill objectives using conventional printed materials is quite limiting if we seek longterm results for our work. I would like to see greater variety of materials and greater range of objectives.

2.1 The Individual and Society

2.1-Q1 What is the nature of the individual and of society, and how are the individual and society related to each other?

<table>
<thead>
<tr>
<th>Gu.</th>
<th>1-Tw.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tw.</td>
<td>4-Sh.</td>
</tr>
</tbody>
</table>

SN NA UA C

Schnell--Through the student's realization that population problems are universal and solutions might be found only if individuals participate in effective ways in seeking solutions.

Shirts--"Your Country" represents one of the most important relationships between the individual and society.

2.1-Q2 What goals should education foster for the individual and for society? To what extent are these goals compatible, to what extent in conflict?

<table>
<thead>
<tr>
<th>Gu.</th>
<th>1-Tw.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tw.</td>
<td>4-Sh.</td>
</tr>
</tbody>
</table>

SN NA UA C

Shirts--"Your Country" helps students focus on the rights of the individual to have children as opposed to the state's right to control population.
2.2 Knowledge and Values

2.2-Q1 What is the author's view about the source or sources of knowledge and about how man acquires knowledge?

<table>
<thead>
<tr>
<th>3-Gu.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sh. Tw.</td>
</tr>
<tr>
<td>Tw.</td>
</tr>
<tr>
<td>SN</td>
</tr>
</tbody>
</table>

Gunn—The author draws his objectives from substantive fields as they are found in universities.

2.2-Q2 What is the author's view about the source or sources of values and about how man acquires values?

<table>
<thead>
<tr>
<th>3-Gu.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sh. Tw.</td>
</tr>
<tr>
<td>Tw.</td>
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<tr>
<td>SN</td>
</tr>
</tbody>
</table>

Gunn—The author clearly expects values to be challenged and re-assessed in light of new knowledge as experienced in the particular structure of a simulation game.

2.3 Existence and Use of a Rationale

Information. If the curriculum materials are based on a rationale, as defined in 2.0 above, then they should contribute to achievement of the goals for the individual and society, as the author sees them. Development of the materials should also have been guided by the author's views about the nature of the individual, society, knowledge, and values.

2.3-Q How much evidence is there that the development of the materials was guided by a clear rationale?

<table>
<thead>
<tr>
<th>4-Sc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sh.</td>
</tr>
<tr>
<td>Sc.</td>
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<td>0</td>
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<tr>
<td>SN</td>
</tr>
</tbody>
</table>

No evidence Moderate Great amount deal
2.4 **Cognitive Objectives**

2.4-Q1 To what degree are cognitive content objectives emphasized in the materials?

<table>
<thead>
<tr>
<th>Sc.</th>
<th>Sh.</th>
<th>4-Sc.</th>
</tr>
</thead>
<tbody>
<tr>
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<td>SN</td>
<td>NA</td>
</tr>
<tr>
<td>UA</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

No/No emphasis

Moderate/Much emphasis

Much emphasis

2.4-Q2 In general, how clearly does the author state his cognitive objectives?

<table>
<thead>
<tr>
<th>Sh.</th>
<th>Sc.</th>
<th>4-Sc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>6</td>
<td>SN</td>
<td>NA</td>
</tr>
<tr>
<td>UA</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

Very/Very clearly

Fairly/clearly

2.4-Q3 What is the author's relative emphasis on memorization, as opposed to critical and analytical thinking?

<table>
<thead>
<tr>
<th>Sh.</th>
<th>Sc.</th>
<th>3-Sc.</th>
</tr>
</thead>
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<tr>
<td>6</td>
<td>SN</td>
<td>NA</td>
</tr>
<tr>
<td>UA</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

Much critical and memory work

Some of each memory work

Much critical and memory work

2.5 **Affective Objectives**

2.5-Q1 To what degree are affective objectives emphasized in the materials?

<table>
<thead>
<tr>
<th>Gu.</th>
<th>Sh.</th>
<th>Tw.</th>
<th>Ar.</th>
<th>Sc.</th>
<th>3-Gu.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>SN</td>
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<td></td>
</tr>
</tbody>
</table>

No/Moderate emphasis

Moderate/Much emphasis

Much emphasis

2.5-Q2 How clearly does the author state his affective objectives?
2.5-Q3 To what extent does the author attempt to have students take positive and committed stand on values?

2.6 Psychomotor Objectives

2.6-Q To what extent are psychomotor objectives present in the materials?

3.0 Content

Information. In this section the concern is with what content-related changes are intended in the knowledge, attitudes, and behavior of the student through the use of the materials being analyzed. As a result, this section is broken down into cognitive content and affective content. Cognitive content is concerned with examining the facts, concepts, generalizations, structure(s), and theory(ies) presented in the materials. Affective content is concerned
with examining the presence of values and attitudes in the materials, and the affective levels of commitment to which the materials aspire.

**Instruction.** After completing Section 3.0, write and insert here an abstract of the section in not more than 100 words.

Twelker--The heavy emphasis on chance might preclude the attainment of some cognitive outcomes. I see no emphasis on attitudes or values. They may be implicit, but I would have to play the game to tell.

3.1 **Cognitive Content**

3.1-Q1 How useful does the author view each of the following to be in explaining his discipline?

For analytical purposes, the analyst can refer to the following definitions:

A **fact** is a unique thing or event that exists in the world.

A **concept** is an idea generalized from particular facts.

The essence of a concept is its unity, its oneness. A useful concept should identify a cluster of properties that usually go together and that have a meaningful relationship to each other. The usefulness of a concept depends partly on its general acceptance, partly on its communicability--but most importantly on its relationship to a larger body of knowledge.

A **generalization** is a statement of a relationship between two or more concepts. Most useful generalizations are universally applicable and can be used for prediction purposes. Useful generalizations are desirable knowledge.
A structure is the arrangement and interrelationship of concepts within a whole. The concepts of a structure define the investigated subject matter of a discipline and function as a guide to inquiry.

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<tbody>
<tr>
<td>Theories</td>
<td>Gu.</td>
<td>Tw.</td>
<td>Ar.</td>
<td>Sh.</td>
<td>Sc.</td>
</tr>
</tbody>
</table>

Useless | Moderately useful | Extremely useful
SN | NA | UA | 2-Gu., Tw.; 3-Sc.; 4-Sh. | C

3.1-Q2 What discipline(s) is (are) emphasized in the materials?

Anthropology: Arnsdorf, Gunn, Shirts, Twelker
Economics: Arnsdorf, Gunn
Geography: Arnsdorf, Gunn
History: Arnsdorf, Twelker
Political Science: Arnsdorf, Twelker
Psychology: Arnsdorf, Schnell
Sociology: Arnsdorf, Schnell
Social Psychology: Arnsdorf, Schnell
Interdisciplinary: Arnsdorf, Schnell
Multidisciplinary: Arnsdorf, Schnell

SN | NA | UA | 2-Tw. | 4-Gu. | C
3.1-Q3 What other subject areas are emphasized?

Schnell--Population study and demography are the focus although all social sciences are (could be) emphasized.

3.1-Q4 Would you judge the overall cognitive content of the materials to be biased?

Shirts--Biased towards the notion that we must control population.

3.1-Q5 What is the substantive quality of the cognitive content?

3.1-Q6 How would you judge the overall affective content of the materials?
3.1-Q7 Do the materials emphasize the affective or cognitive content?

<table>
<thead>
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<th>Ar.</th>
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<tbody>
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<td>UA</td>
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</tr>
</tbody>
</table>

A great deal of affective content

3.1-Q8 To what extent is the author's view of his discipline consistent with the cognitive content in his curriculum materials?

<table>
<thead>
<tr>
<th></th>
<th>Tw.</th>
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<tbody>
<tr>
<td>Sh.</td>
<td>3-Gu.</td>
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<tr>
<td>Ar.</td>
<td>4-Tw.</td>
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<tr>
<td>Gu.</td>
<td>2-Sc.</td>
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<td></td>
<td>UA</td>
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<td></td>
<td>C</td>
</tr>
</tbody>
</table>

Totally inconsistent

Gunn--See comment on 1.1-Q2.

3.2 Affective Content

3.2-Q1 What is the author's view of the affective content of the discipline(s)?

<table>
<thead>
<tr>
<th></th>
<th>Tw.</th>
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</thead>
<tbody>
<tr>
<td>Sh.</td>
<td>1-Gu.</td>
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<tr>
<td>Ar.</td>
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<td>C</td>
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</tbody>
</table>

Gunn--This is difficult to assess. The information does not carry a rationale.

3.2-Q2 How are values and attitudes presented in the materials?

A value is assessed worth toward a thing, event, behavior, or phenomenon. To value something means it has met certain criteria you have posed.
An attitude is a simple generalized relationship of a person to a class of things or situations. A value is often considered to be more positive, more structured, and more likely to lead to action than attitudes. An attitude is indicated by statements such as "I feel that . . ." "I think that . . ." and "The way I see it is . . ." To value involves choosing, prizing, and acting upon something.

3.2-Q3 To what extent are the values and attitudes studied parallel to the present and future needs of the student?

3.2-Q4 To what extent is the author's view of the affective content of his discipline consistent with the affective content in his curricular materials?

4.0 Theory and Strategies

There is no comprehensive theory which covers all aspects of learning. Nor is there a comprehensive theory which covers all aspects of instruction or educational methodology.
When examining curriculum materials, we must do careful analysis and make sound judgements about theory and its application to the curriculum materials. In this section the concern is the adequacy with which components of theory can be described and explained, rather than the rightness or wrongness of a particular theoretical position.

Learning theorists are concerned about the emotional, intellectual, and behavioral development of the child: his personality, motivations, and the social conditions of learning. More specifically they are also concerned about reinforcement, transfer of learning, and retention. Instructional theory is closely tied to learning theory. It is both prescriptive and normative. It prescribes rules which convey the most effective way of achieving curricular objectives. For example, if a concept in mathematics is presented to a student in small steps combined with immediate feedback, it is likely he will better retain the concept. Instructional theory is normative in that criteria are established (on some basis) and the conditions are stated for meeting the criteria. In short, a theory of instruction is concerned with the improvement of, rather than a description of, learning.

A teaching strategy is a chosen pattern of action(s) aimed at reaching some goal. It includes the conceptualization of the desired interaction and outcomes; the selection of teacher role; the selection of materials and media; the
selection of the pattern of communication; and the selection of the physical arrangements.

**Instructions.** After completing Section 4.0, write and insert here an abstract of the section in not more than 100 words.

Twelker--The design or use of a simulation exercise such as this could draw heavily from Gestalt Theory, mediation theory, etc. Yet, the explicit theory used is far from clear (nor would it be expected to be clear). I still question the use of chance.

4.1 **Learning Theory**

4.1-Q1 What explicit statements does the author make in the materials or elsewhere which reflect his position toward a particular theory of learning?

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<thead>
<tr>
<th></th>
<th>Gu.</th>
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<tbody>
<tr>
<td>SN</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>4-Sc.</th>
</tr>
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<tbody>
<tr>
<td>Tw.</td>
<td>C</td>
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</tbody>
</table>


4.1-Q2 If there are no explicit statements made by the author, what implicit statements does the analyst find in the curriculum materials or in associated writings that reflect the author's position towards a particular theory of learning?

<table>
<thead>
<tr>
<th></th>
<th>3-Gu.</th>
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</thead>
<tbody>
<tr>
<td>SN</td>
<td>Tw.</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>4-Tw.</th>
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<td>C</td>
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</table>

Gunn--See comment on 2.2-Q1.

4.1-Q3 What is the author's view, as evidenced explicitly or implicitly in these materials, and what is the analyst's
view, of the importance of each of the following categories of learning theory?

The following brief description of learning theories may be useful in answering this question:

**Specifist theory** is concerned with the analysis of specific stimuli and specific human behaviors. A general assumption of this theoretical position is that complex behavior is a summation of specific behaviors. Other terms used for this theoretical position are respondent theory or stimulus-response theory. Major writers in the field are Edward L. Thorndike, Ivan Pavlov, John B. Watson, Edwon R. Guthrie, Clark Hull, and B. F. Skinner.

**Field theory** is concerned with analysis of mediating processes which occur in the organism between stimuli presentation and responses. Mediation in field theory is thought to take the form of internal organization patterns within the individual. These patterns govern the reception of stimuli, their translation into behavior, and resulting action. Another term sometimes used is Gestalt psychology. Major writers in the field are Wolfgang Kohler, Kurt Lewin, Edward C. Tolman, and Max Wertheimer.

**Personality theory** is concerned with the analysis of the individual's unique characteristics and unique behavior patterns. Personality theorists study both mental and physical properties of the individual and their inter-relationships as well as individual thought and behavior patterns. Major
writers in the field are Sigmund Freud, Henry A. Murray, Abraham Maslow, and Gordon Allport.

<table>
<thead>
<tr>
<th>Specifist Theory</th>
<th>Author</th>
<th>Sh.</th>
<th>Tw.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Theory</td>
<td>Author</td>
<td>Sh.</td>
<td>Tw.</td>
</tr>
<tr>
<td>Personality Theory</td>
<td>Author</td>
<td>Sh.</td>
<td>Tw.</td>
</tr>
</tbody>
</table>

Unimportant | Moderately important | Very important

Schnell—I believe both you (Mr. Connor) and I believe all of these theories are important.
Twelker—Can't tell author's viewpoints.

4.2 Instructional Theory

4.2-Q1 What explicit statements in the materials or elsewhere does the author make which reflect his position toward a particular theory of instruction?


4.2-Q2 If there are no explicit statements made by the author, what implicit statements does the analyst find in the curriculum materials or in associated writings that reflect the author's position toward a theory of instruction?

Gunn—See comment on 2.2-Q1
4.2-Q3 How well is the author's theory of instruction supported by evidence and/or logic?

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<td>Tw.</td>
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<tr>
<td>3-Sc.</td>
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</table>

Very poorly | Moderately | Very well

4.2-Q4 To what extent do you (the Analyst) agree with the author's theoretical position on instruction?

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<th>5</th>
<th>6</th>
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</thead>
<tbody>
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<td>SN</td>
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<td>UA</td>
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<td>Gu.</td>
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<tr>
<td>Tw.</td>
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<tr>
<td>4-Sc.</td>
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</tbody>
</table>

Not at all | Moderately | Completely agree

4.3 Teaching Modes

4.3-Q1 What are the principal teaching modes, as identified by the author, that are to be employed in teaching the materials?

Gunn--See objectives
Schnell--The teaching mode is quite clear--a simulation game.
Twelker--Small group decision-making.

4.3-Q2 What terms describing the modes are used by the author, e.g., inquiry, discovery, directed discussion?

Schnell--compute, evaluate, identify, explain, describe
Twelker--discussion, simulation

4.3-Q3 How carefully are the author's terms describing teaching modes defined?
### 4.4 Strategy Pattern

#### 4.4-Q1 What is the predominant pattern of strategy use?

<table>
<thead>
<tr>
<th>Object</th>
<th>Gu.</th>
<th>Sc.</th>
<th>Tw.</th>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gunn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schnell</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Twelker</td>
<td></td>
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</tbody>
</table>

Gunn--The pattern of the game is consistently traditional inquiry in the context of small groups and peer interactions.

Schnell--Simulation-game playing

Twelker--Student team decision-making with teacher leading debriefing, specific physical arrangements, selection media, etc.

#### 4.4-Q2 How clear is the author about the pattern?

<table>
<thead>
<tr>
<th>Object</th>
<th>Gu.</th>
<th>Sc.</th>
<th>Tw.</th>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
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</thead>
<tbody>
<tr>
<td>Very</td>
<td></td>
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</tr>
<tr>
<td>Moderately</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Very clear</td>
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</tbody>
</table>

#### 4.4-Q3 How consistent do you judge this strategy pattern to be with the objectives, content, and theory?

<table>
<thead>
<tr>
<th>Object</th>
<th>Gu.</th>
<th>Sc.</th>
<th>Tw.</th>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
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</thead>
<tbody>
<tr>
<td>Objectives:</td>
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<tr>
<td>Content:</td>
<td></td>
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<tr>
<td>Theory:</td>
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</tbody>
</table>

Very inconsistent | Somewhat consistent | Very consistent
4.5 Effectiveness

4.5-Q1 In general, how effective do you think these strategies will be in teaching the materials?

<table>
<thead>
<tr>
<th>Gu.</th>
<th>Tw.</th>
<th>Sc.</th>
<th>3-Gu.</th>
<th>4-Sc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Ineffec-</td>
<td>Somewhat</td>
<td>Very effective</td>
<td>effective</td>
<td>effective</td>
</tr>
</tbody>
</table>

4.5-Q2 Could you teach these materials? (Describe briefly.)

<table>
<thead>
<tr>
<th>Gu.</th>
<th>Ar.</th>
<th>Tw.</th>
<th>Sc.</th>
<th>3-Gu.</th>
<th>4-Sc.</th>
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<td>1</td>
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<td>3</td>
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<td>5</td>
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<tr>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Yes, with modifications</td>
<td></td>
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<td></td>
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</tbody>
</table>

Gunn--I would like to have more time for this game. I would expect to have to deal with asides. Since I am fairly familiar with this area, I would be able to develop additional elements.

5.0 Antecedent Conditions

Information. Antecedent conditions are the conditions which must exist, with respect to pupil, teacher, school, and community in order for the curriculum materials to be successfully implemented.

In this section, the analyst is trying to determine what prior skills and knowledge both the learner and the teacher must possess in order to succeed in achieving the objectives which are intended by use of the curriculum materials. The analyst should also indicate if any unique characteristics and conditions should exist within a school before the materials may be used. In instances where unusual conditions should exist in a community in order for
materials to be used with success, these conditions should also be discussed.

**Instruction.** After completing the rest of Section 5.0, write and insert here an abstract of the section in not more than 100 words.

Twelker—These materials seem structured enough to be quite robust.

### 5.1 Physical Characteristics

#### 5.1-Q1 At what grade level(s) should students be in order to have the most success with these materials?

<table>
<thead>
<tr>
<th>Junior-Senior High School</th>
<th>Arnsdorf</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>Schnell</td>
</tr>
<tr>
<td>11th grade</td>
<td>Twelker</td>
</tr>
<tr>
<td>9-10th grade</td>
<td>Shirts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SN</th>
<th>Gu.</th>
<th>NA</th>
<th>UA</th>
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<tbody>
<tr>
<td>1</td>
<td>Sh.</td>
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<td>Tw.</td>
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<tr>
<td>3</td>
<td>Sc.</td>
<td></td>
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</tbody>
</table>

#### 5.1-Q2 At what grade level(s) should students be in order to have moderate success with these materials?

<table>
<thead>
<tr>
<th>Middle School</th>
<th>Arnsdorf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junior High School</td>
<td>Schnell</td>
</tr>
<tr>
<td>12th Grade</td>
<td>Twelker</td>
</tr>
<tr>
<td>5,6,7,8th Grade</td>
<td>Shirts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SN</th>
<th>Gu.</th>
<th>NA</th>
<th>UA</th>
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<tbody>
<tr>
<td>1</td>
<td>Sh.</td>
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<tr>
<td>2</td>
<td>Tw.</td>
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<tr>
<td>3</td>
<td>Sc.</td>
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</tbody>
</table>

#### 5.1-Q3 These materials are suited for pupils of what academic status?

<table>
<thead>
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<tbody>
<tr>
<td>0</td>
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<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>SN</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>UA</td>
<td>C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Slow learner</th>
<th>Average</th>
<th>Gifted</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Sh.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Gu.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tw.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.1-Q4 Indicate with a check mark the success the various groups indicated below might have with the materials?

<table>
<thead>
<tr>
<th></th>
<th>No success</th>
<th>Some success</th>
<th>Good success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blacks</td>
<td>Arnsdorf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indians</td>
<td>Arnsdorf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jews</td>
<td>Arnsdorf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexicans</td>
<td>Arnsdorf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientals</td>
<td>Arnsdorf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whites</td>
<td>Arnsdorf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Arnsdorf</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2 Teacher Characteristics

5.2-Q1 What type of teacher, with respect to academic background, training, and experience will have success in teaching these materials?

<table>
<thead>
<tr>
<th>Tw.</th>
<th>3-Gu.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sn.</td>
<td>NA UA</td>
</tr>
<tr>
<td>Sc.</td>
<td></td>
</tr>
</tbody>
</table>

Gunn--A good background in subjects related to demography, plus an interest in academic study.
Schnell--A social studies teacher with a little arithmetic ability.

5.2-Q2 What type of teacher personality is best suited to teach these materials successfully?

<table>
<thead>
<tr>
<th>Tw.</th>
<th>Sh.</th>
<th>Ar.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sn.</td>
<td>NA UA</td>
<td>C</td>
</tr>
</tbody>
</table>

Strongly attached to flexible procedure

5.2-Q3 What cultural and socio-economic characteristics should a teacher possess in order to use these materials successfully?
5.2-Q4 At what intelligence level should the teacher be to successfully implement these materials?

<table>
<thead>
<tr>
<th>Shirts</th>
<th>Average or above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gu.</td>
<td>Tw.</td>
</tr>
<tr>
<td>SN</td>
<td>NA</td>
</tr>
<tr>
<td>UA</td>
<td>C</td>
</tr>
</tbody>
</table>

5.2-Q5 To what degree will the teacher have to be motivated to use these materials?

<table>
<thead>
<tr>
<th>Unmotivated</th>
<th>Moderately motivated</th>
<th>Highly motivated</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>SN</td>
<td>NA</td>
</tr>
<tr>
<td>UA</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

5.3 School

5.3-Q What school conditions are necessary for successful implementation and use of these materials?

<table>
<thead>
<tr>
<th>Schnell</th>
<th>No special conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gu.</td>
<td>Tw.</td>
</tr>
<tr>
<td>SN</td>
<td>NA</td>
</tr>
<tr>
<td>UA</td>
<td>C</td>
</tr>
</tbody>
</table>

5.4 Community Characteristics

5.4-Q1 What type of community is best suited for the successful teaching of these materials?

<table>
<thead>
<tr>
<th>Schnell</th>
<th>No special type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gu.</td>
<td>Sh.</td>
</tr>
<tr>
<td>SN</td>
<td>NA</td>
</tr>
<tr>
<td>UA</td>
<td>C</td>
</tr>
</tbody>
</table>
Shirts--Not likely to go over big with Catholic schools.

5.4-Q2 In what geographic areas will the materials be most successful?

\[
\begin{array}{cccc}
\text{Gu.} & \text{Sh.} & \text{Tw.} & 4-\text{Sc.} \\
\text{SN} & \text{NA} & \text{UA} & C \\
\end{array}
\]

Schnell--None--they have wide application.

5.4-Q3 What should the occupational-industrial makeup of the community be to successfully implement these materials?

\[
\begin{array}{cccc}
\text{Gu.} & \text{Sh.} & \text{Tw.} & 4-\text{Sc.} \\
\text{SN} & \text{NA} & \text{UA} & C \\
\end{array}
\]

Schnell--No special make-up

5.4-Q4 What should the social attitudes of a community be to successfully implement these materials?

\[
\begin{array}{cccccc}
\text{Ar.} & \text{Gu.} & \text{Sh.} & \text{Tw.} & 4-\text{Sh.} \\
0 & 1 & 2 & 3 & 4 & 5 & 6 & \text{SN} & \text{NA} & \text{UA} & C \\
\end{array}
\]

Very conservative to Very liberal road

5.5 Relationship to Other Aspects of Curriculum

5.5-Q How well do these materials relate to other materials being taught in the existing K-12 curriculum structure?

\[
\begin{array}{cccc}
\text{SN} & \text{NA} & \text{UA} & C \\
\end{array}
\]

6.0 Evaluation Information. In this section the purpose is to use the work of the analyst, along with data from other sources, to arrive at an overall evaluation about the curriculum
materials. Some evaluative questions have been asked in other sections. These, combined with other sources of information, will enable the analyst to arrive at the evaluation of the materials. This section is organized so that the analyst will be able to compare his predictions with reported information prior to making internal and external comparisons and recommending uses of the materials.

Instruction. After completing the rest of Section 6.0, write and insert here an abstract of the section in not more than 100 words.

Gunn—I have a very high view indeed of this simulation game. It avoids most of the weaknesses that are found in existing games, and it has a tight logic that links effectively the stated objectives with the game details. Unfortunately this very logic usually means that affective and attitudinal goals have to be curtailed because of the difficulty of justifying clearly the raison d'être for their inclusion. It often happens that the values of simulation games lie most strongly in the area of long-term attitudinal change. The use of varied media and open-endedness support such values. But you cannot evaluate in the short run, if at all, these values. For the situation in which the designer finds himself, this game is exemplary.

6.1 Sources of Evaluative Data

6.1-Q With respect to the analysis and use of the materials, what primary sources of evaluative data are available?

<table>
<thead>
<tr>
<th></th>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
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</thead>
</table>

6.2 Effects Predicted or Reported

6.2-Q1 In general, what effects of use of the materials would you (the analyst) predict?
Gunn—Essentially skills of an academic nature plus academic knowledge. Some attitudinal change would be secured because of the nature of the teaching mode—the game.

6.2-Q2 In general, what actual effects of use of the materials were reported by researchers, evaluators, observers, and/or students?

Twelker—I'll make the prediction that students will find the exercise tedious because of the math and may be confused by the chance factor.

6.3-Q3 To what degree do your predictions and the reported effects agree?

6.2-Q4 In general, how successful in use were the materials reported to be?

6.3 Comparisons

In general, how do these curriculum materials compare with respect to the following:
6.3-Q1 Author's intentions:

<table>
<thead>
<tr>
<th></th>
<th>Gu.</th>
<th>Sh.</th>
<th>Sc.</th>
<th>Ar.</th>
<th>Tw.</th>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inconsistent and inappropriate throughout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Twelker--Author's intentions not clear.

6.3-Q2 Other similar curriculum materials? List those materials use as comparison(s).

<table>
<thead>
<tr>
<th></th>
<th>Gu.</th>
<th>Sh.</th>
<th>Sc.</th>
<th>Ar.</th>
<th>Tw.</th>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doesn't compare favorably</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Schnell--High School Geography Project

6.3-Q3 Standards of analyst:

<table>
<thead>
<tr>
<th></th>
<th>Gu.</th>
<th>Tw.</th>
<th>Sh.</th>
<th>Ar.</th>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does not compare favorably favorably</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Twelker--The guide is quite incomplete, with respect to goals and rationale, objectives, statements, a description of how the exercise runs, references, etc.

6.4 Recommended Uses

Information. Responses in this section in general will be based on the analysis done in the previous five sections. In particular, it will be helpful to refer to sections 1.2
and 5.0, as well as sections 6.2 and 6.3 to answer the questions in this section.

6.4-Q1 In general, to what degree would you (the analyst) recommend that these materials be used, given the intended uses described in sections 1.2 and 5.0 above?

<table>
<thead>
<tr>
<th>Sc.</th>
<th>Sh.</th>
<th>Tw. Ar. Gu.</th>
<th>3-Sh.</th>
<th>4-Gu.</th>
<th>Sc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Not recommended</td>
<td>Recommended</td>
<td>Highly recommended</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with qualifications</td>
<td>recommended</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.4-Q2 To what degree do the sources, other than the analyst, described in 6.1 and 6.2 above, recommend use of the materials?

<table>
<thead>
<tr>
<th>Ar.</th>
<th>Gu.</th>
<th>Tw.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Not recommended</td>
<td>Recommended</td>
<td>Highly recommended</td>
</tr>
<tr>
<td>with qualifications</td>
<td>recommended</td>
<td></td>
</tr>
</tbody>
</table>

7.0 **Background of Materials Development**

The purpose of this section is to provide the reader of the Curriculum Materials Analysis with a brief synopsis of some of the historical background of the project which produced the materials. Some parts of this section will repeat some of the information in Section 1.6, "Background, Sources, and Availability of Materials."

7.1 **Institution and/or Person(s) Responsible for Materials**

7.1-Q1 What is the institution or agency responsible for development of the materials? Are there other common names
by which the institution or agency is known?

<table>
<thead>
<tr>
<th>SN</th>
<th>Sh.</th>
<th>Tw.</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
</tr>
</thead>
</table>

7.1-Q2 Check below the type of institution or agency.

- Federal-
- State-
- School district-
- University-
- Private not-for-profit-Schnell
- Commercial-
- Other (specify)-

<table>
<thead>
<tr>
<th>Ar.</th>
<th>Sh.</th>
<th>Tw.</th>
<th>4-Sh.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN</td>
<td>NA</td>
<td>UA</td>
<td>C</td>
</tr>
</tbody>
</table>

7.1-Q3 Who is (are) the person(s) most responsible for development of the materials?

<table>
<thead>
<tr>
<th>Tw.</th>
<th>NA</th>
<th>UA</th>
<th>4-Sc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN</td>
<td></td>
<td></td>
<td>C</td>
</tr>
</tbody>
</table>

Schnell, Shirts, Twelker--T. Dwight Connor

7.2 Duration and Funding of Project

7.2-Q1 What was the major source of funding of the project?

<table>
<thead>
<tr>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
</tr>
</thead>
</table>

7.2-Q2 Check below the type of agency that was the major source of funding.

- Federal-
- State-
- School district-
- University-
- Private not-for-profit-
- Commercial-
- Other (specify)-

<table>
<thead>
<tr>
<th>Ar.</th>
<th>NA</th>
<th>UA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.3 Dissemination
7.3-Q How much dissemination work—to teachers, school
districts, state department, colleges, the public, and others—
was (is) done by the project and/or publisher? (Publisher's
workshops should be included in the concept of dissemination,
but not their publicity activities.)

<table>
<thead>
<tr>
<th>Ar.</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Moderate</td>
<td>Great</td>
<td>SN</td>
<td>NA</td>
<td>UA</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>amount</td>
<td>amount</td>
<td>amount</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.4 Associated Programs

7.4-Q Describe briefly other materials development pro-
jects or programs in which the principal personnel of the
project are, or have been, involved. What is the nature of
this involvement (principal author, consultant, etc.)?

<table>
<thead>
<tr>
<th>SN</th>
<th>NA</th>
<th>UA</th>
<th>C</th>
</tr>
</thead>
</table>

8.0 Background of the Analysis

The purpose of this section is to give information about
the background of the analyst(s), the circumstances under
which the analysis was done, the reasons for analyzing
these particular materials, and the references used by the
analyst(s) in performing the analysis.

8.1 Characteristics of the Analyst(s)

In this section, references will be made to the analyst,
in the singular. However, if there are two or more analysts,
information in Section 8.1 should be given for each of them
individually. Throughout the rest of the analysis, if there
are two or more analysts working together, it is assumed
that they give a single answer to each question, representing a consensus.

8.1-Q1 What is the analyst's educational affiliation?

Elementary-
Junior high-
Senior high-
School district-
College/university-Arnsdorf
State department-
Other (specify)-

8.1-Q2 What is the analyst's professional affiliation?

Education- Arnsdorf
Social Science- Arnsdorf, Shirts
Other academic discipline(specify)-
Other (specify)-

8.1-Q3 What is the analyst's highest academic degree?

BA or BS-
MA or MS-
PhD or EdD-Arnsdorf, Shirts
Other (specify)

8.1-Q4 How many curriculum materials analyses has the analyst done prior to this one, using this system or a similar system?

None-
One-
Two-
Three-
Four-
Five or more-Arnsdorf, Shirts

8.2 Circumstances of this Analysis

8.2-Q1 Approximately how many man-hours were spent doing this analysis?

\[
\begin{array}{ccc}
\text{SN} & \text{NA} & \text{UA} \\
4-\text{Sh.} & \text{C} \\
\end{array}
\]

Arnsdorf, Shirts--3 hours
8.2-Q2 Describe the circumstances under which this analysis was undertaken:

- In a workshop-
- In another type of inservice program-
- In a class-
- As part of the duties of an employee-
- Other (specify)-Professional Interest--Arnsdorf

8.3 Selection of Materials

8.3-Q Was there any reason why the analyst chose these particular materials to analyze, such as previous familiarity with them or plans to teach them in the future? If so, describe the reason briefly.

Arnsdorf--At request of author

8.4 References

In Section 1.6, references are given which should help the reader of the analysis learn more about the materials. In Section 7.02, references are given which contain additional information about the project which produced the materials. In this section, the analyst should note references that he found particularly helpful in understanding and applying the analysis system.

8.4-Q If the analyst used any references which helped him understand and apply the analysis system to these materials, indicate those--two or three at the most--which were most helpful.
8.5 Attitudes and Opinions of the Analyst

These questions are to be answered by the analyst after he has completed the entire analysis.

8.5-Q1 How adequately does the analyst think his analysis represents the materials analyzed?

<table>
<thead>
<tr>
<th>Ar.</th>
<th>Sh.</th>
<th>Gu.</th>
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<tbody>
<tr>
<td>0</td>
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<td>NA</td>
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<tr>
<td>UA</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

Very inadequately, Moderately adequate, Very adequately

8.5-Q2 How does the analyst feel about the system used to make this analysis (the CMAS)?

<table>
<thead>
<tr>
<th>Sh.</th>
<th>Gu.</th>
<th>Ar.</th>
</tr>
</thead>
<tbody>
<tr>
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<td>5</td>
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<tr>
<td>6</td>
<td>SN</td>
<td>NA</td>
</tr>
<tr>
<td>UA</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

Very negative, Ambivalent, Very positive

Gunn--This analysis system is too heavily biased towards the social sciences as sources of objectives. It almost suggests that no other sources exist.
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124


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