Geographic Place Location Knowledge: An Empirical Investigation into the Performance of University Undergraduate Students as a Result of Cognitive Theory Based Instruction

Sharafat Khan

Western Michigan University

Follow this and additional works at: http://scholarworks.wmich.edu/dissertations

Part of the Higher Education Commons

Recommended Citation

Khan, Sharafat, "Geographic Place Location Knowledge: An Empirical Investigation into the Performance of University Undergraduate Students as a Result of Cognitive Theory Based Instruction" (1984). Dissertations. 2363.
http://scholarworks.wmich.edu/dissertations/2363

This Dissertation-Open Access is brought to you for free and open access by the Graduate College at ScholarWorks at WMU. It has been accepted for inclusion in Dissertations by an authorized administrator of ScholarWorks at WMU. For more information, please contact maira.bundza@wmich.edu.
GEOGRAPHIC PLACE LOCATION KNOWLEDGE: AN EMPIRICAL INVESTIGATION INTO THE PERFORMANCE OF UNIVERSITY UNDERGRADUATE STUDENTS AS A RESULT OF COGNITIVE THEORY BASED INSTRUCTION

by

Sharafat Khan

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor of Education
Department of Educational Leadership

Western Michigan University
Kalamazoo, Michigan
April 1984
The major purpose of the study was to determine the effects of cognitive based Atlas Exercises and cognate materials (films, data sheets, readings from a geography book, regional examinations and map tests, book reviews, transparencies, a map module, wall maps, and slides) on the geographic place location knowledge of undergraduate university and/or college students. The research sample (n = 371) consisted of students enrolled in introductory geography courses located in three institutions of higher education in Michigan. Three researcher designed survey instruments were utilized for data collection: Background Data Questionnaire, Map Location Test I, and Map Location Test II. These instruments were utilized in a Pretest-Posttest Control Group Design.

All subjects were placed into one of three experimental groups. Each group was given varying degrees of cognitive based or no specially prepared cognitive based instruction. A One-Way Analysis of Variance was applied to test the hypothesized relationships between the independent and dependent variables. Differences in mean test scores were observed in geographic place location knowledge among the three groups.
It was concluded that cognitive theory based exercises and cognate instructional materials do, in fact, enhance geographic place location knowledge of undergraduate university and/or college students. The implications for educational practice and recommendations for future research are offered.
INFORMATION TO USERS

This reproduction was made from a copy of a document sent to us for microfilming. While the most advanced technology has been used to photograph and reproduce this document, the quality of the reproduction is heavily dependent upon the quality of the material submitted.

The following explanation of techniques is provided to help clarify markings or notations which may appear on this reproduction.

1. The sign or “target” for pages apparently lacking from the document photographed is “Missing Page(s)”. If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting through an image and duplicating adjacent pages to assure complete continuity.

2. When an image on the film is obliterated with a round black mark, it is an indication of either blurred copy because of movement during exposure, duplicate copy, or copyrighted materials that should not have been filmed. For blurred pages, a good image of the page can be found in the adjacent frame. If copyrighted materials were deleted, a target note will appear listing the pages in the adjacent frame.

3. When a map, drawing or chart, etc., is part of the material being photographed, a definite method of “sectioning” the material has been followed. It is customary to begin filming at the upper left hand corner of a large sheet and to continue from left to right in equal sections with small overlaps. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.

4. For illustrations that cannot be satisfactorily reproduced by xerographic means, photographic prints can be purchased at additional cost and inserted into your xerographic copy. These prints are available upon request from the Dissertations Customer Services Department.

5. Some pages in any document may have indistinct print. In all cases the best available copy has been filmed.
Khan, Sharafat

GEOGRAPHIC PLACE LOCATION KNOWLEDGE: AN EMPIRICAL INVESTIGATION INTO THE PERFORMANCE OF UNIVERSITY UNDERGRADUATE STUDENTS AS A RESULT OF COGNITIVE THEORY BASED INSTRUCTION

Western Michigan University

Copyright 1984 by Khan, Sharafat

All Rights Reserved
PLEASE NOTE:

In all cases this material has been filmed in the best possible way from the available copy. Problems encountered with this document have been identified here with a check mark √.

1. Glossy photographs or pages ______
2. Colored illustrations, paper or print _____
3. Photographs with dark background ___
4. Illustrations are poor copy  √
5. Pages with black marks, not original copy _____
6. Print shows through as there is text on both sides of page ______
7. Indistinct, broken or small print on several pages  √
8. Print exceeds margin requirements ______
9. Tightly bound copy with print lost in spine ______
10. Computer printout pages with indistinct print ______
11. Page(s) __________ lacking when material received, and not available from school or author.
12. Page(s) __________ seem to be missing in numbering only as text follows.
13. Two pages numbered ___________. Text follows.
14. Curling and wrinkled pages ______
15. Other ________________________________________________________________
Dedication

to

Joseph P. Stoltman, my mentor, colleague, and a scholar

to

Mary, Armand, and the Gebhard family of Stevensville, Michigan,

for their affection, understanding, support, and friendship
ACKNOWLEDGMENTS

No study of this nature can be undertaken nor successfully completed without the help and advice of others. Thus, I wish to extend my deepest and sincere appreciation to a number of individuals who have played a key role in my accomplishments.

I wish to thank Dr. Lawrence Schlack, my committee chairperson, for his help and advice. Thanks are due to Drs. Uldis Smidchens and Joseph Stoltman, my committee members, for providing effective leadership and giving me their time whenever I was in need. Working with these individuals has been challenging and rewarding.

Additionally, I would like to thank Dr. Donald C. Weaver for teaching me both the theory and practice of leadership. It was indeed a pleasure working under his direction as a Mott Fellow.

To Dr. Michael Libbee, Central Michigan University, and Mr. Gordon Lindland, Ferris State College, for their help in administering my materials.

I also wish to thank Drs. George Vuicich and William Grimshaw for their help and friendship. They were always available at time of need.

To Mrs. Lee Pakko for typing my manuscript which was not always in the clearest form.

To Mary and Armand for their constant support and affection.

To all of the mentioned persons, I am greatly indebted.

Sharafat Khan

ii
# TABLE OF CONTENTS

**ACKNOWLEDGMENTS** ........................................... ii

**LIST OF TABLES** ............................................. vi

**LIST OF FIGURES** ........................................... vii

**CHAPTER**

I. BACKGROUND AND STATEMENT OF THE PROBLEM ............... 1

   Background of the Problem .......................... 1

   Statement of the Problem .......................... 5

   Definition of Terminology .......................... 6

   Limitations of the Study .......................... 9

   Need and Significance of the Study ................. 9

   Organization of the Study .......................... 10

II. REVIEW OF SELECTED LITERATURE AND RATIONALE FOR
    HYPOTHESES ............................................... 12

   The Cognitive Theory Paradigm: A Review ............ 13

      Concepts and Conceptualization of Phenomena ..... 21

      Structure ....................................... 28

   Cognitive Theory: Comparisons and Contrasts ........ 33

   Cognitive Theory: Geographical Applications ........ 36

   Geographical Teaching and Learning .................. 40

   Geography in Popular Literature and Nonprinted
   Media ............................................. 45

   Place Location Knowledge of Undergraduate
   Students .......................................... 48

   Maps and Map Study .................................. 54

   Instructional Materials ............................. 56
Table of Contents—Continued

CHAPTER

Wall Maps ................................... 56
Globes ....................................... 57
Films ....................................... 57
Slides ....................................... 58
Overhead Projectors and Transparencies ......... 59
Rationale and Hypotheses ....................... 60
Summary ......................................... 63

III. RESEARCH DESIGN AND METHODOLOGY ................... 65
The Research Sample ............................. 65
Steps in the Development of the Instructional
Material Unit ................................... 65
Description of Instructional Material Unit .... 74
Instrumentation .................................. 77
Validity ......................................... 78
Reliability ..................................... 78
Internal and External Validity ................. 79
Design and Procedure ........................... 81
Procedure .................................... 82
Data Analysis ................................... 85
Summary ......................................... 87

IV. RESULTS AND DISCUSSION ............................. 89
Research Results ................................ 89
Hypothesis 1 .................................... 89
Hypothesis 2 .................................... 94
Hypothesis 3 .................................... 96

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis 4</td>
<td>98</td>
</tr>
<tr>
<td>Discussion of the Results</td>
<td>98</td>
</tr>
<tr>
<td>Summary</td>
<td>103</td>
</tr>
<tr>
<td>V. SUMMARY, CONCLUSIONS, EDUCATIONAL IMPLICATIONS,</td>
<td></td>
</tr>
<tr>
<td>AND RECOMMENDATIONS FOR FUTURE RESEARCH</td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td>105</td>
</tr>
<tr>
<td>Summary of the Results</td>
<td>109</td>
</tr>
<tr>
<td>Limitations of the Study</td>
<td>111</td>
</tr>
<tr>
<td>Conclusions</td>
<td>112</td>
</tr>
<tr>
<td>Implications for Educational Practice</td>
<td>112</td>
</tr>
<tr>
<td>Recommendations for Future Research</td>
<td>113</td>
</tr>
<tr>
<td>APPENDICES</td>
<td></td>
</tr>
<tr>
<td>A. Map Location Test I</td>
<td>116</td>
</tr>
<tr>
<td>B. Map Location Test II</td>
<td>120</td>
</tr>
<tr>
<td>C. Communication on Geographic Place Location Knowledge to Roger Mudd</td>
<td>124</td>
</tr>
<tr>
<td>D. World Regional Geography Syllabus</td>
<td>126</td>
</tr>
<tr>
<td>E. Atlas Exercises</td>
<td>137</td>
</tr>
<tr>
<td>F. Sample Data Sheet</td>
<td>168</td>
</tr>
<tr>
<td>G. Study Questions Sample</td>
<td>172</td>
</tr>
<tr>
<td>H. Examination Sample</td>
<td>174</td>
</tr>
<tr>
<td>I. Background Data Questionnaire</td>
<td>181</td>
</tr>
<tr>
<td>J. Communications with Study Participants</td>
<td>185</td>
</tr>
<tr>
<td>K. Background Data Questionnaire Coding System</td>
<td>194</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>199</td>
</tr>
<tr>
<td>Table Number</td>
<td>Table Title</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Atlas Exercises: Internal Consistency Coefficients</td>
</tr>
<tr>
<td>2</td>
<td>Cognitive Domain: Descriptor Terms</td>
</tr>
<tr>
<td>3</td>
<td>Atlas Exercises: Concept Components</td>
</tr>
<tr>
<td>4</td>
<td>Atlas Exercises: Skill Components</td>
</tr>
<tr>
<td>5</td>
<td>Pretest-Posttest Research Design</td>
</tr>
<tr>
<td>6</td>
<td>One-Way Analysis of Variance for Comparison of the MLT I Scores Between ...</td>
</tr>
<tr>
<td>7</td>
<td>One-Way Analysis of Variance for Comparison of the MLT I Scores Between ...</td>
</tr>
<tr>
<td>8</td>
<td>One-Way Analysis of Variance for Comparison of the MLT I Scores Between ...</td>
</tr>
<tr>
<td>9</td>
<td>One-Way Analysis of Variance for Comparison of the MLT I Scores Between ...</td>
</tr>
<tr>
<td>10</td>
<td>One-Way Analysis of Variance for Comparison of the MLT I Scores Between ...</td>
</tr>
<tr>
<td>11</td>
<td>One-Way Analysis of Variance for Posttest MLT II Scores Between ...</td>
</tr>
<tr>
<td>12</td>
<td>One-Way Analysis of Variance for Posttest MLT II Scores Between ...</td>
</tr>
<tr>
<td>13</td>
<td>One-Way Analysis of Variance for Posttest MLT II Scores Between ...</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

1. Taxonomy of Educational Objectives: Cognitive Domain 15
2. Bruner's Taxonomy of Cognitive Development 19
4. Ausubel and Robinson's Taxonomy of Cognitive Development 34
5. A Process/Knowledge Matrix 38
CHAPTER I

BACKGROUND AND STATEMENT OF THE PROBLEM

Background of the Problem

Many learning theories have been identified and utilized in the process of teaching different disciplines. None has received wider recognition, however, than cognitive theory. According to the premises underlying cognitive theory, learning involves many diverse but interrelated steps ranging from simple to complex. As a result, any cognitive based learning task must be structured and sequenced in a hierarchal manner in order for learner retention of subject matter to occur effectively.

This study has used geography as the substantive content for testing the effectiveness of specifically constructed learning instructional materials designed to enhance the place location cognition of undergraduate university and/or college students. The cognitive basis for the instructional materials has a wider applicability to other subjects as well. Many educators and geographers (e.g., Hills, 1970, p. 308; Richburg & Vuicich, 1970, p. 88; Schomburg & Sheridan, 1970, pp. 29-30) believe that cognitive instruction requires the student to develop essential skills for examining relationships between and/or among phenomena. The intuitive and realistic appeal of cognitive based instruction is applicable to designing materials that might facilitate the student's place location cognition. Hence, cognitive based instructional
materials might prove beneficial for enhancing the learning of geographical place location knowledge.

What is place location knowledge? It is concrete information that students possess that has to do with the locations of both physical and cultural phenomena on the earth's surface. The concept of place locations can be traced back to ancient times. For example, Strabo, the Greek geographer, was keenly cognizant of geographic place locations. He identified, described, compared, and contrasted different regions of the world (Getis, Getis, & Fellmann, 1981). Warntz (1964) has suggested that during the 17th and 18th centuries, there was much concern and demand from the "lay public" that colleges must be receptive to the needs of the students and thus should provide "knowledge of where places are in the world" by assessing the similarities and differences of one place from another. Similar arguments were being heard during the 1950s.

In his survey of 298 American colleges and universities, Fine (1951) determined that fewer than 5% of the college students were taking at least one course in geography. Fine noted that although the United States is in a position of "global leadership," the nation's colleges and universities "virtually ignore the teaching of geography" (p. 165). Similarly, educators in the 1960s were also concerned with place location teaching and learning.

Ediger (1969) followed a similar theme and stressed the "location of important cities, countries, continents, oceans, rivers, and other geographical features" (p. 161). The same general concerns continued into the 1970s. James (1971) noted that it is only the
geographer who addresses the questions concerned with the "signifi-
cance of location."

Knowledge about place locations continues to be a major concern
today, and this has been expressed in several recent publications. The Educational Testing Service (ETS), for example, conducted a study throughout the United States that demonstrated poor place location knowledge of 4th, 8th, and 12th graders (Pike & Barrows, 1979). The study revealed that American students were not able to correctly locate the major nations of the world on an outline map. Despite the fact that a majority of the people in the Western Hemisphere have ready access to a variety of mass media (e.g., radio, television, newspapers, and popular journals, such as the National Geographic), their knowledge of the world's place locations is lacking (CGIS, 1982).

Knowledge about the locations of the nations of the world is crucial to developing an understanding of current international affairs, geopolitics, and economic interdependencies. Morris (1981) elaborates further by stating that:

Never before in the history of the United States have its citizens needed to know more about the world in which they live. Today we have armed forces stationed in Europe, Asia, and Africa as well as many Pacific Islands. We spend billions of dollars each year as aid to help people in underdeveloped countries that most Americans have never heard of and know nothing about. (p. 4)

Morris's observations are also supported by other geographical researchers. Wise (1975), for example, noted that college students' inability to locate places was particularly apparent when they were asked to consider countries and cities in Asia, Africa, Latin
America, and the Middle East. This might have been due to students' conception that all nations are not interdependent (Morris, 1981).

From yet a different perspective, Elson (1982), writing in the *Detroit Free Press*, explained that a teacher in Chicago begins his first-of-the-year daily geography lesson with a simple exercise:

"He pulls down a map of the world and randomly selects a student to come forward and point to the United States on the map. Never in 10 years has the first student pointed to the correct land mass. Nor has the second student" (p. 1B). Elson further notes that in a recent place location survey, almost one-third of the respondents thought that El Salvador was in Africa (p. 3B).

In light of the foregoing considerations, one might ask "why is it necessary to be cognizant of other nations and peoples?"

Saunders, Phillips, and Johnson (1966), in their book entitled *A Theory of Educational Leadership*, provided a provocative rationale for being aware of other countries, peoples, and their affect upon the United States. The authors stated that:

The traveling time between the two uttermost points on the globe has been reduced from months, at the turn of the century, to a few hours today. Improved communication brings the average American home in contact with the uttermost point on the earth in a matter of seconds. These factors are significant, not only because people of one nation can now gain a great deal of knowledge about people of other nations, but also because increased knowledge can lead to a greater concern for other people and manifest itself in the form of an informed public opinion and understanding. (p. 126)

Despite the generally agreed upon importance of the knowledge of place locations, there have been four areas where more attention should be devoted. First, there have been too few experimental
studies designed to ascertain whether students can improve their relatively poor place location knowledge (Khan, 1982). Second, the literature has not explicitly identified the concepts, instructional materials, and strategies that could be used to successfully teach place locations in an integrated manner. Third, research carried out thus far reported limited data with regard to student background in geography (Manson, 1977). Fourth, the conclusions drawn with respect to student knowledge about place locations in the past had been built upon pretreatment measures. It was concluded that the question of place name knowledge had to be reviewed and researched in order to develop comprehensive understanding of the variables and factors relating to cognition.

Statement of the Problem

The major purpose of this study was to investigate the question: What effects do cognitive theory designed instructional materials have on the level of geographical place location knowledge of university and/or college students? In order to address that question, a treatment was administered and students were tested to determine their level of geographical knowledge. Included were experimental groups of students treated with a full range of specifically designed instruction, a partial range of specifically designed instruction, and no specific researcher-designed instruction. In order to accomplish the preceding objectives, there were two tasks which needed to be completed. First, an instrument was constructed which helped evaluate students' ability to locate
countries and capital cities on an outline map of the world. Supporting information was collected regarding the academic background of the subjects selected for the study, the extent to which they owned atlases and globes, the extent to which they read popular magazines and newspapers, the extent to which they watched world news, the extent to which they traveled within the United States and foreign nations, and the degree to which they were familiar with map symbols. The second task was to design instructional materials for use by students which focused on geographical facts, concepts, generalizations, and principles based on cognitive theories postulated by Bloom, Englehart, Furst, Hill, and Krathwohl (1956); Bruner, Olver, & Greenfield (1966); and Ausubel (1968). These theories were chosen and integrated into the treatment unit since they possess many similarities—they are all hierarchal in nature and direction. Simply, the basic premise these authors presented—in relation to knowledge—ranged from simple to complex.

Definition of Terminology

For the purpose of this study, the ensuing definitions were formulated:

**Instructional material unit** refers to the text which was written by the investigator entitled *Atlas Exercises* and contained a variety of learning activities utilized to enhance the place location knowledge of the subjects. There were three levels of the instructional materials for the experiment. First, the experimental treatment materials were utilized in their entirety with the
experimental group. Second, the comparison treatment group was administered only the supplementary materials. And third, the comparison group did not receive any of the instructional materials except the regular instruction given by the instructor.

**Atlas exercises** refers to the treatment unit written by the researcher. It is structured around cognitive theory principles and consists of questions ranging from simple to complex. The *Goode's World Atlas* (Espenshade & Morrison, 1982) was used to construct the questions.

**Experimental treatment group** refers to the subjects who were taught with the full range of the instructional and supplementary instructional materials. This experimentation was carried out in the Department of Geography, Western Michigan University, Kalamazoo, Michigan.

**Comparison treatment group** refers to those subjects who were taught with a partial range of the instructional materials—films, data sheets, readings from *Geography: Regions and Concepts* (de Blij, 1981), wall maps, slides, transparencies, a map module, regional map tests, book review exercises, and examinations. The subjects for this type of treatment were selected from the Department of Geography, Ferris State College, Big Rapids, Michigan.

**Comparison group** refers to those subjects who did not receive any type of cognitive designed treatment except the regular instruction given by the course instructor. This group of subjects were identified from specific classes in the Department of Geography, Central Michigan University, Mount Pleasant, Michigan.
Supplementary instructional materials refer to additional materials that were constructed and/or identified for the purpose of teaching place locations. These materials were integrated with the "Instructional Material Unit." The supplementary instructional materials included book review exercises, films, slides, wall maps, a map module, transparencies, globes, data sheets, regional map location tests and examinations, and selected readings from de Blij's (1981) Geography: Regions and Concepts book.

Map Location Test I (MLT I) refers to the pretest instrument which consisted of 30 countries and five capital cities. This instrument was used to measure the level of achievement of subject's place location knowledge prior to treatment (Appendix A).

Map Location Test II (MLT II) refers to the posttest instrument which consisted of 60 countries and 10 capital cities. This instrument was utilized to measure the knowledge of subjects in both the experimental treatment and comparison groups following treatment (Appendix B).

Since the study employed three intact groups and utilized a pre- posttest design, it became necessary to construct MLT II so that it was slightly different. This was done because, according to Kerlinger (1973), subjects become "sensitized" following the administration of the pretest instrument (MLT I) and that if the same test is administered again the researcher cannot be sure to what extent the pretest affected the changes in the subject's place location knowledge scores.
Pretreatment scores refer to the subjects' scores on the pre-treatment administration of the Map Location Test I.

Posttreatment scores refer to the subjects' scores on the post-treatment administration of the Map Location Test II.

Theory: A theory is defined as a "set of interrelated constructs (concepts), definitions, and propositions that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting phenomena" (Kerlinger, 1973, p. 9).

Limitations of the Study

The study was confined to two state universities and one state college in Michigan. Consequently, generalizations drawn from this study should be restricted to similar populations. Other limitations are identified and discussed in the last chapter.

Need and Significance of the Study

As noted earlier, few experimental studies on the place location knowledge of university and/or college students have been designed on cognitive theory principles. Likewise, the researcher could not locate instructional materials that could be utilized in teaching place locations. Manson (1977) noted that:

We lack data about students, curriculum, and teaching practices. We do not know which innovative courses, which experimental teaching methods, and which of the newer introductory textbooks are in use, not to mention which have proven effective. Beyond such rudiments lies the paucity of concepts, models, and theories necessary
Manson also stressed that this situation required immediate solutions. It was concluded, therefore, that a need existed to study and employ experimentation to determine whether students improve their place location knowledge. In addition, this study is significant in that the findings, with respect to instructional methodology and the materials developed, should aid other geographers at the secondary and postsecondary levels to adopt a program of instruction to facilitate learning place locations effectively. Similarly, the paradigm and the general methodology applied in this study can also be utilized in science education. Furthermore, it is anticipated that the results will contribute to the general body of knowledge on how students familiarize themselves with nations and capital cities of the world.

Organization of the Study

An introduction to the study, a statement of the problem, definitions of terminology, limitations of the study, and the significance of the study were stated in Chapter I.

Chapter II presents the literature review, the rationale, and the hypotheses for the study.

Chapter III contains the methods and procedures used to conduct the study. The discussion focuses on the subjects chosen for the study, the types of instruments used for data collection, the research design used in this study, and the procedures utilized in
data collection.

Chapter IV focuses on the analysis of data and the testing of the research hypotheses.

Chapter V contains appropriate conclusions, recommendations, and implications of the study in relation to the results obtained.
CHAPTER II

REVIEW OF SELECTED LITERATURE AND RATIONALE FOR HYPOTHESES

The major purpose of this study was to investigate the effects of cognitive based instructional materials on the level of geographical place location knowledge of university and/or college students. As a result, this chapter will expand the theoretical framework for the study as outlined in the previous chapter and review the literature pertinent to the topic. Discussion will focus on several dimensions. First, cognitive theory will be reviewed, comparisons and contrasts will be made, and applications to geographical education described. Second, geographical teaching and learning will be assessed from kindergarten through 12th grade. Third, geography as it is perceived and presented in popular literature and nonprinted media will be examined. Fourth, place location knowledge of undergraduate students and its implications will be discussed. Fifth, a general discussion on map, mapping, and map reading will be presented. Sixth, instructional materials that are most often employed in teaching geographical concepts and principles will be reviewed. Finally, rationale and hypotheses pertinent to the study will be presented.
Different theories and models of learning and instruction have been developed and articulated by different educators and philosophers (Sergiovanni & Starratt, 1979). Examination of any standard textbook on educational psychology will illustrate the foregoing statement. Although many learning theories have been presented in the literature (see, e.g., Bruner, 1966), most can be placed into one of three categories, namely: association theories, cognitive theories, and conditioning theories (Leith, 1979, p. 149). This review will focus on cognitive theories only.

Cognition refers to the idea of knowledge and recognition; to be cognizant is to be aware of something, e.g., location of a particular country, city, or a town. In short, cognition means to know or possess knowledge. It is possible to identify and present cognitive processes and how they are related to and interrelated with one another. Bloom et al. (1956, p. 18) identified specific cognitive processes that focus upon abstract and concrete instructional development and objectives. They developed a taxonomy of cognitive processes under six distinct, yet systemic categories. The taxonomy is arranged in a hierarchal order to demonstrate that cognitive development increases by successive additions of new knowledge, and that each class is systemic in nature and direction. Systemic, as used in this study, means that each intellectual process, beginning from the comprehension level, is dependent upon the previous category for the acquisition of instructional objectives. The taxonomy,
nevertheless, encompasses knowledge, comprehension, application, analysis, synthesis, and evaluation (see Figure 1). The taxonomy was critical to the study since it formed the basis for the design of Atlas Exercises.

The lowest cognitive process, knowledge, focuses upon those elements that require the student to recognize and recall simple facts, terms, principles, generalizations, and theories in different life situations. The information in this class is further subdivided, in a hierarchal fashion, into specifics that emphasize learning subject terminology, trends, sequences, classification, criteria, structure, and methodology. Like the overall hierarchal nature of the taxonomy, the knowledge dimension is arranged from the concrete to abstract. Bloom et al.'s inclusion of knowledge in the overall scheme was justified by citing the skills in problem solving that can only be refined and sharpened through the use of the individual's existing knowledge base. Further, Bloom et al. maintained that as individuals acquire more knowledge, they become increasingly aware of their immediate surroundings. Examples of knowledge level questions, however, might include asking students to list several natural hazards that are prevalent in Southeast Asia, and to provide a detailed description of at least one of the natural hazards. In addition, students could be asked to identify and locate a particular geographical phenomenon on the earth's surface.

The lowest level of understanding is called comprehension and constitutes the second category in the taxonomy. It encompasses
FIGURE 1

TAXONOMY OF EDUCATIONAL OBJECTIVES:
COGNITIVE DOMAIN
those elements that represent the understanding of some phenomenon communicated in a clear language. There are three levels of comprehension: translation, interpretation, and extrapolation. Translation takes place when the student changes the communicated materials into another form of language, message, or term. The ability to recognize interrelationships of the integral parts of a communication and the relevance of these components to generalizations that are described in the original written passage is the process of interpretation. And finally, extrapolation is the means whereby the inferences are made by an individual upon the tendencies, conditions, and trends suggested by the communication. An example question in geography class might be to ask students to carefully study the maps that show vegetation, annual rainfall, and mineral resources for a particular nation and determine whether there is a relationship between these elements and population distribution.

The third class in the taxonomy is application. This deals with remembering abstract information for use in concrete situations. The concept of abstraction, nonetheless, can take on a number of formalized ideas, rules of procedures, and generalized methods. Furthermore, the abstractions might include technical statements, ideas, and higher order cognitive learning that must be remembered for application in different situations. For example, students might be asked to compute the distance, from a map, between Sydney and Brisbane, Australia, to apply the method of using scale.

Analysis is the fourth cognitive process in the taxonomy. This term literally means the breakdown of the instructional concepts,
generalizations, principles, and theories into a variety of formalized classes: analysis of element, analysis of relationships, and analysis of organizational principles. In this category students might be asked to identify and analyze the major industrial regions of a particular nation in terms of site and situation.

Synthesis is the fifth category in the taxonomy and involves the placement of selected parts of a phenomenon into a whole for the purposes of obtaining a new concrete relationship. Inherent in this class are three additional subcategories: production of a unique communication, production of an organized plan and sets of operations, and construction of statements of an abstract nature expressing relationships between and/or among the elements. The student might, for example, be instructed to observe changes depicted on a map in the vegetation and asked to relate this to precipitation as one travels from west to east across China.

Evaluation is the final cognitive process and is the act of judging the adequacy of the materials and methods developed for a specific learning outcome. A criterion is used to examine and judge the internal and external consistency and accuracy of the phenomenon under observation. From yet a different perspective, evaluation can be considered as the process of examining and judging both the short- and long-range value, worth, quality, and distinctiveness of the instructional materials, and the procedures employed in reaching a specific goal. In designing evaluative questions, the students might be instructed to compare and contrast the precipitation and temperature regimes for Thailand and Vietnam.
In order to design and/or construct learning materials, one needs to look at the entire nature of systemic cognitive processes consisting of knowledge, comprehension, application, analysis, synthesis, and evaluation for the accomplishment of preferred outcomes. Bloom et al. (1956) illustrate the mentioned dimensions by suggesting:

If it [the taxonomy] is to be useful for teachers and testers, it should provide a basis for suggestions as to methods for developing curricula, instructional techniques, and testing techniques. As a highly organized and presumably comprehensive plan for classifying educational behaviors, it should form the basis for easily determining the availability of relevant evaluation instruments, techniques, and method so that each worker [researcher] can determine their appropriateness for his [or her] work. (p. 21)

Bruner et al. (1966) also identified and developed six sequential and hierarchal cognitive processes. These are characterized by Bruner et al. as: perceiving, remembering, recognizing, conceiving, judging, and reasoning (see Figure 2). However, a seventh element, extending, can also be added to complete the classification. Perceiving is the way in which an individual interprets his/her environment. Remembering shares similar characteristics to the knowledge category in that it requires recall of some designated facts, principles, and generalizations with respect to the study of a particular phenomenon. Recognizing stresses that a "connection be made between a present experience and the memory of a like experience" (Bruner et al., 1966, p. 103). Conceiving encompasses the idea of developing the mind with cognitive processes in relation to diverse life experiences. Judging is perceived as the worth, significance,
FIGURE 2

BRUNER'S TAXONOMY OF COGNITIVE DEVELOPMENT

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
and appropriateness of instructional materials. Reasoning is identified as the highest level of cognitive process and stresses logical and coherent thinking on the part of the learner. The writer listed a possible seventh category, extending, whereby the learner enhances the learning of meaning, sequence, and effect. This implies that the learner must acquire mastery in learning beyond immediate experience through structured cognitive tasks.

A basic premise of cognitive learning theory is that knowledge is ordered into sequential and hierarchal patterns (Van Parreren, 1978; Voss, 1978). Numerous authors have elaborated upon that principle. For example, Sawrey and Telford (1968) postulated that:

Perceiving, remembering, and conceiving are ordering and organizing processes. A person's cognitions are indicative of how he [or she] has broken his [or her] world into parts and then tied these parts together. While some of the processes involved in the organization of one's perceptual and conceptual world are conscious and formal, much of one's organization represents the internalization of culturally transmitted patterns which are acquired as part of one's socialization. (p. 109)

Sawrey and Telford (1968) further suggested:

It seems that people impose both a sequential and clustering structure in perception and in recall. This organization of material increases with repeated exposure, and there is a positive relationship between extent of organization and amount of material retained and recalled. This organization occurs even with unrelated words presented in a random order. This means that the learner discovers relationships with the material and structures it in such a way as to facilitate retention and recall. (p. 109)

The foregoing discussion substantiates that cognitive learning converges directly and indirectly upon human intellectual growth and enhancement. Further, students use previously acquired experience.
as a frame of reference to assimilate, accommodate, and add new experiences in a cumulative manner and assimilate learning within their cognitive structure (Day, 1981; Labinowicz, 1980; Piaget & Inhelder, 1963; Voyat, 1982; Wadsworth, 1971). Each individual experiences and extrapolates the environment in different ways and thus possesses unique ways of organizing information within the cognitive structure. In addition, the continuous process of acquiring and accumulating knowledge in different situations requires that the learner must reorganize cognitive structure so that new learning will be conformed into the existing cognitive arrangement. It is apparent, then, that cognitive learning theory provides a path-goal frame of reference for comprehending how individuals acquire, process, accumulate, and store diverse knowledge. However, there are two underlying theoretical premises that constitute cognitive learning. One is the process of concept identification and conceptualization, and the second is the role of subject structure in assimilating and accommodating knowledge in varied life situations.

Concepts and Conceptualization of Phenomena

Numerous authors have implied that school learning is conceptual in nature, the most widely recognized being Child (1974); Doll (1978); Ehrenberg (1981); Georglades, Hilde, and Macaulay (1977); Lunzer (1979); Wiles and Bondi (1979); and Woodruff (1964). Sawrey and Telford (1968), in their study, postulated that "percepts and concepts are the product of learning. They represent the retained and organized effects of past experience" (p. 107). The question
remains, however, "What is a concept?"

A number of authors have presented, articulated, and elaborated upon the definitions of concept. Wilson, Robeck, and Michael (1974) suggested that concepts "are generalized or abstracted ideas which may be stimulated by affective as well as cognitive associations, but which involve awareness on the part of the learner" (p. 324). Wilson et al. suggested that concepts are derived by a learner through integrating and relating pertinent information. Engelmann (1969) defined a concept as "a set of characteristics which differentiate a group of instances (events, objects, relationships, etc.) from all other instances presented" (p. 9). Finally, Engelmann stated that concepts are dynamic and change with environmental conditions and demands. Moreover, Ehrenberg (1981) defined a concept as:

The set of attributes or characteristics common to any and all instances (people, objects, events, ideas) of a given class (type, kind, category) or the characteristics that make certain items examples of a type of thing and that distinguish any and all examples from nonexamples. (p. 37)

Each of the preceding definitions demonstrate that a concept holds certain characteristics which are derived from theoretical variations and relationships within or between phenomena. Child (1974) extended this notion by positing several characteristics of concepts. He suggested that:

1. concepts are generalizations that are formulated by identifying and abstracting designated sensory images;

2. concepts are contingent upon prior experiences of the learner;
3. concepts provide a symbolic frame of reference for individuals;
4. concepts can form horizontal or vertical organizations in the mind of humans;
5. concepts can be irrational;
6. concepts form without the individual being fully cognizant of the phenomenon; and
7. concepts possess two functions—extentional and intentional.

Child (1974) explained the nature of extentional and intentional terms by suggesting that extentionally the concept is applied in situations where the meaning is clearly apparent to the teacher and the learner. In terms of intentional use of concepts, Child stated that they hold different meanings for individuals. Thus, the concept is initiated by bringing together personal and subjective experiences in formulation of conceptual cognitive base. Ehrenberg (1981) suggested a hierarchy of sequential learning in which concept learning is placed second: fact, concept, principle, attitude, and skill. In sum, then, it can be concluded that a concept is simply a name of a particular category or classification that is constructed for the purposes of teaching and learning (Imperatore, 1970, p. 174; West, 1971, p. 109). This type of hierarchal learning has been identified and presented by a number of authors, including Gagne (1965).

Gagne's thesis encompasses a hierarchal taxonomy of intellectual development and processes (Linke, 1975, p. 39). Gagne proposed an eight-stage classification of cognitive learning on the notion...
that each category of the model was systemic in nature and direction. He called these: signal learning, stimulus-response learning, chaining, verbal association, multiple discrimination, concept learning, principle learning, and problem solving (see Figure 3).

Signal learning is the first type of learning and requires the identification of a behavioral conditioned response. In this class learning is said to be general, diffused, and emotional because it "has a truly 'involuntary' character, and applies to responses that are not typically under voluntary control" (p. 35).

The stimulus-response learning requires an individual to make a precise response when confronted with specific learning conditions. In this case the voluntary responses comprise the total observed output, thus making it possible to learn material when the student chooses.

Chaining comprised the third class in Gagne's model, and is the process of sequencing individual responses such that they are connected to previously attained knowledge. Chains might be classified in one of two categories: motor or verbal. Chaining deals with motor activity; whereas verbal chains are usually identified with verbal associations.

Verbal association is the fourth cognitive process, and is considered by Gagne to be a classification of chaining. This category holds some unique elements and links for the purposes of learning a variety of data. However, Gagne suggested that the lowest verbal chains are the naming of objects. For example, an elementary student who is presented with an object may respond by observing and
FIGURE 3

GAGNE'S TAXONOMY OF COGNITIVE DEVELOPMENT
examining it. Then the student is told that the object is a world map. The student might be stimulated to respond "world map." This notion of a chain, in terms of verbal association, may be represented in a visual form:

Ss ——— R ——— S ——— R = "World map"

Object   Observation   World Map   Learning outcome

If the student has the knowledge of the two stimulus-response chains, there is better recognition of the object when it is seen again.

The fifth category of the taxonomy encompasses multiple discrimination. This type of learning becomes evident when an individual can identify single objects from a set of objects possessing different characteristics.

Concept learning constitutes the sixth type of intellectual learning and it takes place when an individual recognizes accurately the distinct categories that constitute an object.

The seventh type of learning is called principle learning. Principles are perceived to be chains of several concepts that are generally labeled as knowledge and recognition.

Finally, the eighth category is called problem solving. This cognitive process can be defined as the ability and capability of an individual to solve concrete and abstract problems by synthesizing previous learned principles into new ones and ordering them sequentially.

Despite the effort expended by Gagne in developing his theory, Hilgard and Bower (1966, p. 569) suggested that Gagne's theory...
lacked eclectic characteristics since he did not borrow principles from other cognitive theories. Nevertheless, Gagne's taxonomy of cognition and/or recognition ranges from simple to complex in the development of intellectual processes. Briefly, Gagne's paradigm can be described as: percept, concept, principle, generalization, and theory. Moreover, Gagne's writing implies that the basic notion of concept constructed cognitive learning materials are an effort to permit a student to acquire knowledge from facts (lowest level) to the acquisition of skills, higher level of cognitive learning. A fact is defined as a component of a situation chosen by a person which is applicable to the problem at hand (Boles, 1980, p. 262). A skill, according to Jarolimek (1971, p. 385), is the ability of an individual to work something out with some degree of expertness and congruency in repeated performance.

The concepts are placed into different categories, however, and this is important (Bruner, Goodnow, & Austin, 1956, pp. 11-13). First, categorization of instructional concepts minimizes the complex reality of the immediate environment. Second, categories are the only way through which phenomena can be identified and explained. Third, categories help individuals minimize constant learning. Fourth, categorization is imperative since it provides much needed guidance for a meaningful cognitive activity that allows students to be aware of suitable and unsuitable activities. And finally, categories allow structuring of classes of objects and events.

Bearing the foregoing considerations in mind, West (1971) suggested that once concepts are identified and explained, curriculum
researchers can:

then attempt to develop a curriculum which introduces the easier ideas about concepts at earlier levels and adds more and more difficult ideas about them at later levels. If this is accomplished for each major concept, the curriculum will include the most significant generalizations in the field and will provide [students] with some knowledge of a structure of the field (i.e., the ways in which concepts and generalizations are related to each other). (p. 120)

Broek (1965) suggested seven concepts that are fundamental to teaching and learning geography—the cultural appraisal of the earth, the regional concept, areal coherence, spatial interaction, localization, the significance of scale, and the concept of change.

The major objective of concept based education, nevertheless, is to excerpt concepts that are relevant to a particular discipline whether that subject is physics, geography, mathematics, sociology, etc. The concepts in turn are then ordered into an effective paradigm for their use in the classroom. This leads to the second major dimension in cognitive theory, that of "structure."

Structure

All subject matter has inherent structure which permits a discipline to demonstrate relationships and interrelationships (Ford & Pugano, 1964). Specifically stated, the structure of a subject "is understanding it in a way that permits many other things to be related to it meaningfully. To learn structure, in short, is to learn how things are related" (Bruner, 1960, p. 7). Similarly, Ford and Pugano (1964) define structure as "the parts of an object and the ways in which they are interrelated" (p. 2). However, more recent
thinking concerning structure has presented a new dimension. Presently, some authors believe that structure in curriculum planning should be viewed as a process of "thinking about fundamental curriculum questions and about the product of that thinking" (Ehrenberg, 1976, p. 45). Curriculum paradigms that have been developed in almost every subject-matter from kindergarten through college levels seek to verify and describe structure. This structure in turn is construed and applied into the planning of specific teaching and learning strategies.

Bruner's (1960) paradigm provides several generalized criteria in terms of a structure that must be present in any type of instructional unit. He stated that comprehension of basic principles, concepts, and generalizations of data make a discipline learnable. Bruner illustrates the foregoing notion by the following example:

Once one has grasped the fundamental idea that a nation must trade in order to live, then such a presumable special phenomenon as the Triangular Trade of the American Colonies becomes altogether simpler to understand as something more than commerce in molasses, sugar cane, rum and slaves. (pp. 23-24)

This implies that once "structure" is classified in the minds of the learners, then students should be able to connect relationships in the notion of trade.

The second criterion concerns itself with "human memory." Bruner builds a justification for this by suggesting that if the instructional materials are not structured, learning will not be retained over a long period of time. This implies that curriculum materials must be orderly when representing a particular phenomenon.
in the context of cognitive theory.

Finally, Bruner stressed the acquisition of insight into the basic concepts and principles that facilitate the application of the previous learned materials in unfamiliar situations. Bruner elaborated by stating:

To understand something specific as an instance of a more general case—which is what understanding a more fundamental principle or structure means—is to have learned not only a specific thing but also a model for understanding other things like it that one may encounter. (p. 25)

The importance of subject-matter structure has been emphasized by a number of authors in recent years. Preece (1976), for example, contended that much attention was being given to subject-content structure simply because: "knowledge of structure is necessary for a full understanding of a subject [e.g., geography], it enhances retention, facilitates problem solving, leads to transfer, results in intellectual excitement, and develops an aptitude for learning" (p. 174). Inherent in the preceding statement is the thesis of sequencing subject-matter for the purpose of teaching. Sequence has been considered to be an important strategy in curriculum instruction and design (see, e.g., Khan & Weiss, 1973, p. 789; Taba, 1962, pp. 428-429). Sequencing refers to the ways in which the curriculum or treatment units are constructed and ordered. Tillema (1982) says it most eloquently by suggesting:

Sequencing refers to design decisions, pertaining to the order in which subject matter is presented (i.e., the relationship of concepts and principles within a knowledge domain), which build upon existing cognitive structures to produce new or elaborated cognitive structures. Sequencing is an important design strategy because the
type of sequence is likely to influence the nature and stability of the cognitive structures which a pupil constructs. (p. 170)

Despite this notion, however, Ehrenberg (1976) recognized that there were two different schools of thought. One school espouses the idea of structure because they believe it was cognitively efficient and effective in achieving preferred learning. The opponents of the structure paradigm, on the other hand, present a counter argument by proposing the notion that structure hinders the "accomplishment of the collateral goals of individual growth, creativity, and involvement" (p. 46). It may be concluded, however, that researchers who do not believe in the "structured curriculum" provide very little or no empirical evidence to lend credibility to their argument.

Another structure based cognitive theory has been proposed by Ausubel (1960, p. 267) and is labeled as "advance organizers." Inherent in this theory are three fundamental cognitive elements—verbal reception, meaningfulness, and subsuming concepts. The verbal approach permits students to assimilate environmental cues into their cognitive frame of reference. Moreover, the verbal strategy allows the students to learn material which is "potentially meaningful" by relating it to what the students already hold in their cognitive structure. Ausubel claimed that there are certain "conditions" that must be present before a student can learn the material meaningfully. The most important of these conditions identified is the existence of organization of a student's ideas about the learning environment. Ausubel (1968) believed that:
Meaningful learning is so important in the process of education because it is the human mechanism par excellence for acquiring and storing the vast quantity of ideas and information represented by any field of knowledge. The acquisition and retention of large bodies of subject matter is really a very impressive phenomenon considering that: (a) human beings, unlike computers, can apprehend and immediately remember only a few discrete items of information that are presented just a single time, and (b) memory for rote learned list receiving multiple presentation is notoriously limited both over time. . . . (p. 58)

Essentially, verbal learning becomes meaningful learning when the treatment materials are arranged in a hierarchal frame of reference and impart information to students. This process leads to Ausubel's next theoretical proposition, that of subsumption.

Subsumption is the process of merging or combining unfamiliar subject content into a broader cognitive structure. The fundamental principle underlying subsumption is that the meaningful content is engendered and integrated into the student's existing cognitive arrangement. Moreover, the idea of subsumption process derives its foundations from sequencing textual materials in view of enhancing subsequent content of subject matter. Ausubel (1968) recognized two types of subsumptions: derivative and correlative. In the derivative dimension Ausubel believed that it "takes place when learning material is understood as a specific example of an established concept in cognitive structure" (p. 100). Correlative subsumption, on the other hand, "is an extension, elaboration, modification, or qualification of previously learned propositions" (p. 100). The preceding theoretical constructs provide a rationale for the development of what Ausubel terms "advance organizers."
An abundance of literature has been published which focuses on the testing of Ausubel's propositions concerning advance organizers. These studies have been conducted by Allen (1970); Ausubel (1960); Ausubel and Fitzgerald (1961, 1962); Ausubel, Stager, and Gaite (1968); Ausubel and Youssef (1963); Cohen (1977); Kuhn and Novak (1971); Lawton (1977); Lawton and Wanska (1977); Luiten, Ames, and Ackerson (1980); Satterly and Telfer (1979); Schulz (1966); Stasz, Shavelson, Cox, and Moore (1976); and Steinbrink (1970). All of the studies report that "advance organizers" do help facilitate learning and retention of unfamiliar verbal material.

Ausubel (1968) believed that organizers were an integral component of any instructional unit that is structured around cognitive principles. As a result, the major purpose of the organizer "is to bridge the gap between what the learner already knows and what he [or she] needs to know before he [or she] can successfully learn the task at hand" (p. 148). In short, advance organizers provide structure and sequence to treatment materials.

Cognitive Theory: Comparisons and Contrasts

The cognitive theories that have been presented and discussed in the preceding sections will be briefly compared and contrasted.

According to Marsden (1976, p. 32), Ausubel's paradigm resembles closely to that of Bloom et al.'s in that Ausubel (1968) and Ausubel and Robinson (1969, pp. 72-74) identify and elaborate upon five distinct cognitive structures (see Figure 4). The first cognitive classification is "rote learning" which is the lowest level of
FIGURE 4

AUSUBEL AND ROBINSON'S TAXONOMY
OF COGNITIVE DEVELOPMENT

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
learning. This can be equated with Bloom et al.'s "knowledge" category. However, Ausubel (1968) and Ausubel and Robinson (1969) do not regard rote learning as of any significant value. This is because, according to Ausubel (1968): "Rote learning tasks ... are not mastered in a cognitive vacuum. They are relatable to cognitive structure, but only in an arbitrary, verbatim fashion that does not result in the acquisition of any meaning" (p. 41). The second stage is indicated as meaningful learning, which encompasses the idea of concepts, principles, and generalizations, and covers the comprehension category postulated by Bloom et al. Third, application is similar to both schools of thought, and is explained by Ausubel and Robinson as applying ideas acquired in newer situations in a direct manner. Fourth, problem solving approximates analysis in the Bloom et al.'s classification, but Ausubel proposes it encompasses more than analysis. Application engages the student in identifying and changing relevant principles to achieve a preferred outcome: that of finding a solution to an "intellectual problem" (Marsden, 1976, p. 33). The final and highest category is creativity, ultimately challenging the student to formulate an original thought in order to solve simple and complex tasks. This classification resembles or equates with the synthesis category of Bloom et al.'s typology.

Bruner et al.'s taxonomy can also be equated with Ausubel's (1968), Ausubel and Robinson's (1969), Bloom et al.'s (1956), and Gagne's (1965) cognitive theories. Marsden (1976), however, summed up the preceding theories by stating:
Gagne's "conceptual learning" and "principle learning," therefore, seem to cover Ausubel's "meaningful learning" and Bloom's "comprehension" categories, while his "problem solving" covers "application" and "problem solving" in Ausubel's scheme and "application" and "analysis" in Bloom's. The higher level activities are valued by Ausubel and Gagne as cognitively efficient. (p. 33)

The similarities among the varied sets of cognitive processes identified are heuristic in nature, direction, and purpose. Furthermore, the series of cognitive elements presented correspond and each is hierarchal in its approach toward the acquisition of specific learning tasks.

The theoretical rationale for distinguishing between and/or among the preceding cognitive theories was to define succinctly the manner in which concrete or abstract information is perceived, processed, recalled, and modified in view of numerous life experiences that are different from the one in which the original learning took place. It is now necessary to discuss cognitive theory with regard to geographical education.

Cognitive Theory: Geographical Applications

Cognitive theories have provided a frame of reference for numerous disciplines in terms of structure and concept identification and formulation. One of the many disciplines that has developed cognitive theory based learning and teaching principles, concepts, structure, and generalizations is geography. Specifically, geographers have used Bloom et al.'s, Bruner's, and Ausubel's theories of cognition in identifying specific facts, concepts, and generalizations for classroom use.
Manson (1973, p. 29) developed a typology for geographical educators that encompassed remembering, understanding, solving, analyzing, synthesizing, and judging. Under each of these categories (see Figure 5), Manson identified and elaborated upon a more precise criterion that fits into the knowledge and process dimensions in a 3 x 6 matrix that facilitated the construction of "eighteen potential types of questions" (p. 28).

Bloom et al.'s (1956) taxonomy has been widely applied by geographers in the United States (see, e.g., Monkhouse, 1971), Canada, and Australia (Graves, 1977). In each case all dimensions of the taxonomy have been applied in a hierarchical fashion: simple to complex. For example, Graves (1977) cited and illustrated the lowest level of knowledge as:

the ability to recall facts, concepts, principles, trends, criteria and processes. Thus the objective may simply be that the pupil be able to recognize and name 66°N line of latitude as the Arctic Circle, or the wind blowing over Madras in December as North-east Monsoon. (p. 91)

Maraden (1976) also discussed Bloom et al.'s taxonomy in terms of questioning students in the classroom. He applied the "taxonomy" to the classroom questioning strategy and believed that appropriate questioning should include: "(a) asking questions fluently and precisely, (b) gearing questions to the pupil's state of knowledge; (c) involving a wide range of pupils in the question-answer session; . . . [etc.]" (p. 148).

Similarly, Hunkins (1970, p. 45) believed that students must be led to discover meaningful geographical relationships, concepts, and generalizations. Hunkins adopted Bloom et al.'s taxonomy to
<table>
<thead>
<tr>
<th>The Process Dimension</th>
<th>Judging</th>
<th>Synthesizing</th>
<th>Analyzing</th>
<th>Solving</th>
<th>Understanding</th>
<th>Remembering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the concept &quot;threshold&quot; sufficiently precise to permit measurements?</td>
<td>Assess the validity of the friction of distance principle by comparing it with &quot;the real world.&quot;</td>
<td>Develop a procedure through which you could teach the idea of &quot;a nested hierarchy&quot; to high school students.</td>
<td>Formulate several testable hypotheses deriving from the assumptions of central place theory.</td>
<td>Outline the form of scientific explanation used in developing central place theory.</td>
<td>&quot;If there were no Great Lakes, Chicago would still be a large city.&quot; What assumptions seem to be implicit in that statement?</td>
<td>The originator of central place theory was</td>
</tr>
<tr>
<td>Analyzing</td>
<td>Given a population distribution map and the assumptions of central place theory, construct the most probable urban hierarchy.</td>
<td>How would a reduction in transport costs affect the range of a good?</td>
<td>Explain what is meant by &quot;a nested hierarchy.&quot;</td>
<td>Draw a graph showing the relationship between threshold level and range of a good.</td>
<td>State the definition of &quot;range of a good.&quot;</td>
<td>List the assumptions of central place theory.</td>
</tr>
<tr>
<td>Solving</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understanding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remembering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Facts**  | **Concepts**  | **Generalizations**

**THE KNOWLEDGE DIMENSION**


**Figure 5**

*A Process/Knowledge Matrix*  

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
formulate question criteria that identified and presented examples from geographical education. Hunkins argued that classifying questions through utilization of the Taxonomy of Educational Objectives is very useful for geographers. For example, under comprehension category Hunkins suggested such questions as: "'How are the economic bases of the Connecticut Valley and the Yakima Valley alike or different?' Specifically it [the question] is asking for pupils to determine a comparative relationship" (p. 47). It is obvious that one cannot compare and contrast different regions without knowledge of where the places are located in relation to each other.

Bruner et al.'s theory has also been useful in geographical teaching and learning. The curriculum "Man: A Course of Study," for example, contains many geographical themes and concepts. One of the major units in "Man: A Course of Study" dwells upon the lifestyle of the Netsilik tribe of Canada. Since the Netsilik tribe was depicted as nomadic in the teaching unit, the students had an opportunity to trace their seasonal migratory routes on a map around Pelly Bay, Canada, thus noting place locations.

Ausubel's theory on advance organizers has also been utilized by geographers. Steinbrink (1970), for example, used Ausubel's cognitive theory to construct the geography instructional materials, Comparative Rural Landscapes, in order to investigate the effect of advance organizers in helping disadvantaged black elementary students learn unfamiliar verbal material. He judged, on the basis of his experimental study, that advance organizers were indeed effective in facilitating more learning and retention among students in
the experimental group as against those in the comparison group.

It is apparent from the preceding review that the cognitive theories presented by the writer in this study justify their application to the enhancement of geographical place location knowledge of university and/or college students. Next, a review of geographical teaching and learning as it is carried out from kindergarten through the 12th grade will be assessed.

Geographical Teaching and Learning

Most of the work in geography at the elementary level is carried out under the umbrella of social studies. Geographical concepts within the social studies curriculum were defined for grade levels by Gabler (1970) and later restudied by Joyce and Brooks (1979). Those researchers analyzed a variety of curriculum guides, courses of study, and other literature dealing with social studies. From the study by Joyce and Brooks (1979), it is possible to draw a composite of the type of geographical information presented in social studies. For example, at the kindergarten level students study the globe and children in other lands including both physical and cultural geography. At the first grade level students take the concepts of the globe further and make maps of their immediate environment (Meyer, 1973, p. 31). In second grade many new geographical concepts are introduced including urban and rural terms. The preceding is but a sample of geographical work carried out at the initial grades.
It is possible from examining social studies material and research reports to distinguish one geographical philosophy at the elementary level. Each grade becomes a building block to the next level and so forth. Thus, the concept of "near" and "far" is stressed in the early grades (McLendon & Penix, 1968). Other writers have contended that current events complement geographical work being done in the early grades (Gross & Badger, 1960). Geography is unquestionably a part of the elementary school curriculum. However, the amount of geographical study varies between schools within the United States (Gabler, 1970).

Research studies have indicated that student interests are not confined to the local environment. Estvan and Estvan (1959) and Flinspach (1967) found that students often expressed an interest in distant nations of the world. The implications for the social studies are that the curriculum should remain flexible and not so rigidly defined as to exclude current events (McLendon & Penix, 1968).

Since the 1960s and 1970s the scope of the social studies curriculum has been both broadened and diversified. This is especially evident in the primary school (Martorella, 1976). During this period many curriculum projects were developed. One project developed by the Statewide Social Sciences Education Committee (Kennamer, 1970, pp. 392-393) in California was for primary and secondary grades. The theme of the project from kindergarten through eighth grade, for example, was people and their relationship to the environment.
Yet despite these prodigious efforts in curriculum development, Martorella (1976, p. 31) claimed that the social studies curriculum becomes disjointed at the seventh and eighth grade levels. He further comments, "Social studies in the middle school grades is a more undefined state than at any other level" (p. 31). This assertion is further supported by James and Crape (1968) and Sommers (1970) who contended that geography should be taught with continuity because it takes time and practice to acquire and understand necessary geographical skills.

The National Science Foundation (Directorate for Science Education, 1979) conducted an extensive survey to determine the amount of instructional time spent on various school subjects in the United States. Social studies was one of the subjects surveyed. It was reported that schools which have written guidelines for grades one through six require a minimum of 30 minutes per day on social studies. However, teachers indicated that they devote about 20 minutes a day for social studies in grades kindergarten to three, and 35 minutes in grades four to six (Weiss, 1978). It can be concluded that the social studies, including geography, does not have a clearly defined time allocation within the elementary curriculum. One author has attributed this to the fact that the Association of American Geographers has paid little attention to the elementary school social studies curriculum (Towler, 1971).

It is apparent that elementary school social studies time needs to be upgraded. More classroom time might present the inclusion of geographical concepts which are essential for later grade
levels.

Geography teaching in the high school has also received attention. Many writers, including McLendon and Penix (1968) and Vuicich and Stoltman (1974) contended that the patterns of geography offerings in the traditional high school have changed little since the 1920s. Any such changes were reflected in part by the High School Geography Project (HSGP) of the Association of American Geographers (Goodlad, 1966, pp. 64-65). The changes in geography teaching were brought about in part by government support for education following the launching of Sputnik in 1957 (Doll, 1978; Khan, 1981; Pratt, 1976). The "space race" resulted in a comprehensive and unifying curriculum movement in science and social studies at all levels (Stoltman, 1980b).

The High School Geography Project evolved under the direction and active leadership of Gilbert F. White, a prominent geographer (Pratt, 1976). It was designed to upgrade geography at the high school level by developing both practical and theoretical aspects of the subject. In addition, the thrust of the project was to convey "Some of the ways [geographers] looks at the world, some of the kinds of the questions geographers ask about the world, and some of the methods geographers employ to answer the questions they ask" (Patton, 1970, p. 3).

It is evident that geography has an important role to play in student education at all levels. Many times it has been called the tool that enables students to comprehend the real world and its people (James & Crape, 1968). Geography allows students to

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
understand the relationship of people to their environment and the problems facing the nations of the world (Sommers, 1970). James and Crape (1968) further argued that all students must understand current events and how these relate to and affect their lives.

It might be asked, "What can geographical concepts contribute to 'student education' that no other subject can?" (CCG, 1970). In order to answer this question it is necessary to consider the meaning of geography in the context of student education. McNee (1967) provided a provocative definition. He stated that geography "should focus on questions of concern to [the] thinking men [and women] of today's [world], questions which are relevant to most of [us] . . . and not questions which excite the specialist only" (p. 3).

A thorough knowledge of geography permits students to understand the problems and issues facing the global community. That point was illustrated by the Association of American Geographers (CCG, 1970) when they stated that geography "involves the student directly in the study of the real world through map and photo interpretation and fieldwork, and encourages him [or her] . . . continually to test abstraction against experience" (p. 13). There is little doubt that geography provides the student with unique experiences. In addition, geography allows students to gain an appreciation of "patterns on the earth's surface [which] have different meaning for society, [in accordance with] the techniques and values systems of differing cultures" (CCG, 1970, p. 1).

In summary, geographical relationships and concepts form an integral component for understanding the real world. Students come
to appreciate man-land relationships on the earth through geography. They come to realize that each society is dependent upon one another. They gain an understanding of the role of the United States in international affairs. This can only be achieved by being cognizant of where places are located.

Geography in Popular Literature and Nonprinted Media

During the past several years geography has received a great deal of attention from the media and other popular magazines (CGIS, 1982). Most of the discussion centered on the idea of geographical illiteracy, as Elson (1982) illustrates:

"Most people didn't have a clue that a place called the Falkland Islands existed, much less where the islands were or why anybody would be fighting over them," said Richard Morrill, a geography Professor at the University of Washington. . . . A recent survey of adult Americans revealed that almost one-third of the respondents thought El Salvador was in Africa. (p. 3B)

Moreover, the Editor of the National Geographic Garrett (1982) also lamented the geographical illiteracy of the nation's population. He provided an example, the fact that "Even though National Geographic Society headquarters has been in Washington, D.C., since 1888, a lot of mail to us each year is addressed to Washington State" (p. 685).

The foregoing statement demonstrates the limited place location knowledge of many people in the country. He also suggested that:

We fought a ten-year war in Southeast Asia. Yet many of us . . . could not point out Laos, Cambodia, or Vietnam on a world map. It's inconceivable a better understanding of Asia's historical and political geography might have helped win, shorten, or even prevent the war. (p. 685)
He concluded his commentary, however, by making the following observation, "Any generation that can master Pac-man* can cope with continental drift" (p. 685).

Other popular writers have also spoken in favor of geography. Ann Landers (cited in AAG Newsletter, January 1983, p. 1), the popular newspaper syndicated columnist, has called upon the nation's schools to be more receptive to geographical teaching and learning. She particularly commented on the deficiency of locating places, especially major cities of the United States. Moreover, the Association of American Geographers (AAG) devoted two full pages to recent articles that appeared both in local and national newspapers concerning the plight of geography: The New York Times, Chicago Tribune, Ann Arbor News, and the Miami Herald (AAG Newsletter, October 1982).

In addition, Marous (1983) warns that the United States citizens cannot live in isolated enclaves. He cites an example of a person who collected data about the world problems and concluded that "a global configuration was inevitable" (p. A-7). As a result, he quit his job and sought "sanctuary" in the Falkland Islands along with the rest of his family. But his refuge in peaceful surroundings was shattered when Argentina invaded the Falkland Islands and the British retaliated and a war followed. Nevertheless, geographical themes are not only confined to printed popular newspapers and magazines, but are also alluded to frequently in novels.

A variety of novels have been identified that demonstrate geographical themes and place locations. In a review, Lamme (1977)
identified four major recurring themes in most novels: landscape, human ecology, strategy, and regionalism. Miner (1981) identified and discussed the foregoing elements in relation to a novel entitled Congo (Crichton, 1981) which is set in an African country of Zaire. In his concluding remarks, Miner suggested that the novel introduced him to a "part of the African Continent" that he knew little about with respect to its geography. Moreover, Hughes (1981) reviewed a novel entitled The Azanian Assignment about South Africa and reached similar conclusions.

James Michener has contributed much to the general public's knowledge and understanding of landscape, human ecology, strategy, and regionalism in novels (CGIS, 1982, p. 3). Michener (1970) observed:

I invariably start with the best geography I can find. . . . [In addition, he goes on to stress] I suppose that my books on Hawaii, Israel and Spain have won a rather wide readership primarily because my work in the geography of these areas—really minute field work carried on over periods of many years—has provided a solid tactile base for what I had to say. My characters were not drifting in space; they were rooted in the ground. (pp. 764–765)

The geographical themes of novels and other popular literature are also identified by nonprinted media, especially television.

In recent years the nonprinted media has given extensive coverage to geography and has called upon the nation's schools to ameliorate the poor geographical knowledge of students. For example, Roger Mudd (March 1983) (Appendix C), anchorman for the National Broadcasting Corporation (NBC), drew attention to geographical illiteracy at the University of Miami, Florida.
However, the Public Broadcasting Service (PBS) has been instrumental in airing popular programs produced by the National Geographic Society (Renfrew, 1983, p. B-2) on diverse geographical themes. Renfrew (1983) stresses that "For years 'National Geographic Specials' have been conducting fabulous journeys to places as diverse as the teeming tenements of Hong Kong and the twilight world of the shark far beneath the ocean floor" (p. B-2). In 1983, moreover, the National Geographic Society produced several documentaries on such subjects as the "Rain Forest," deserts of Australia, mountains of China, and major volcanoes that inhabit the earth (see TeleVue: Kalamazoo Gazette, April 2, 1983, p. 3). Some of these have already been shown, e.g., "Rain Forest" was shown on January 12, 1983, and others are scheduled to be shown throughout the succeeding months.

In sum, geography is ever present in both printed and non-printed media. Popular novelists and journalists have championed the need for geography for they recognize the important role of geography in local, national, and international affairs. Specifically, the importance of place location knowledge is much stressed in the mass media. Yet most of the American public remains geographically illiterate.

Place Location Knowledge of Undergraduate Students

In this section, the writer will (a) focus on the importance of place location knowledge, (b) identify the types of "locations," and (c) relate the discussion to student place location knowledge.
The importance of place locations has been discussed at length by a number of authors. Most authors share the sentiments expressed by R. O. Clark (1969a, 1969b):

A knowledge of world place location, that is, the concept of where, is basic prerequisite to any analysis and synthesis of man and his environment.

A geographic awareness of important world locations and their juxtaposition to other elements in the landscape is fundamental and necessary to any mode of investigation that seeks to evaluate the inhabited world. . . . There is a definite and timely requirement to answer the basic question of where, not for places in the United States but for the world as a whole. (p. V)

Three types of geographical locations can be specified in distinct but related ways: mathematically, nominally, and relatively (Thomas, 1965, p. 15). Thomas believed that location of places' mathematically can be demonstrated by the cartesian or the polar coordinate systems. In the cartesian system, the place is located on a flat surface "specified by its distances from two lines which intersect at right angles" (p. 16). Geographers use longitude and latitude, one of the procedures, to locate cities on a map (Greenhood, 1964).

Nominal location requires specifying a phenomenon (e.g., a country) by its name. Thomas (1965) suggested that "when places are well-known we simply talk about the names attached to them: Arizona, Chicago or the British Isles" (p. 20). However, it is possible to translate the nominal place into "mathematical specification and vice versa by referring to an atlas or a reference map" (p. 21). Finally, relative locations emphasize the relationship of one place
Students' place location knowledge has been of concern for some time. It was not until the late 1960s and early 1970s that geographers began to examine the whole concept of place locations in the context of education. This statement should not be construed as though that place locations have not been studied. Indeed, "where" or the concept of place location is at the nucleus of geographical study and thus is old as geography (R. O. Clark, 1969a, 1969b). However, much study and experimentation was generated following the appearance of an article concerning "The Most Visible Countries and Cities." This article comprised a list of cities and countries compiled and published by Mason and Owen (1971) from The New York Times over a period of several years for the purpose of identifying places around the world that "made news."

Kory (1972, p. 4) selected a total of 25 "most visible" cities from the original list and administered a test to about 100 university students. Following analysis of the data he noted that most students were capable of locating cities in Europe, but experienced much difficulty in locating cities in Asia, Africa, the Middle East, and South America.

Mason and Owen's (1971) list of most visible countries and cities was used by Wise (1975) who constructed a map location test utilizing cities and countries. The major objective of the Wise study was to determine the knowledge about the location of major cities and some countries of the world by undergraduate (university)
students. The place location knowledge test was administered in 1971 and 1973.

The data suggest that cities such as Moscow, London, and Rome were identified and located accurately by the subjects on an outline map of the world. However, many subjects were unable to locate the major cities of Southeast Asia, Africa, the Middle East, and South America. For example, Kuala Lumpur, the Malaysian capital, was located incorrectly by the entire sample (n = 23). This was followed by Dar es Salaam, a city in Tanzania, which was correctly located by one subject. Further, Wise noted that five subjects linked Lagos with Nigeria in 1971, whereas in 1973 only three subjects associated Lagos with Nigeria. Extensive studies have been carried out by Griffin and Fredrich (1976), Pike and Barrows (1979), and the Educational Testing Service (Hill, 1981) on the subject of place locations.

Griffin and Fredrich (1976) believed that "success in communicating fundamental geographic principles is in large part dependent upon whether students can conceptualize visually where on earth a specific process is occurring" (p. 459). Thus, bearing this proposition in mind they designed a map location test and later administered it to determine the knowledge of 3,302 introductory level geography students in 30 colleges and universities in 23 states. In their concluding remarks, Griffin and Fredrich suggested:

that place awareness among university students, on a macro-scale, is far from perfect. The "average" student can locate roughly half of the world's largest nations. Probabilities increase greatly if the country has an identifiable form, large size, or is located in North
America or Western Europe. Locating most African, Asian, Eastern European, and Middle Eastern countries is at least twice as difficult for college students as in locating Western European countries. (pp. 465-466).

A study utilizing country and city names was undertaken by Pike and Barrows (1979) for the U.S. Office of Education. Fourth, eighth, and 12th graders were tested throughout the United States. In their concluding remarks, Pike and Barrows claimed that:

On the knowledge findings alone, the weaknesses in such a fundamental area as geography, the pervasive ignorance about the Middle East and Africa, the lack of knowledge about Western Europe, and the misunderstanding of some key aspects of American history and government—all of these are serious matters by any standard. It is particularly so with deficiencies at the 12th-grade level, for here the data reflect the cumulative effects of more than 11 years of formal schooling plus related gains from all out-of-school sources. (p. xii)

The Educational Testing Service (ETS) undertook an extensive survey in 1980 to determine the place location and general geographic knowledge of undergraduate students. Students at 185 institutions of higher learning throughout the United States participated in a test in which the major objective was to ascertain information on the knowledge and "understanding of patterns [and] attitudes about world problems" (Hill, 1981, p. 239).

As a panel member and the only geographer on the organizing committee, Hill assisted in formulating the geographical questions included on the measurement instrument. An analysis of the test revealed that out of a possible 101 test questions, 30 dealt with geographical (place) locations. Hill (1981) commented: "The test had 101 items, the mean scores were virtually equal to the percentage correct. The mean for the two-year college freshmen scored
Seniors achieved a mean of 50.46" (p. 239).

The foregoing findings were reinforced by other experienced geographical educators. Schwartzberg (1982, p. 91) concurred with Hill and stated that college students, in general, are deficient in geographical knowledge. In his analysis of Hill's findings, Nelson (1982, p. 92) asserted that students' global knowledge ranges from "minimal to nonexistent," with some exceptions.

A similar test has been utilized by Saveland (1983) in 13 countries. The test was administered to 13-year-old students to determine fundamental place location knowledge. Saveland determined, following analysis of 12,500 responses, that students are highly deficient in place cognition. As a result, Saveland suggested that researchers must give priority to "structured" sequenced curriculum to develop and enhance student "encoding" processes for place location knowledge if the problem is to be solved.

In general the research studies done to date have demonstrated an absence of pertinent data regarding student background. Specifically, very little was known regarding whether students owned atlases, globes, read newspapers/magazines, had traveled within the United States and foreign nations, watched televised world news, studied geography from kindergarten through 12th grade, or could read map symbols. As a result, an important research question remains: Are students with particular background experience more knowledgeable on place location geography than those individuals who have not had those experiences. Such research necessitated the collection of appropriate background data from students to determine if
such variables permitted better conceptualization and/or understanding of place locations.

In summary, various map location tests have been developed and administered. For the most part, the tests were administered to undergraduate students to determine their place location knowledge. No attempt had been made, to the researcher's knowledge, to employ specifically designed cognitive theory based instructional materials as a treatment in order to determine if changes occur in student place location knowledge.

Maps and Map Study

Maps have long been used in geographical study. The map is considered a major analytical tool for the geographer, just as a telescope is a tool to the astronomer (Meinig, 1971). There are various types of maps, among them topographic, isoplethic, and choroplethic (Gopsill, 1966; Meinig, 1971). Different maps serve different purposes. For example, when geographers are conducting fieldwork, the map is a tool they are able to use in recording their observations (Coleman, 1970). Geographers who write textbooks illustrate major geographical relationships with maps and other diagrams. Maps demonstrate relationships between phenomena and can be classified from simple to complex (Willatts, 1967). Virtually any spatial data can be shown on a map including physical landscape, relief, locations of towns and villages, and statistical ranges of social and economic activities (Stoltman, 1980a; Willatts, 1967).
An atlas contains data to be utilized by students of introductory courses in geography. Some authorities are of the opinion that a freshman in college should own an atlas for personal reference (IAAMSS, 1968). However, an atlas serves at least two major purposes: (1) it serves the students in a way the dictionary does; and (2) it enables one to get acquainted with the relative importance of major physical and cultural elements of the world. Moreover, the atlas helps students to visualize both area and distance.

One atlas which serves geography courses is the Goode's World Atlas (16th ed.), edited by Espenshade and Morrison (1982). The Goode's atlas contains the following themes in mapped form: (a) climate; (b) regional economy including natural resources, industry, agriculture, and commodity production; (c) political units; (d) physical relief; (e) population distribution and density; and (f) transportation networks.

An atlas should be used in most geography courses and students should be encouraged and/or required to locate place name(s) which appear in their readings. Furthermore, atlas exercises should be formulated to familiarize students with the atlas. Harris (1977) maintained that most students are deficient in map reading skills and the solution to this problem is a set of carefully designed, well constructed, and structured atlas exercises. Through experimentation he found that students improve map reading skills after having completed required atlas exercises.

In summary, maps are an integral component in geographical study. The atlas contains a variety of maps depicting phenomena
across the earth's surface and can be used effectively in introductory level courses.

Instructional Materials

Teachers of geography also have an opportunity to utilize wall maps, globes, films, slides, and overhead transparencies in their instruction. Klasek (1972) suggested that numerous items can be used in lectures to illustrate major geographical concepts leading to the attainment of instructional objectives. Gerber (1977) agreed with Klasek in using a variety of materials in communicating geographical concepts. Richason and Wilner (1968) suggested that each instructional support item be examined separately since each has unique features.

Wall Maps

Wall maps are a useful tool in facilitating undergraduate teaching. They appear in different shapes, sizes, and scales. The teacher is at liberty to choose the type of map that fits into his or her topic readily.

Wall maps convey a variety of information at different scale(s). These include: (a) political information maps depicting boundaries of a given region or a nation; (b) population density maps showing the distribution of population per square-unit of area; and (c) regional transportation maps depicting waterways, freeways, streets, and domestic air routes.
The Association of American Geographers (CCG, 1970) maintained it is important that teachers of introductory courses use (a) a map of the United States showing the prominent physical and political entities; (b) a world map showing physical and political attributes; (c) one map of each continent showing both physical and political attributes; and (d) a map of the state in which one is teaching.

Globes

Globes are useful in world regional geography and many authorities believe a 16-inch or 24-inch globe is an asset in all geography courses (CCG, 1970). Slate globes, for example, show an outline map of the world drawn in white on a black surface. They are useful since the students and teachers can draw on it with chalk to show political boundaries, major mountain chains, and other geographical features. One advantage of this globe is that the great circle routes can be shown (IAAMSS, 1967). In addition, the slate globe makes it possible to illustrate the concept of longitude and latitude which help the students comprehend the distortion of all map projections (CCG, 1970).

Films

According to Gopsill (1966) and Gerber (1977), there are two criteria for choosing geographical films. They are: (1) films that are used specifically for teaching purposes, and (2) films that provide and/or convey general information on a given topic or theme.
The film used for the specific purpose of teaching does the job effectively and provides information which cannot be provided other ways. M. J. Clark (1970) explained that the film is a "heuristic medium, leading the [student] through a series of arguments to reach a convincing conclusion and this conclusion is then used to suggest lines of further inquiry" (p. 20). Further, Gerber (1977) suggested that "movie films in geography teaching and learning . . . are more realistic . . . because [they] depict a world which moves" (p. 30).

Films that purport to convey general information are, for the most part, descriptive in their approach toward subject matter. These types of film(s) utilize the travel method to convey a feel for a given topic. These are usually narrated by a person who has expertise in the field.

Slides

Slides are an integral part of geographical teaching and learning (Rago, 1971). This is especially true in teaching introductory level courses. It is anticipated that different situations will lend themselves best when utilizing quality slides.

Many opportunities exist for instructors to select and order commercially produced slides depicting a wide variety of phenomena. One of the best sources is the National Council for Geographic Education. Frequently the Journal of Geography carries a listing of available slides depicting various parts of the world.

Although the slides do not provide a direct contact with persons or places, they do give students a feeling or flavor for a
given place (Preston, 1968). Several advantages of the slides are apparent. First, instructors can go at their own pace when presenting geographical facts, principles, and relationships; thus dwelling upon the concepts being conveyed. Second, Atkins (1974) remarked that "slides are available longer than the spoken word or a frame of film, thereby enabling repeated student referral and enabling the instructor the control of exposure for questions and discussion" (p. 27). Moreover, Klasek (1972, p. 50) has suggested that slides possess the following advantages: (a) concepts can be conveyed through sequential order; (b) it is possible they might encourage active participation from students; (c) slides are available on a variety of subfields of geography, e.g., physical and human; (d) slides can be used in conjunction with other media; and (e) they show realism. In addition, slides can be used to show relationships and interrelationships of geographical factors, such as maps, photos, and charts (Atkins, 1974, p. 27).

Overhead Projectors and Transparencies

Overhead projectors are frequently utilized by geographers in their daily instruction(s). It is a versatile instrument that consists of a translucent staging which is illuminated by a very bright lamp or bulb (Gopsill, 1966; Klasek, 1972; Rago, 1971). Transparencies placed on the staging are reflected by a mirror, thus producing an image on the screen. Transparencies of maps, charts, and pictures can be shown effectively (James & Crape, 1968). Several advantages for using the overhead projector are: (a) separate
transparencies can be shown on a screen; (b) a teacher is able to build up stages by placing a number of overlays clarifying a concept of a region; and (c) the teacher can write on the acetate while facing the class.

In addition, Klasek (1972, p. 51) posited a substantial list of other advantages regarding the transparencies for the overhead. These include: (a) they do not present a storage problem; (b) they are inexpensive, large, and easy to use; and (c) they can be made with a specific instructional objective in mind.

In sum, the instructional materials identified form an important part of geographical teaching and learning. Each instructional material described can be incorporated into geographical courses for the purpose of clarifying subject-matter, concepts, principles, generalizations, and theories.

Rationale and Hypotheses

The foregoing review of the literature has established a theoretical rationale for the study. This has been established primarily through identification and discussion of major tenets of cognitive theories developed by Ausubel, Bloom et al., Bruner et al., and Gagne. Specifically, the instructional materials constructed and/or identified for this study adhere to the suggestions inherent in cognitive theories. The treatment unit designed is hierarchal in nature emphasizing facts, skills, concepts, structure, sequence, and generalizations. The preceding variables are considered central to the cognitive theory premise. In addition,
instructional materials and Supplementary Instructional Materials were identified and/or constructed that complemented the cognitive theory based place location learning.

It was recognized that a major shortcoming of prior research has been its failure to identify integrated instructional materials based on a theory that could be used to teach place locations effectively. Moreover, past researchers (e.g., Fredrich & Griffin, 1976; Pike & Barrows, 1979; Wise, 1975) have used only a one-time measure to draw conclusions with respect to student place location knowledge. In addition, limited student background data existed for determining whether students who had geography courses, watch world news, owned globes, atlases, could read maps, read popular magazines/newspapers, and traveled within the United States and foreign nations were more knowledgeable in place location geography than those individuals who did not own such materials and/or carry out the mentioned activities. Thus, a Background Data Questionnaire was constructed to collect information. Further, it was judged necessary to develop a set of cognitive theory based Atlas Exercises and identify and/or construct cognate materials for the purpose of treatment. Hypotheses were constructed to test the proposition that cognitive theory designed instructional materials facilitate the enhancement of student place location knowledge. The development of the hypotheses was based on the review of the literature and several years of university teaching experience.

The foregoing considerations, then, led to the construction of the following hypotheses:
Hypothesis 1: There is a relationship between scores on the place location knowledge pretest when the prior experiences of the subjects with geographical materials and/or activities are considered. The prior experiences of the subjects with materials and/or activities include enrolled geography students, media viewers, reference users, media readers, and travelers.

Subhypothesis A: There is a difference in the place location knowledge pretest scores between subjects who had geography courses in the senior high school and/or college levels compared to scores for those subjects who did not have geography courses.

Subhypothesis B: There is a difference in the place location knowledge pretest scores between subjects who read newspapers and/or popular magazines compared to those subjects who do not read these materials.

Subhypothesis C: There is a difference in the place location knowledge pretest scores between subjects who watched world news on television compared to those subjects who did not.

Subhypothesis D: There is a difference in the place location knowledge pretest scores for subjects who owned atlases, globes, and/or believed they could read map symbols compared to those who did not indicate a positive response to these three questions.

Subhypothesis E: There is a difference in the place location knowledge pretest scores between subjects who have
traveled in the United States and/or foreign nations compared to those subjects who have not.

**Hypothesis 2:** There is a difference in the place location knowledge between the group that received treatment through cognitive theory based *Atlas Exercises* and *Supplementary Instructional Materials* and the group which received no specific cognitive designed instructional materials.

**Hypothesis 3:** There is a difference in place location knowledge between the group that was administered treatment through cognitive theory designed *Atlas Exercises* and *Supplementary Instructional Materials* compared to that group which received treatment through only cognitive based *Supplementary Instructional Materials*.

**Hypothesis 4:** There is a difference in place location knowledge scores between the group that was administered treatment through only cognitive based *Supplementary Instructional Materials* compared to that group which received no specific cognitive designed instructional materials.

**Summary**

The preceding review of the literature has been placed into seven distinct but related sections. In the first section cognitive theory and its application to geographical education was reviewed. The second section focused on the rationale for geographical teaching and learning from kindergarten through the high school levels. The third section dealt with geography in the popular literature. In the fourth section the fundamentals of undergraduate student
place location knowledge were discussed. In section five aspects of maps and map study were examined. In section six instructional materials—wall maps, films, slides, transparencies, and globes—were identified and discussed. And finally, in the seventh section several hypotheses, based on review of the literature and several years of teaching experience at the university level, were presented.
CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

The focus of this chapter is to present the design of the study, to describe the developmental processes of the Instructional Material Unit, and to elaborate on the procedures used to conduct the study. Specific subtopics include the research sample, steps in the development of the Instructional Material Unit, instrumentation, internal and external validity, validity and reliability, design and procedure, and data analysis.

The Research Sample

Undergraduate introductory geography classes located in three Departments of Geography in Michigan were used as the research sample. Within the sample there were male and female students with the age range from 17 through 47 years. The classes were comprised of freshmen, sophomores, juniors, and seniors. The sample was heterogeneous in background and academic achievement. This is because all individuals elected to pursue different major areas of study ranging from art to business management.

Steps in the Development of the Instructional Material Unit

Instructional materials and procedures for teaching place location knowledge to undergraduate students were reviewed in R. O.
Clark (1969a, 1969b), Fuson (1970), the High School Geography Project, and other geography based curriculum materials and guides. None of the materials exhibited an integrated, theory based, and effective instructional materials base. The materials examined lacked: a learning theory upon which the instructional materials were predicated; no internal consistency coefficients were reported for the materials; and no instruments were identified and/or constructed to determine the degree to which validity and success of student learning could be measured. Therefore, it was concluded that a need existed for the development of integrated, cognitive designed instructional materials for the purpose of teaching place location knowledge.

Next, a generalized criteria for evaluation was adopted from Doll (1978, pp. 114-115) to provide a cognitive structure to the exercises and cognate materials. This criteria proved useful in the process of constructing the materials used in the study:

1. The validity and significance of the content as disciplined knowledge should be apparent.

2. A balance should be maintained between content for survey and in-depth study.

3. The content should demonstrate the "durability" of the elements of instructional materials.

4. The content should be appropriate with regard to the level of student interest and knowledge.

5. A clear relationship should exist between facts and other minor content concepts.
6. The materials should be constructed in such a manner that the content is "learnable."

By adhering to the preceding criteria, five sets of Atlas Exercises, derived primarily from the Goode's World Atlas, were developed and cognate materials were identified and/or constructed. The cognate materials included wall maps, films, slides, transparencies, a map reading module, globes, book reviews, data sheets, study guides, regional map tests and examinations, and readings from de Blij's (1981) Geography: Regions and Concepts book. These materials were tested at Western Michigan University during Fall Semester, 1981. It was determined that the materials lacked consistency in content and scope and revision of the materials was judged necessary.

Cognitive domain descriptor terms were selected and adapted from Gronland (1978, pp. 28-29). A matrix was then constructed in which the descriptor terms were matched with each of the activities appearing in the five Atlas Exercises. In order to validate the researcher's selection of the activities corresponding to descriptor terms, an individual with expertise in evaluation was requested to match the descriptor terms with each question in the Atlas Exercises. It was found that most of the researcher's and the independent evaluator's responses were in agreement. In addition, concepts and skills were identified and recorded separately in a matrix from each of the five Atlas Exercises.

The concepts and skills inherent in each exercise were identified through content analysis. Some of the concepts that were
identified included agriculture, site, situation, nation, country, topography, location, coordinate, temperature, rainfall, vegetation, etc. The skill components included drawing maps, identifying phenomena, evaluating phenomena, locating, coordinating, explaining, etc. (see Tables 2, 3, and 4). The exercises were then pilot tested for two semesters (Winter 1982 and Fall 1982) with 130 subjects enrolled in introductory geography courses in the Department of Geography, Western Michigan University. This was followed by the establishment of the internal consistency of each Atlas Exercise computed using the Kuder and Richardson (1937) and Richardson and Kuder (1939) formula (see Table 1).

Table 1
Atlas Exercises: Internal Consistency Coefficients (n = 88)

<table>
<thead>
<tr>
<th>Atlas exercise</th>
<th>No. of items</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Asia, Southeast Asia, and East Asia</td>
<td>35</td>
<td>.87</td>
</tr>
<tr>
<td>Africa and the Middle East</td>
<td>40</td>
<td>.79</td>
</tr>
<tr>
<td>Soviet Union and Eastern Europe</td>
<td>23</td>
<td>.79</td>
</tr>
<tr>
<td>Western Europe, Australia, and New Zealand</td>
<td>34</td>
<td>.67</td>
</tr>
<tr>
<td>South America, Central America, the Caribbean, and North America</td>
<td>36</td>
<td>.90</td>
</tr>
</tbody>
</table>

Equivalent forms of a map location test were developed in order to determine whether students improved their place location knowledge, and to test the appropriateness of the instructional materials.
<table>
<thead>
<tr>
<th>Cognitive domain</th>
<th>Descriptor terms</th>
<th>Question number and subsection*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>describes, identifies, lists</td>
<td>1, 2, 3, 4, 5, 6, 7, 8, 9(c, d)</td>
</tr>
<tr>
<td>Comprehension</td>
<td>distinguishes, explains, gives examples, summarises</td>
<td>9(a)</td>
</tr>
<tr>
<td>Application</td>
<td>computes, prepares, demonstrates, relates</td>
<td>9(a)</td>
</tr>
<tr>
<td>Analysis</td>
<td>differentiates, illustrates, draws, relates, selects, discriminates, points out</td>
<td>9(b), 11, 12</td>
</tr>
<tr>
<td>Synthesis</td>
<td>summarises, compiles, explains, reasons</td>
<td>9(a), 10, 6(c), 8</td>
</tr>
<tr>
<td>Evaluation</td>
<td>describes, contrasts, compares, explains, discriminates</td>
<td>13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Atlas exercise</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Asia, Southeast Asia, and East Asia</td>
<td>South Asia, Southeast Asia, and East Asia</td>
<td>Africa and the Middle East</td>
<td>Soviet Union and Eastern Europe</td>
<td>Western Europe, Australia/New Zealand</td>
<td>South America, Central America, the Caribbean, &amp; North America</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question number and subsection*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge describes, identifies, lists</td>
</tr>
<tr>
<td>Comprehension distinguishes, explains, gives examples, summarises</td>
</tr>
<tr>
<td>Application computes, prepares, demonstrates, relates</td>
</tr>
<tr>
<td>Analysis differentiates, illustrates, draws, relates, selects, discriminates, points out</td>
</tr>
<tr>
<td>Synthesis summarises, compiles, explains, reasons</td>
</tr>
<tr>
<td>Evaluation describes, contrasts, compares, explains, discriminates</td>
</tr>
</tbody>
</table>

*Refers to the question # on each exercise.
<table>
<thead>
<tr>
<th>Concept</th>
<th>South Asia, Southeast Asia, and East Asia</th>
<th>Africa and the Middle East</th>
<th>Soviet Union and Eastern Europe</th>
<th>Western Europe, Australia/New Zealand</th>
<th>South America, Central America, the Caribbean, &amp; North America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>12</td>
<td>9(c, d)</td>
<td>1, 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Situation</td>
<td>9</td>
<td>15(a)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural environment</td>
<td>5(a)</td>
<td>1(a)</td>
<td>3(b), 4(b)</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Elevation</td>
<td></td>
<td>1(c), 6</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landlocked</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topography</td>
<td></td>
<td>9(d)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural hazard</td>
<td>3</td>
<td></td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Island</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Population distribution</td>
<td>5(c)</td>
<td>8</td>
<td>9(d)</td>
<td>11(a), 12, 15</td>
<td></td>
</tr>
<tr>
<td>Culture</td>
<td>9(d)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location/coordinates</td>
<td>4, 6, 7, 8, 9(b, c), 11, 13</td>
<td>4, 5, 6, 10, 12, 13, 15(b)</td>
<td>2(b), 3(b), 6, 9(b)</td>
<td>2, 5, 9</td>
<td>7, 10, 12</td>
</tr>
<tr>
<td>Site</td>
<td></td>
<td>15(a)</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concept</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>South Asia, Southeast Asia, and East Asia</td>
<td>Africa and the Middle East</td>
<td>Soviet Union and Eastern Europe</td>
<td>Western Europe, Australia/New Zealand</td>
<td>South America, Central America, the Caribbean, &amp; North America</td>
</tr>
<tr>
<td>Vegetation</td>
<td>5(d), 10, 13(a)</td>
<td>3, 8</td>
<td>6, 8, 10</td>
<td>12</td>
<td>11(b), 12</td>
</tr>
<tr>
<td>Climate</td>
<td>5(b)</td>
<td>11, 15(c)</td>
<td>6, 9(d)</td>
<td>1, 10, 12</td>
<td></td>
</tr>
<tr>
<td>Rainfall</td>
<td>7(a)</td>
<td>6(c), 8</td>
<td>1(b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>7(b), 13(b)</td>
<td>15(c)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precipitation</td>
<td>10, 13(b)</td>
<td>6(c)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tropic of Cancer</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peninsula</td>
<td>7</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Border</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic activity</td>
<td>5(c), 11, 13(c)</td>
<td>6(b), 14</td>
<td>7(a)</td>
<td>9(b)</td>
<td></td>
</tr>
<tr>
<td>Region</td>
<td>3(a)</td>
<td>2(b), 3(b)</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td>2, 7(d)</td>
<td>8, 11</td>
<td>2(a), 7(a), 9(d)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationships</td>
<td>10, 13(c)</td>
<td>8, 12</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mountains</td>
<td>8</td>
<td>10</td>
<td></td>
<td>5, 14</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>7(a)</td>
<td></td>
<td></td>
<td>11(c)</td>
<td></td>
</tr>
<tr>
<td>Concept</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>South Asia, Southeast Asia,</td>
<td>7(c), 12</td>
<td>6(a), 11</td>
<td>3(a)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>and East Asia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Africa and the Middle East</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soviet Union and Eastern</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Europe, Australia/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South America, Central</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>America, the Caribbean, &amp;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North America</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question number and subsection*</th>
<th>Density</th>
<th>Adjacent</th>
<th>Urban</th>
<th>Country/Nation</th>
<th>Capital</th>
<th>Physiography</th>
<th>Distance</th>
<th>Transportation</th>
<th>Koppen system</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7(c), 12</td>
<td>8</td>
<td>12</td>
<td>1, 3, 8, 12,</td>
<td>15</td>
<td>13</td>
<td>5(a)</td>
<td>9(a)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11, 12</td>
<td></td>
<td>4(a), 9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1, 2, 4, 6, 7,</td>
<td>4, 9</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11, 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Refers to the question # on each exercise.
<table>
<thead>
<tr>
<th>Skill</th>
<th>Atlas exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>South Asia, Southeast Asia, and East Asia</td>
</tr>
<tr>
<td>Drawing maps</td>
<td>9(b)</td>
</tr>
<tr>
<td>Comparing and contrasting</td>
<td>13(a, b)</td>
</tr>
<tr>
<td>Measuring distance</td>
<td>5(a)</td>
</tr>
<tr>
<td>Identifying phenomena</td>
<td>4, 6, 7</td>
</tr>
<tr>
<td>Evaluating</td>
<td>13</td>
</tr>
<tr>
<td>Explaining phenomena</td>
<td>8</td>
</tr>
<tr>
<td>Locating and coordinating</td>
<td>4, 6, 7, 8, 9(b, c), 13</td>
</tr>
<tr>
<td>Completing/constructing matrix</td>
<td>12</td>
</tr>
<tr>
<td>Observing</td>
<td>10</td>
</tr>
<tr>
<td>Communication</td>
<td>All</td>
</tr>
</tbody>
</table>

*Refers to the question # on each exercise.*
The first map location test was administered prior to treatment. The second map location test was given following treatment. Based upon the scores for pre- and posttests, it was decided that the cognitive theory designed materials were enhancing student place location knowledge.

The present study utilized the materials which were developed. The ensuing section provides a detailed description of these materials.

Description of Instructional Material Unit

The study employed a variety of researcher designed and commercially produced instructional materials. The major purpose of these materials was to help facilitate place location learning. As a result, the instructional materials were structured around cognitive theory principles, concepts, and generalizations for use in the experimental and comparison treatment courses.

The geography courses used the following unit plan: South Asia, Southeast Asia, and East Asia; Africa and the Middle East; Soviet Union and Eastern Europe; Western Europe, Australia, and New Zealand; and South America, Central America, the Caribbean, and North America (see Appendix D). Each unit had incorporated student learning activities designed from the following:

1. Atlas Exercises based upon the Goode's World Atlas (1982) were utilized to familiarize students with: (a) climatic maps, (b) economic maps, (c) political maps, (d) physical relief maps, (e) transportation maps, and (f) population maps. The questions were
hierarchal with simple to complex learning tasks presented in each exercise. Appendix E contains the exercises designed.

2. **Wall maps** were used to illustrate (a) prominent physical and political entities of the United States; (b) physical and political attributes of each continent; (c) physical, religious, economic, population, and transportation routes; and (d) the state of Michigan.

3. **Films** were secured from Western Michigan University and Ferris State College. These included: (a) film(s) for the specific purpose of teaching, and (b) film(s) that conveyed general background on a given topic/theme. For example, "Where did the Colorado Go?" was utilized to give students background information on the water problems of the Western United States.

4. **Slides** were used during the course of instruction. Although slides do not provide the students with a direct contact with a person or place, they do give the subjects a feel and/or flavor for the regions studied. The purpose of the slides was to provide the students with perceptual, experimental props to reinforce and make realistic the notion of different regions of the world.

5. **Transparencies** depicting varied subject-matter were produced. These were designed to demonstrate maps, charts, and pictures in the classroom.

6. A module on *Maps, Mapping, and Map Reading* (Stoltman, 1980a) was used to introduce students to elementary concepts of mapping, map usage, map projections, longitude, latitude, and other spatial data.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
7. **Globes**, both regular and slate globes (16 and 24-inch), were used by the treatment instructors to acquaint subjects with the concept of mathematical, nominal, and relative locations. In addition, the concept of the "great circle" was introduced.

8. **Book Review.** Each student was required, in experimental and comparison treatment groups, to select a novel that contained geographical prose. The purpose of this was to give students a "feel" or "spirit" of a particular place or time in history (Lamme, 1977). The treatment instructors suggested such novels as **Centennial** (Michener, 1974), **Congo** (Crichton, 1981), **Hawaii** (Michener, 1959), **The Azanian Assignment** (Finlay, 1978), and **Travels with Charley in Search of America** (Steinbeck, 1962), as well as student's freedom to select an appropriate novel. Students were encouraged to follow Lamme's (1977) conceptual model in emphasizing in their review the type of geographical material contained in the novels, namely: landscape, human ecology, strategy, and regionalism.

9. A **data sheet** was distributed to all treatment students featuring information about major regions of the world. Name, land use, current population/annual population growth, religion, literacy level, government legal name, type of government, capital city, and economic information (Gross National Product, per capita, export value, and import values) were included in each data sheet (Appendix F).

10. Prior to each examination a **study guide** was distributed to all treatment and comparison treatment subjects (Appendix G).
11. Examinations were administered periodically throughout the treatment to test student comprehension of general concepts, principles, and generalizations studied in class. Part of each examination consisted of a regional map location test (Appendix H).

12. In order to complement the lectures and materials for treatment purposes, the instructors placed copies of de Blij's (1981) *Geography: Regions and Concepts* book on reserve in the library. Readings were assigned to reinforce the concepts of the major regions studied in class. The materials were used as an integral component during the treatment phase.

**Instrumentation**

The study utilized three instruments for data collection:
(a) *Background Data Questionnaire (BDQ)*, (b) *Map Location Test I (MLT I)*, and (c) *Map Location Test II (MLT II)*. The BDQ was used to collect information about the subjects who participated in the study. The BDQ was based upon a review of such instruments in the literature, and the instrument was pilot tested prior to data collection (Appendix I).

The MLT I was used as a pretest and the MLT II was used as a posttest. The pretest MLT I established the level of the subject's knowledge on place locations before treatment and the MLT II established knowledge on place locations following treatment. The MLT I contained 35 items (30 countries and five capital cities). The MLT II contained 60 countries and 10 capital cities. The examinee was asked to place a correct number, e.g., 1 = State of Israel, on
an outline map of the world showing political subdivisions. The Basic Intelligence Factbook (Director of Public Affairs, 1980) was the source for randomly selecting the legal names of the countries and capital cities included in the MLT I and MLT II.

Validity

Several similar map tests of country and city names have been validated and used in published studies. One was the map location test developed and tested by Wise (1975) focusing on knowledge of place locations of selected cities and countries. A similar test was administered by Griffin and Fredrich (1976) and Pike and Barrows (1979) in their research on place locations. However, for the purpose of this research the content validity of the MLT I and MLT II was established by selecting a sample of countries and cities. This was done by listing "all" the countries and capital cities and then selecting the nations and capital cities by employing simple random sampling procedures (Gregory, 1978; Hinkle, Wiersma, & Jurs, 1979). In addition, the location tests were under development for several years and validity procedures were incorporated in those developmental steps.

Reliability

Kuder and Richardson (1937, pp. 151-160) developed a method that could be utilized to establish internal consistency based on rational equivalence. Importantly, this procedure results in a coefficient of stability. Kerlinger (1973, pp. 442-443) identified
stability as a synonym for reliability. Reliability coefficients were calculated for both MLT I and MLT II. Pretest scores were used to establish reliability coefficients for MLT I. In order to establish reliability for MLT II, posttest scores were analyzed.

The Western Michigan University computer program, Statistical Package, was used to calculate the internal consistency of MLT I and MLT II. For MLT I, the reliability coefficient ranged from $r = .07$ to $r = .77$, with an overall reliability of $r = .93$ ($n = 126$). The same technique was utilized for MLT II. A coefficient was computed for each of the countries and cities listed, ranging from $r = .00$ to $r = .74$, with an overall reliability of $r = .94$ ($n = 70$).

Internal and External Validity

Any pretest-posttest control experimental design requires that consideration be given to the extent to which factors inhibiting internal and external validity can be minimized. Internal validity is crucial in order for the effects of the experimental treatments to be ascertained. Without internal validity the researcher cannot use results objectively since they may have been caused by other factors. External validity refers to the degree and/or limit to which the attained results of the experiment can be generalized to other conditions, peoples, and settings (Bracht & Glass, 1968, p. 438; Kerlinger, 1973, p. 400).

A variety of factors that may hinder internal validity have been identified, articulated, and elaborated upon by Campbell and Stanley (1966, pp. 5-6). They identified eight sources that may
jeopardize internal validity. They are: history, maturation, testing, instrumentation, statistical regression, selection, experimental mortality, and selection-maturation interaction. History is defined as the events that might affect the final outcome. Maturation involves certain processes that are inherent in the individual. These processes are a function of the time and thus might affect the results. Testing refers to the psychological effect of the pretest and its influence upon the posttest results. Statistical regression toward the mean is an effect which permits the higher and lower scores by individual respondents to move toward the mean without any regard to the treatment administered. This phenomenon occurs most frequently when individuals have been chosen on the basis of their extreme test scores. Selection refers to factors that might be operating in a nonrepresentative manner when selecting subjects for treatment. Differential loss of individuals from the target population constitute experimental mortality. It is possible that some type of interaction might occur, resulting in a lack of internal validity.

In addition to the internal validity factors, Campbell and Stanley (1966, pp. 5-6) identified, but did not detail, sources of external validity. However, the factors identified were: the reactive or interactive effect of testing, the interaction effects of selection biases and the experimental arrangements, and multiple-treatment interference.

Several years later Bracht and Glass (1968) restudied the concept of internal and external validity of research design and
elaborated on the sources of external validity since these were not dealt with in detail by Campbell and Stanley. Two major factors hindering generalizability were identified and discussed. They were population validity and ecological validity. Population validity refers to generalizability of the experimental effects to other similar groups. Ecological validity, on the other hand, encompasses the generalizability of the experiment to other conditions, settings, and environments (Bracht & Glass, 1968, p. 438). Bracht and Glass further articulated more precise sources for threats to external validity. Under population validity, for example, they detailed experimentally accessible population versus the target population.

One means to minimize the extraneous variables threatening internal validity is to randomize subjects for experimental treatment in a Pretest-Posttest Control Group Design. It was not possible to randomize subjects in the present study since they were already enrolled in designated introductory geography courses. The concepts of internal and external validity applicable to this study are described under the limitations section in the last chapter.

Design and Procedure

This study was designed to gain insights and answer research questions with respect to cognitive theory based Atlas Exercises and Supplementary Instructional Materials designed to enhance geographic place location knowledge of students at the undergraduate level. This study relied on the experimental treatment, BDQ, and pre-post map location tests for formulating and testing of the hypotheses.
constructed in Chapter II of this study. A Pretest-Posttest, non-randomized, Group Design (Campbell & Stanley, 1966, p. 8) with various independent variables was selected for the study. The independent variables that were controlled included administration of BDQ, MLT I, MLT II, Atlas Exercises, and Supplementary Instructional Materials. The research design is shown in Table 5.

Procedure

During the month of November 1982, a number of experienced geography instructors were identified for possible participants in the study. These individuals taught various introductory courses in the Departments of Geography, Western Michigan University, Central Michigan University, and Ferris State College. All but one of them held a minimum of a doctoral degree in geography, and 12 years of teaching experience.

Each instructor was approached and/or contacted personally by the researcher to determine the level of interest and willingness to participate in the study (Appendix J). As a result, three instructors agreed to participate. The researcher also served as an instructor for treatment purposes in the Department of Geography, Western Michigan University.

All professors participating in the study were requested to read the following statement to their classes during the first class meeting with the exception of the comparison group that was administered no specifically designed treatment (located at Central Michigan University):
Table 5
Pretest-Posttest Research Design

<table>
<thead>
<tr>
<th>Pretest&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Treatment&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Posttest&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG T&lt;sub&gt;1&lt;/sub&gt;</td>
<td>FR</td>
<td>T&lt;sub&gt;2&lt;/sub&gt;</td>
</tr>
<tr>
<td>AG T&lt;sub&gt;1&lt;/sub&gt;</td>
<td>PR</td>
<td>T&lt;sub&gt;2&lt;/sub&gt;</td>
</tr>
<tr>
<td>AG T&lt;sub&gt;1&lt;/sub&gt;</td>
<td>NT</td>
<td>T&lt;sub&gt;2&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>Pretest/Posttest Key:

AG = Assignment of subjects into treatment, partial treatment, and no treatment groups.

T<sub>1</sub> = Map Location Test I scores

T<sub>2</sub> = Map Location Test II scores

<sup>b</sup>Treatment Key:

FR = Full range of treatment (Atlas Exercises and Supplementary Instructional Materials administered for 14 weeks' duration at Western Michigan University).

PR = Partial range of treatment (Supplementary Instructional Materials administered for 6 weeks' duration at Ferris State College).

NT = No specially designed treatment administered except regular classroom activities (at Central Michigan University).

You are requested to participate in this class (e.g., world geography) and to complete Map Location Test I and a Background Data Questionnaire as part of the requisite for the completion of this course. One of my responsibilities this semester is to instruct you. During the course of instruction I shall attempt to enhance your present level of geographic knowledge through the use of cognitive theory designed instructional materials (Atlas Exercises and Supplementary Instructional Materials).
I will be passing out two survey instruments (MLT I and BDQ) to be completed by you, which will help me know more about your knowledge of geography (place locations) and hopefully help me improve the instructional methods.

Before the semester (or quarter) is over I will explain in detail how the information has been used. If you have any reservations about completing the assigned test, feel free to raise pertinent questions for further discussion and/or clarification.

All subjects completed the MLT I and BDQ during the first class meeting. The instructors were requested to impose a 60-minute limit on the subjects to complete the map location test. However, no time limit was set for the BDQ administration.

The treatment phase of the study included class sessions of 75 minutes' duration 2 days a week for a 14-week semester in the Department of Geography, Western Michigan University. At Ferris State College, class sessions of 50-minutes' duration, 3 days a week for a 6-weeks' treatment was administered by a Professor of Geography. However, at Central Michigan University no specifically designed materials were included in the course of treatment except the regular class instruction for a 15-week semester. Subjects at Central Michigan University, however, were administered the BDQ, MLT I, and MLT II for comparison purposes. The Ferris State College and Central Michigan University professors were contacted by telephone twice during the course of the experiment to determine progress and/or problems.

The final class meeting was utilized for administration of the MLT II to all groups. Prior to the actual posttest, however, each instructor was asked to read the following statement to the
examinees: "I would like you to place all the countries and capital cities in their proper political subdivisions. These appear on the instrument (MLT II) I am handing to you."

All instructors were requested to impose 60-minutes' for the completion of the test. When the MLT II instruments were returned to the respective instructors, the subjects were then informed, by their instructors, that they had been part of a research project.

Data Analysis

The pre-place-location knowledge data were first analyzed to determine the characteristics of the sample. This was accomplished using the responses to the BDQ and MLT I in order to derive scores for each of the variables under investigation. All completed BDQ and MLT I items were used in the calculation to obtain the score for study participants. The sum scores for each group provided the overall profile of the sample with regard to geographical background and place location knowledge level.

After the composite profile of the research sample was established, examinees were categorized according to whether or not they had: (a) taken geography courses at the senior high and/or college levels; (b) read newspapers and/or popular magazines; (c) watched televised news; (d) owned atlases, globes, and/or believed they could read map symbols; and (e) traveled within the United States and/or foreign nations (see Appendix K).

Following the establishment of the preceding variable associations, a median was computed and subsequently was used as a point of
reference for categorization of groups. One group was established consisting of those examinees who did not participate and/or were not active geography course takers, media readers, media viewers, reference users, and travelers. A second group was established from the group that reported positively in each of the preceding situations. This task was accomplished by arranging the data to determine the median point for the subdivision of the groups. The half scoring above the median was classified as engaged in greater geographical activities compared to the half that scored below the median.

Bearing the foregoing considerations in mind, the independent variables related to Subhypotheses A through E were operationalized in the following manner. The first independent variable was derived by summing, for each subject, the number of courses taken at senior high school and/or college levels. The second independent variable was determined by totaling the number of newspapers and/or magazines read by each subject. The third independent variable was acquired simply by recording each subject's yes or no response for televised world news. The fourth independent variable was also operationalized by gathering and tabulating each examinee's yes or no answer for atlases, globes, and/or judging they could read map symbols. The fifth independent variable was procured by summing, for each subject, the number of states and/or foreign countries visited. In each case the MLT I score, dependent variable, was used for analysis. Further, the One-Way Analysis of Variance was utilized to test all
of the preceding hypothesized relationships between the independent and dependent variables.

An analysis of variance was applied to Hypothesis 2 to detect whether there was a difference in place location knowledge mean scores between the group that was administered instruction through cognitive designed Atlas Exercises and Supplementary Instructional Materials compared to a group that was allocated no specially designed cognitive based materials instruction. Further, the analysis of variance (one-way) was utilized to analyze Hypothesis 3 to elicit whether there was a difference in mean place location test scores between the group that was administered instruction through cognitive theory based Atlas Exercises and Supplementary Instructional Materials compared to a group that was administered treatment through only cognitive based Supplementary Instructional Materials. Finally, analysis of variance was applied to test Hypothesis 4 to determine whether there was a difference in place location knowledge mean test scores between the group that was presented treatment through only cognitive designed Supplementary Instructional Materials compared to that group which received no specifically cognitive based instruction.

The researcher selected the .05 a level for reporting of the study results.

Summary

The foregoing chapter detailed the procedures that were employed in the study. The sample was selected from three Departments
of Geography in Michigan. Both researcher designed and commercially produced instructional materials were utilized in this study. Salient aspects of internal and external validity, reliability, and validity were identified and discussed. An experimental design based on pre- and posttreatment measurement for the investigation of the hypotheses was constructed. The MLT I and MLT II were used as the main measurement instruments for the study. Further, the BDQ was used to evaluate whether the study participants possessed homogeneous background with regard to geographic place location knowledge.
CHAPTER IV

RESULTS AND DISCUSSION

The purpose of this chapter is to report the results of a statistical analysis of data collected in the research study for the testing of the hypotheses. Results of the study are reported through (a) analysis of Map Location Test I scores and Background Data Questionnaire, and (b) comparison of Map Location Test II scores with the full cognitive treatment, partial cognitive treatment, and no cognitive treatment groups. Finally, the section on the discussion reviews the results and relates the research outcome to the overall theoretical framework of the study.

Research Results

The research results are presented in the following manner: (a) the testing of the research hypotheses, (b) the analysis of data, and (c) a general discussion of the hypotheses and data.

Hypothesis 1

There is a relationship between mean scores on the place location knowledge pretest when the prior experiences of the subjects with geographical materials and/or activities are considered. The prior experiences of the subjects with materials and/or activities include their role as geography students, media viewers, reference users, media readers, and travelers. In order to test this main
hypothesis, five subhypotheses were tested to determine relationships between and/or among the variables.

**Subhypothesis A.** There is a difference in the place location knowledge pretest mean scores between subjects who had geography courses in the senior high school and/or college levels compared to mean score for those subjects who did not have geography courses.

Differences between the mean place location knowledge scores ($F = 4.4, df = 1/369, p = .03$) for the two groups were observed (see Table 6). Subjects who reported having taken geography courses at the senior high school and/or college levels demonstrated better knowledge of world countries and capital cities. The research hypothesis was accepted at the .05 $\alpha$ level. It can be concluded, therefore, that there was a difference in geographic place location knowledge as indicated by a higher mean score for subjects who were exposed to geography courses compared to those subjects who were not.

**Subhypothesis B.** There is a difference in the place location knowledge pretest mean scores between subjects who read newspapers and/or popular magazines compared to those subjects who do not read these materials.

The analysis of mean scores (see Table 7) suggests that an important difference exists in place location knowledge between subjects who read newspapers and/or popular magazines when compared to those who do not read similar materials ($F = 10.0, df = 1/369, p = .00$). Therefore, the research hypothesis was accepted at the .05 $\alpha$ level. It can be concluded that subjects who read newspapers and/or
Table 6
One-Way Analysis of Variance for Comparison of the MLT I Scores Between Subjects Who Had Geography Courses and Those Who Did Not (n = 371)

<table>
<thead>
<tr>
<th>Group</th>
<th>Size</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGCa</td>
<td>283</td>
<td>10.2</td>
<td>7.4</td>
</tr>
<tr>
<td>GCTb</td>
<td>88</td>
<td>12.2</td>
<td>7.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Sq.</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>1</td>
<td>254.6</td>
<td>4.4</td>
<td>.03</td>
</tr>
<tr>
<td>Within</td>
<td>369</td>
<td>56.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NGC = No geography courses.  
GCT = Geography courses taken.

Table 7
One-Way Analysis of Variance for Comparison of the MLT I Scores Between Subjects Who Read Newspapers and/or Popular Magazines and Those Who Do Not (n = 371)

<table>
<thead>
<tr>
<th>Group</th>
<th>Size</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNRPa</td>
<td>245</td>
<td>9.8</td>
<td>7.2</td>
</tr>
<tr>
<td>GRNPb</td>
<td>126</td>
<td>12.4</td>
<td>7.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Sq.</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>1</td>
<td>560.5</td>
<td>10.0</td>
<td>.00</td>
</tr>
<tr>
<td>Within</td>
<td>369</td>
<td>56.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GNRP = Group that did not read newspapers or popular magazines.  
GRNP = Group that did read newspapers or popular magazines.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
popular magazines have a better knowledge of the nations and capital cities of the world compared to those subjects who do not.

Subhypothesis C. There is a difference in place location knowledge pretest mean scores between subjects who watched world news on television compared to those subjects who did not.

A difference in mean test scores was observed between subjects who watched world news on television to those who did not (see Table 8) \( (F = 9.9, \, df = 1/369, \, p = .00) \). The subjects who watched world news scored a higher mean score than those students who did not watch televised news. Therefore, the research hypothesis was accepted at the .05 \( \alpha \) level. It can be concluded that watching world news does help increase geographic place location knowledge.

Table 8

One-Way Analysis of Variance for Comparison of the MLT I Scores Between Subjects Who Watched World News on Television Compared to Those Who Did Not \((n = 371)\)

<table>
<thead>
<tr>
<th>Group</th>
<th>Size</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na</td>
<td>89</td>
<td>8.5</td>
<td>6.8</td>
</tr>
<tr>
<td>WNb</td>
<td>282</td>
<td>11.4</td>
<td>7.6</td>
</tr>
</tbody>
</table>

Source

\( \begin{array}{c|c|c|c|c}
\text{Source} & \text{df} & \text{Mean Sq.} & F & \text{Prob.} \\
\hline
\text{Between} & 1 & 556.4 & 9.9 & .00 \\
\text{Within}  & 369 & 56.0 & & \\
\end{array} \)

\( ^aNa = \text{Did not watch world news.} \)
\( ^bWN = \text{Watched world news.} \)
Subhypothesis D. There is a difference in place location knowledge pretest mean scores for subjects who owned atlases, globes, and/or believed they could read map symbols compared to those who did not indicate a positive response to these three questions.

Differences were observed in the mean scores on the geographic place location knowledge test between subjects who reported owning materials and/or being able to read map symbols as opposed to those who did not own geographical materials/read map symbols (see Table 9) \( (F = 5.5, \text{df} = 1/369, p = .01) \). The research hypothesis, therefore, was accepted at the .05 \( \alpha \) level. Subjects who reported owning materials and who were able to read map symbols demonstrated better geographic place location knowledge on the MLT I than did subjects who did not (own materials or could not read map symbols).

Subhypothesis E. There is a difference in the place location knowledge pretest mean scores between subjects who have traveled in the United States and/or foreign nations compared to those subjects who have not.

A difference in the mean scores for place location knowledge between subjects who had traveled in the United States and/or foreign nations compared to those subjects who have not traveled can be observed (see Table 10) \( (F = 11.1, \text{df} = 1/369, p = .00) \). The research hypothesis was accepted at the .05 \( \alpha \) level. Subjects who have traveled in the United States and/or foreign nations posited better geographic place location knowledge compared to those who have not traveled in the United States and/or foreign nations.
Table 9
One-Way Analysis of Variance for Comparison of the MLT I Scores Between Subjects Who Owned Atlases, Globes and/or Believed They Could Read Map Symbols Compared to Those Who Did/Could Not (n = 371)

<table>
<thead>
<tr>
<th>Group</th>
<th>Size</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM&lt;sup&gt;a&lt;/sup&gt;</td>
<td>306</td>
<td>10.3</td>
<td>7.2</td>
</tr>
<tr>
<td>OM&lt;sup&gt;b&lt;/sup&gt;</td>
<td>65</td>
<td>12.7</td>
<td>8.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Sq.</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>1</td>
<td>312.9</td>
<td>5.5</td>
<td>.01</td>
</tr>
<tr>
<td>Within</td>
<td>369</td>
<td>56.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>NM = No materials.
<sup>b</sup>OM = Owned materials.

Hypothesis 2

There is a difference in the mean place location knowledge between the group that received treatment through cognitive theory based Atlas Exercises and Supplementary Instructional Materials and the group which received no specially prepared cognitive instructional materials.

Differences in the mean scores were observed in the place location knowledge level between the experimental treatment group and the comparison group (see Table 11) ($F = 603.5$, $df = 1/240$, $p = .00$). Specifically, subjects in the experimental group who received a full range of cognitive based instruction (ETG) had higher mean scores on
Table 10

One-Way Analysis of Variance for Comparison of the MLT I Scores Between Subjects Who Have Traveled in the United States and/or Foreign Nations Compared to Those Who Have Not Traveled (n = 371)

<table>
<thead>
<tr>
<th>Group</th>
<th>Size</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT&lt;sup&gt;a&lt;/sup&gt;</td>
<td>268</td>
<td>9.9</td>
<td>7.4</td>
</tr>
<tr>
<td>T&lt;sup&gt;b&lt;/sup&gt;</td>
<td>103</td>
<td>12.8</td>
<td>7.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Sq.</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>1</td>
<td>619.9</td>
<td>11.1</td>
<td>.00</td>
</tr>
<tr>
<td>Within</td>
<td>369</td>
<td>55.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>NT = Not traveled within the United States or foreign nations.
<sup>b</sup>T = Traveled within the United States or foreign nations.

The geographic place location knowledge test than did the comparison group. The research hypothesis suggesting a difference between the posttest mean scores for the experimental and the comparison groups was accepted at the .05 a level. The data suggest that statistically important differences existed between the posttest scores of the experimental and comparison groups. The experimental treatment group was administered the full range of cognitive materials and scored higher on the MLT II than did the comparison group that was not exposed to cognitive based instructional materials. It can be concluded, therefore, that manipulating the main independent variable, the use of cognitive based Atlas Exercises and Supplementary
Instructional Materials, had a positive effect on the examinees' posttest mean scores.

Table 11
One-Way Analysis of Variance for Posttest MLT II Scores Between the Experimental Treatment Group and the Comparison Group (n = 242)

<table>
<thead>
<tr>
<th>Group</th>
<th>Size</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG(^a)</td>
<td>154</td>
<td>19.5</td>
<td>10.3</td>
</tr>
<tr>
<td>ETG(^b)</td>
<td>88</td>
<td>55.6</td>
<td>11.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Sq.</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>1</td>
<td>72710.0</td>
<td>603.5</td>
<td>.00</td>
</tr>
<tr>
<td>Within</td>
<td>240</td>
<td>120.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)CG = Comparison group.
\(^b\)ETG = Experimental treatment group.

Hypothesis 3

There is a difference in place location knowledge mean scores between the group that was administered treatment through cognitive theory designed Atlas Exercises and Supplementary Instructional Materials compared to that group which received treatment through only cognitive based Supplementary Instructional Materials.

A difference was observed in the place location knowledge post-test mean scores between subjects who were administered Atlas Exercises and Supplementary Instructional Materials compared to those
individuals who had treatment through only Supplementary Instructional Materials (see Table 12) \((F = 273.3, \text{df} = 1/167, p = .00)\).

The research hypothesis was accepted at the .05 \(\alpha\) level. A statistical difference between the mean scores for the groups suggests that the experimental treatment group which was administered a full range of cognitive materials achieved a higher mean on the MLT II than did the group which was given a partial range of instruction. It can be concluded that varying the main independent variable, or the full use or partial use of the cognitive based Atlas Exercises and Supplementary Instructional Materials, affected the mean post-test MLT II scores.

### Table 12

<table>
<thead>
<tr>
<th>Group</th>
<th>Size</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETGa</td>
<td>88</td>
<td>55.5</td>
<td>11.9</td>
</tr>
<tr>
<td>CTGb</td>
<td>81</td>
<td>22.5</td>
<td>14.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Sq.</th>
<th>(F)</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>1</td>
<td>46010.5</td>
<td>273.3</td>
<td>.00</td>
</tr>
<tr>
<td>Within</td>
<td>167</td>
<td>168.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(a\) ETG = Experimental treatment group.

\(b\) CTG = Comparison treatment group.
Hypothesis 4

There is a difference in place location knowledge mean scores between the group that was administered treatment through only cognitive based Supplementary Instructional Materials compared to that group which received no specific cognitive designed instructional materials.

A difference in the posttest mean scores on the geographic place location knowledge test was observed between subjects who were given treatment through Supplementary Instructional Materials and those who were not administered any specially prepared cognitive instructional materials (see Table 13) ($F = 3.6, df = 1/233, p = .05$). The research hypothesis was accepted at the .05 $\alpha$ level. Presenting the Supplementary Instructional Materials to the comparison group did facilitate higher geographic place location cognition compared to that group which did not receive specially prepared cognitive based instructional materials.

Discussion of the Results

In order to maintain continuity with the previous section, the discussion will adhere to the same sequence as the hypotheses. Additionally, student responses and the effectiveness of the Atlas Exercises and Supplementary Instructional Materials will be examined.

The first subhypothesis was supported in that the mean score for subjects who did not study geography at the senior high school and/or college levels was 10.2, whereas individuals comprising the
Table 13

One-Way Analysis of Variance for Posttest MLT II Scores
Between the Comparison Treatment Group and the Comparison Group
(n = 235)

<table>
<thead>
<tr>
<th>Group</th>
<th>Size</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTGa</td>
<td>81</td>
<td>22.5</td>
<td>14.0</td>
</tr>
<tr>
<td>CGb</td>
<td>154</td>
<td>19.5</td>
<td>10.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Sq.</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>1</td>
<td>500.4</td>
<td>3.6</td>
<td>.05</td>
</tr>
<tr>
<td>Within</td>
<td>233</td>
<td>138.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

aCTG = Comparison treatment group.
bCG = Comparison group.

group that did engage in geography courses obtained a mean score of 12.2 on the MLT I. This result suggests that both groups were deficient in geographic place location knowledge. This notion has been derived from the fact that the instrument, MLT I, contained a total of 35 items (30 countries and five capital cities).

The results supported the second subhypothesis in that individuals who reported reading newspapers and/or popular magazines obtained a mean score of 12.4 compared to 9.8 attained by subjects who did not read similar materials. This implies that even though subjects read printed media, their geographic place location recognition is minimal. It further suggests that there are additional variables that need to be appraised, such as identification of specific
instructional materials, before this situation could be improved.

The third subhypothesis was in the predicted direction. The difference in achievement level between the two groups may have been exhibited by the individual respondent's different characteristics, preferences, and learning styles. However, it appears that visual stimuli facilitate place location learning since individuals who were active viewers of televised news acquired a mean score of 11.4 compared to 8.5 achieved by the subjects who did not watch world news on television.

The fourth subhypothesis was accepted. The subjects who owned materials and/or those who believed they could read map symbols exhibited a mean score of 12.7 compared to 10.3 exhibited by those subjects who did not own materials and/or could not read map symbols. These low mean scores might be due to the fact that actually possessing the materials and/or being able to read map symbols does not guarantee better conceptualization and recalling of place locations; and that acquisition of additional educational experiences are necessary in order to acquire geographic place location cognition competency.

The fifth subhypothesis positing a difference in place location knowledge between individuals who had traveled in the United States and/or foreign nations and those who did not was accepted. It appears that traveling in general facilitates better geographic place location knowledge. However, the mean score for the subjects who reported having traveled was 12.8, compared to 9.9 derived by those subjects who did not travel.
Results of the second major research hypothesis showed a difference in place location knowledge between subjects who comprised the two groups. Specifically, the full cognitive treatment group revealed a difference in gains in knowledge. It is likely that sequencing and structuring of the cognitive learning materials in a hierarchy may have had a positive effect as measured by information recall on knowledge-level examination; MLT II. The mean test result for the full cognitive treatment group was 55.6 compared to 19.5 for the comparison group.

After testing Hypothesis 3, the results indicated a strong support for the full cognitive treatment group's achievement advantage over the comparison treatment group. This implies that the Atlas Exercises and Supplementary Instructional Materials were effective in enhancing student place location knowledge. This notion is further supported in that the mean score for the full cognitive treatment group was 55.6, whereas the comparison treatment group exhibited a mean score of 22.5.

Results from the fourth hypothesis did show achievement gains by the comparison treatment group. This condition might be due to the fact that the tasks inherent in the Supplementary Instructional Materials, for the most part, do possess reasoning processes that are crucial to forminganchoring geographical principles in student cognitive structure. From this perspective, the data seem to support the effectiveness of the cognitive materials. Moreover, it should be noted that subjects who were given treatment through Supplementary Instructional Materials attained a mean score of 22.5.
compared to 19.5 achieved by the comparison group. However, it is evident that the comparison treatment group scored slightly higher on the MLT II than the comparison group.

The Atlas Exercises contained both simple and complex learning activities. The part of the exercises which addressed low levels of knowledge were responded to correctly by a large portion of the subjects in the full cognitive treatment group. Additionally, higher order based tasks were also answered adequately. Questions that required synthesis and integration of information from various maps, such as vegetation, mineral resources, and population distribution, located in the Goode's World Atlas proved less difficult for the group as a whole. In contrast to this, higher order questions that focused on integration and processing of data proved difficult for less able students. This conclusion was based on the performance of students on essay examinations, exercises, MLT II (score), and final course grades. However, it is likely that the performance differences, between and/or among able and less able students in the full cognitive treatment, may be due to differentials in cognitive-integration and information processing skills as opposed to question comprehension. Further, it is possible that the higher order questions required the students to reorganize tasks without losing the original meaning of the question. From a different perspective, an analysis of the tasks demonstrated that all low level questions required minimal elaboration, explanation, and data processing skills compared to the higher levels of synthesis and evaluation questions. In other words, those tasks requiring identification and listing of
geographical phenomena proved less difficult for the students to process than did questions requiring elaboration of similarities and differences between phenomena. It appears that higher order cognitive based tasks required more careful interpretation as to the meaning of the question than did the low order tasks. The cognitive task that prescribed greater elaboration through several different maps to construct answers was viewed by students as the more difficult task. It would seem reasonable to suggest, therefore, that higher order cognitive tasks demanded greater effort in decision making. In short, all questions in the exercises required students to use the cognitive processes of recalling, comprehending, organizing, processing, applying, analyzing, and reasoning skills through a variety of geographic data.

In interpreting principles and concepts presented through Supplementary Instructional Materials, little difficulty was exhibited by students. This is evident, when examining the book reviews that stressed derivation of four major geographical themes: landscape, human ecology, strategy, and regionalism. Thus, the effectiveness of the cognate materials was apparent; primarily, because the comparison treatment group did gain an achievement advantage over the comparison group.

Summary

If one accepts the polemic that it is important for students to possess geographic place location knowledge, then the Atlas Exercises and Supplementary Instructional Materials provide a tested
method to achieve that objective. A high level of geographical place location knowledge was acquired by students in the full cognitive treatment group. Further, differences were observed in the geographic place location knowledge mean scores between subjects who were enrolled geography students, media viewers, media readers, reference users, and travelers compared to those subjects who were not.
CHAPTER V

SUMMARY, CONCLUSIONS, EDUCATIONAL IMPLICATIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH

The purpose of this chapter is to provide a summary of the research study. The following subtopics will be examined: summary of the study, summary of the results, conclusions, limitations, educational implications, and possible directions for future research.

Summary

This empirical research study was conceptualized, designed, and implemented to test specifically designed instructional materials intended to enhance the geographic place location knowledge of undergraduate university and/or college students. The instructional strategy incorporated was based upon careful considerations of the place location knowledge scores revealed through MLT I. The author tested instructional materials designed to enhance place location knowledge from a cognitive perspective. The materials were designed to foster higher order learning in treatment groups.

The research study was designed to test the following question: What effects do cognitive theory based instructional materials have on the level of geographic place location knowledge of university and/or college students?

A literature review revealed a paucity of cognitive learning theory based instructional materials pertaining to the research.
question posed in this study. Following the review, the researcher designed cognitive learning theory based materials which focused upon place location knowledge. The principles and generalizations of cognitive theory guided the author in constructing the conceptual structure of the materials, which consisted of Atlas Exercises and Supplementary Instructional Materials. In addition to the Atlas Exercises (main treatment unit), the Supplementary Instructional Materials included films, slides, transparencies, globes, wall maps, data sheets, readings from de Blij's (1981) Geography: Regions and Concepts, a map module, book reviews (novels), study guides, examinations, and regional map tests (subordinate treatment unit).

The instructional materials were designed with sequential and systemic cognitive levels of progression. The purpose of the experimental materials was to facilitate student geographic place location learning through cognitive tasks. The cognitive tasks were traceable throughout the materials constructed. The design of the research incorporated a learning model which included process —► program —► practice within its numerous elements (see Figure 6). Each of the elements, beginning from instructor's assumptions, is interdependent with other components.

Based upon the previous research results, the instructor assumed that the students possessed a little geographic place location knowledge (Wise, 1975). It was further assumed that all students had varying ability or competency skills. Thus, it became necessary to construct specific cognitive based goals and objectives for the materials. The goals and objectives were to: (a) acquaint
FIGURE 8
ATLAS EXERCISES: THE DEVELOPMENTAL PROCESS
students with a variety of maps; (b) facilitate geographic place location learning through differing techniques and approaches; (c) facilitate learning of geographic facts, concepts, skills, and generalizations through formalized activities; and (d) enhance and build upon the existing student knowledge with regard to place location familiarization. This led to the construction of two survey instruments, MLT I and BDQ, for the purpose of collecting data from all study subjects. The MLT I and BDQ were administered prior to experimentation to determine student experience and level of geographic place location recognition. The test results demonstrated a lack of geographic place location knowledge of students at a macro-level. As a result, Atlas Exercises and Supplementary Instructional Materials were developed.

Five sets of exercises were developed from the data presented in the Goode's World Atlas. The questions in the exercises were organized and sequenced in such a way that the learning tasks were structured from simple to more difficult levels of cognitive thought. Further, each exercise comprised geographical concepts and skills which were interrelated with simple to complex learning tasks. The cognate materials also contained concepts and skills similar to the exercises. Next, the instructional materials were tested.

A total of three test groups participated in the experiment: a full cognitive treatment group, a partial cognitive treatment group, and no cognitive treatment group. The full cognitive instruction was administered at Western Michigan University for 14 weeks with subjects receiving two treatments of 150 minutes a week. The
partial treatment—Supplementary Instructional Materials only—was given at Ferris State College for 6 weeks and comprised three treatments of 50 minutes a week. The conventional group, at Central Michigan University, was taught without specially prepared cognitive based materials for two treatments of 78 minutes for 15 weeks at Central Michigan University.

Immediately at the end of the designated time periods, all study participants were administered a specifically investigator constructed 70-item (60 countries and 10 capital cities) MLT II instrument. All MLT II scores were subjected to a statistical test for the purposes of evaluating place location knowledge of students. Moreover, student responses to each exercise were used to derive internal consistency coefficients accomplished through application of Kuder and Richardson formula #20 that yielded the following results: .87, .79, .79, .67, and .90.

It was determined that the exercises and cognate materials were effective in facilitating student geographic place location knowledge. Thus, no major modifications were made in the way the instructional materials were structured and sequenced. In short, the materials could be utilized in teaching geographic place location knowledge.

Summary of the Results

The results in this section will be summarized in accordance with each of the subhypotheses and main hypotheses.
Results between subjects who had geography courses and those subjects who did not: Subjects who reported having had taken courses at the senior high school and/or college levels demonstrated better mean scores on geographic place location knowledge as measured by the MLT I.

Results between subjects who read newspapers and/or popular magazines and those subjects who did not: Subjects who reported reading newspapers and/or popular magazines achieved higher mean scores on the MLT I.

Results between subjects who watched televised news and those subjects who did not: Subjects who were active viewers of televised world news achieved higher mean scores on the MLT I.

Results between subjects who owned atlases, globes, and/or who believed they could read map symbols compared to those subjects who did/could not: Subjects who reported owning materials and/or believed they could read map symbols obtained higher mean scores on the MLT I.

Results between subjects who have traveled in the United States and/or foreign nations compared to those subjects who did not: Subjects who have traveled demonstrated higher mean scores on the MLT I.

Results between the experimental treatment group and the comparison group: Subjects in the experimental treatment group who received a full range of cognitive based instructional materials obtained higher mean scores on the MLT II.
Results between the experimental treatment group and the comparison treatment group: Subjects who were administered a full range of cognitive based instructional materials exhibited higher mean scores on the MLT II.

Results between the comparison treatment group and the comparison group: Subjects who were administered a partial range of cognitive based materials derived higher mean scores on the MLT II.

Limitations of the Study

This study was implemented with several constraints related to internal and external validity. First, it was not possible to randomize subjects for treatment and comparison purposes. This condition was brought about by the fact that all subjects had already elected to enroll for different introductory geography classes offered at Western Michigan University, Central Michigan University, and Ferris State College. Second, experimental materials were used only in the treatment and partial treatment groups. The remaining comparison group, located on a separate campus, did not receive any specially prepared treatment. Third, it is possible, however, that final outcomes reflect professor, group, or differences between and/or among the group of subjects in the study. Finally, inferences from this research must be limited to similar types of instructional materials and students in the United States.
Conclusions

This section presents the major conclusions based upon the research study. The major purpose of this study was to determine the effects of specifically designed cognitive instructional materials on the geographic place location knowledge of undergraduate university and/or college students. The examination of the current data and professional research literature support the contention that Atlas Exercises and Supplementary Instructional Materials based upon cognitive theory do, in fact, enhance geographic place location knowledge of undergraduate university and/or college students.

Implications for Educational Practice

The effectiveness of the exercises and cognate materials suggests several educational implications.

1. The instructional strategies at the undergraduate level must incorporate Atlas Exercises and the Supplementary Instructional Materials in order to enhance student geographic place location knowledge. Specifically, evidence of integrating the materials proved successful in fostering recall, knowledge, comprehension, application, analysis, synthesis, and reasoning skills.

2. The authors of introductory world regional geography textbooks should incorporate similar cognitive instructional materials so that place location familiarization and enhancement is attained.
Recommendations for Future Research

At best the Atlas Exercises and Supplementary Instructional Materials are an effort to clarify current thinking with respect to the type of instructional materials that can be used successfully to enhance geographic place location knowledge. However, from a practical classroom viewpoint, researchers interested in specific learning theories will be able to formulate and relate current instructional practices which are similar in design and function. It is recommended, therefore, that future research efforts be directed toward the following areas.

1. A basic replication of the study should be carried out at other academic institutions. This might provide further support to the cognitive based instructional materials.

2. Recognizing the diversity of interests likely to exist among students in a typical introductory geography class, the content of the Atlas Exercises might be varied and tested on student ability basis rather than uniformly for all students.

3. Expand the MLT I and MLT II to include major rivers, seas, oceans, and mountains.

4. Compare MLT II results from different groups with varied treatments.

5. Similar cognitive theory based instructional materials should be constructed for study and experimentation at the middle and senior high schools.
6. A delayed posttest (MLT II) should be administered to full cognitive treatment group to determine the retention rate after a period of at least 3 months.

7. A cross-cultural study should be conducted to determine the utilization and effectiveness of the Atlas Exercises and Supplementary Instructional Materials.
Appendix A

Map Location Test I
MAP LOCATION TEST I
World Countries and Capital Cities

Class__________________ Name________________________
Date______________ Age_____
Major__________________ Minor_____________________

There are 30 countries, numbered 1 through 30. There are 5 capital cities, numbered 31 through 35. Place the number of the country (1-30) and the capital city (31-35) on the map. Be precise as possible, since accuracy is important.

COUNTRIES

1. State of Israel
2. Republic of Indonesia
3. Commonwealth of Australia
4. Republic of Mali
5. Kingdom of Norway
6. Republic of Iraq
7. People's Republic of Bangladesh
8. Republic of Bolivia
9. Polish People's Republic (Poland)
10. Argentine Republic (Argentina)
11. Portugese Republic (Portugal)
12. Republic of Burundi
13. United Mexican States (Mexico)
14. Republic of Guatemala
15. Federal Republic of Germany
16. United Kingdom
17. Kingdom of Nepal
18. Republic of India
19. Republic of Chile

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
20. Italian Republic (Italy)
21. Kingdom of Saudi Arabia
22. Democratic Republic of Afghanistan
23. Federative Republic of Brazil
24. Federal Republic of Nigeria
25. Republic of South Africa
26. Malaysia
27. Ireland
28. Arab Republic of Egypt
29. New Zealand
30. Democratic and Popular Republic of Algeria

CAPITAL CITIES

31. Kabul
32. London
33. Paris
34. Cairo
35. Tokyo
Appendix B

Map Location Test II
MAP LOCATION TEST II

World Countries and Capital Cities

Class ________________________________ Name ________________________________
Age ________________________________ Major ________________________________
Date ________________________________ Minor ________________________________

There are 60 countries, numbered 1 through 60. There are 10 capital cities, numbered 61 through 70. Place the number of the country (1-60) and the capital city (61-70) on the map. Be precise as possible, since accuracy is important.

Countries

1. Ethiopia
2. Polish People's Republic (Poland)
3. Oriental Republic of Uruguay (Uruguay)
4. Greenland
5. Democratic Republic of Afghanistan
6. Belize
7. Democratic Socialist Republic of Sri Lanka (Ceylon)
8. Kingdom of Denmark (Denmark)
9. Sultanate of Oman (Oman)
10. Socialist People's Libyan Arab Jamahiriya (Libya)
11. Republic of Paraguay
12. Commonwealth of Australia
13. Kingdom of Saudi Arabia
14. Hong Kong
15. Swiss Confederation (Switzerland)
16. United States of America
17. Ireland
18. Union of Soviet Socialist Republics (Russia)
19. State of Qatar
20. Lao People's Democratic Republic (Laos)
21. State of Israel
22. Republic of Peru
23. Malaysia
24. Republic of Ghana
25. Commonwealth of the Bahamas
26. Socialist Republic of Romania
27. Republic of Uganda
28. Republic of Zaire
29. Republic of Ecuador
30. Grand Duchy of Luxembourg
31. Republic of Mali
32. Arab Republic of Egypt
33. Republic of Cuba
34. Gibraltar
35. Socialist Federal Republic of Yugoslavia
36. Republic of South Africa
37. People's Democratic Republic of Yemen
38. Republic of the Philippines
39. State of Kuwait
40. United Kingdom
41. Republic of Haiti
42. Republic of Zambia
43. Argentine Republic (Argentina)
44. Mongolian People's Republic (Mongolia)
45. Republic of Nicaragua
46. Republic of Botswana
47. People's Republic of China
48. Republic of Sierra Leone
49. Republic of Korea (South Korea)
50. Republic of Chad
51. Hashemite Kingdom of Jordan
52. Republic of El Salvador
53. Commonwealth of Dominica
54. Socialist Republic of Vietnam
55. Syrian Arab Republic (Syria)
56. Hellenic Republic (Greece)
57. Kingdom of Nepal
58. Barbados
59. French Republic (France)
60. New Zealand

Capital Cities

61. Cairo
62. Riyadh
63. Bonn
64. Moscow
65. Beijing (Peking)
66. Rome
67. Bern
68. Beirut
69. Brasilia
70. Bangkok
Appendix C

Communication on Geographic Place Location
Knowledge to Roger Mudd
March 3, 1983

Mr. Roger Mudd
NBC, 30 Rockefeller Plaza
New York, NY 10020

Dear Mr. Mudd:

The subject of geography is currently being debated in the popular media as well as in scholarly journals. Your excellent segment on "geographical illiteracy" is just one example of a continuing concern for our nation's neglect of geographical education. Thus, we appreciate your efforts in making the public cognizant of the importance of geography and the contribution it can and does make to the lives of the citizens.

Although there is much concern on the part of the public and scholars alike on place location knowledge deficiency, few experimental studies have been completed, to our knowledge, which demonstrate that students can improve their geographical knowledge. As a result, we have responded by developing and experimenting with instructional materials which address this much debated problem. Our preliminary research findings were presented at the "Michigan Academy of Science, Arts, and Letters" meeting in March, 1982. We have continued to refine, articulate, and extend our instructional techniques in order to pursue the question of geographic literacy. If you are interested in continuing to address the question of geographic literacy, we will be happy to address the more positive side of what can be accomplished.

We, therefore, look forward to hearing from you soon.

Sincerely,

Sharafat Khan
Mott Doctoral Fellow

Joseph P. Stoltman
Professor and Chair
Appendix D

World Regional Geography Syllabus
SYLLABUS
FOR
WORLD GEOGRAPHY THROUGH MEDIA AND MAPS

GEOGRAPHY 102
Department of Geography
Western Michigan University
Instructor: 
Office: 330 Wood Hall
Phone: 383-1839 (if you call and I am not available, please leave your name and telephone number where I can reach you).
Office Hours: To be announced.

WORLD GEOGRAPHY THROUGH MEDIA AND MAPS

Course Rationale

This course presents an introduction to the geography of the earth. This includes the earth as the home of humans, major urban concentrations, descriptive physical characteristics of continents and countries, political subdivision, and general man-land relationships which reflect cultural preferences. Information delivery will be through textual material with a major concentration of carefully selected audio-visual and map study activities to enhance investigating the character of distant places.

Goals and Objectives

The course will deal with the following concepts in an interrelated manner throughout the semester:

A.
1. Understand a definition of geography.
2. Understand the difference between and/or among: Regional geography, physical geography, political geography, economic

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
geography, etc.

3. Why study geography?

B.
1. Be able to identify and locate nations on an outline map.
2. Identify the Prime Meridian.
3. Identify map symbols.
4. Scale.
5. Be able to distinguish between and/or among great circles, small circles, meridians, parallels, longitude, latitude, stereographic projection, equidistant projection, etc.
6. Be able to distinguish between and/or among mathematical, nominal, and relative location(s).
7. Be able to define and evaluate the continental drift theory.

C.
1. Understand and complete at least five Atlas Exercises.
2. Be able to distinguish between weather and climate.
3. Be able to define birth rates, death rates, demographic transition theory, etc.
4. Be able to define and distinguish between disasters and natural hazards.
5. Compare the relationship between "water" and "population" distribution.
6. Compare and contrast at least three definitions of geography and determine which is meaningful to you.
7. Understand "Koppen climatic system."
D.

1. Understand and describe principal vegetation types.

2. Be able to list and describe factors that determine the location of industrial plants.

3. Understand the difference between "site" and "situation."

Instructional Materials

The instructor will utilize a variety of materials during the course of the semester.

This course is structured into the following units: (a) Asia (Southeast Asia, South Asia, Japan, and China); (b) Africa, the Middle East, and Southwest Asia; (c) USSR and Eastern Europe; (d) Western Europe, Australia, and New Zealand; and (e) Latin America, North America, Canada, and the Caribbean.

Specific topics are arranged in the following manner:
- Introduction to the world/maps and mapping.
- Asia (Japan, S.E. Asia, S. Asia)
- Africa
- USSR and Eastern Europe
- Western Europe
- Australia and New Zealand
- Latin America
- North America and Canada
- World water problems
- World population
- Comprehensive examination. (It will cover all topics that
Learning activities will be offered through: *Atlas Exercises* based upon the *Goode's World Atlas* (1982). These will be utilized to familiarize you with: (a) climatic maps, (b) economic maps, (c) political maps, (d) physical relief maps, (e) transportation maps, and (f) population maps.

**Wall Maps** will be used to illustrate: (a) prominent physical and political entities of the United States, (b) one map of each continent showing both physical and political attributes, (c) world maps depicting physical and political attributes, and (d) a map of this state (Michigan).

**Films:** Two types of films will be shown: (a) films for the specific purpose of teaching, and (b) films that will convey general background on a given topic.

**Slides:** Although slides will not provide you with a direct contact with a person or place, they will provide you with a feel or a flavor of a particular place.

**Transparencies** depicting varied subject matter will be presented.

**Data sheets** will be distributed throughout the semester. Name, land use, population/annual growth, religion, literacy level, government legal name, type of government, capital economics—GNP, per capita, and export values will be included in each data sheet.
Scheduled Films

<table>
<thead>
<tr>
<th>Title</th>
<th>Date Shown</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;India: Asian Subcontinent&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Egyptian Villagers&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Man Changes the Nile&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;African All&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Leningrad&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Great Britain&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;South America&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Central America: The Crowded Highlands&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Where Did the Colorado Go?&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Book Review

Each student will be required to complete at least one reading of geographic literature during the course of this semester and hand in a written review of the work. The review should be prepared in accordance with the following specifications:

*1. Title Page
   a. Shows the title of the paper
   b. Shows the course name and number
   c. Shows the student's name
   d. Is neatly arranged

2. **Content**
   a. Relates to the title
   b. Has continuity and "flow"
   c. Develops the major aspects of the assignment
   d. Provides reasonably complete coverage of the title/topic

3. **Correctness of format**
   a. Margins
   b. Spacing
   c. Seriation
   d. Indentations
   e. Pagination

4. **Correctness of grammar**

5. **Correctness of punctuation**

6. **Correctness of spelling**

7. **Neatness of typing**

8. **Style**


   **Please Note:** Book reviews are due no later than __________

   In addition, the **title** must be approved by the instructor. It is highly recommended, therefore, that the students hand in at least four titles of some major novels that contain appropriate geographical themes. The titles must be typewritten on a 4 by 6 card, and must be cited in the following manner:

The possibilities are numerous and you shall need to be selective in your search for high quality geographical journalism. It must be understood that all projects must be of appropriate quality. Under no circumstances should quantity be misinterpreted as an acceptable substitute for quality.

**Instructor's Expectations of Students**

You must adhere closely to the following points:

1. You are expected to spend at least two-three hours per week in learning activities (such as Atlas Exercises, map exercises) outside of class.

2. You are requested to be present, on time, and participate in class.

3. You are expected to keep a record of learning activities and methods you use in realizing your objectives.

4. You are expected to learn whatever transpired in any class session you miss.

5. You are expected to complete, and submit for grading purposes: Atlas Exercises, map exercises, book reviews, and any other assignments deemed appropriate.

**Assistance to the Student**

You may find it helpful to consult the following "resources" whenever you are in need: other students, the course instructor, and the library staff.
Grading Policy

The following criteria will apply toward grading all assignments/examinations:

- 5 examinations 60%
- Map/atlas exercises 15%
- Book Review(s) 25%

Tentative Grading Scale

93–100% = A  
86–92 = BA  
79–85 = B  
72–78 = CB  
65–71 = C  
58–64 = DC  
51–57 = D  
50-below = E

Required Texts and Materials


Required Readings


In addition, readings will be assigned from de Blij's book.

**General Reading List**


Saveland, R. N. Map skills around the world: How to test and diagnose place vocabulary capabilities. *Social Education*, 1983, 47(3), 206-211.
Appendix E

Atlas Exercises
Preface

At the present time much emphasis is being accorded, both in popular and professional literature, to student deficiency in place location cognition. This concept is not revolutionary, but evolutionary in that place cognition has been a concern to educators for many decades. However, the concept has taken on a new dimension or facet; in recent years many educators have called for immediate solution of the problem at all educational levels.

These instructional materials are an effort to develop and enhance place location knowledge through structure and sequence. Specifically, the instructional materials, based on cognitive theory principles, have been developed:

- To acquaint students with a variety of maps;
- To facilitate place location learning through differing techniques and approaches;
- To facilitate learning of geographical concepts, skills and generalizations through formalized activities;
- To enhance and build upon the existing student knowledge with regard to place location knowledge.

INTRODUCTION

Five Atlas Exercises have been designed which can be utilized in introductory geography; especially world geography. Furthermore, the Atlas Exercises do not have a specific "sequential" order for class presentation. In other words, the course instructor may start
a class unit on any given region covered by an exercise. In addition, these exercises can be used in conjunction with available commercial or instructor-designed materials.

Each *Atlas Exercise* has its own instruction for the student. The questions are hierarchal and require the student to use an atlas. Thus, the exercises can be answered independently by the student.

In the section which follows, each *Atlas Exercise* is presented along with a set of instructions for successful completion of the listed tasks.
ATLAS EXERCISE #1
SOUTH ASIA, SOUTHEAST ASIA, AND EAST ASIA

You may use any appropriate resources to complete the following assignment. The Goode's World Atlas (16th ed.) (1982), however, is recommended since most of the questions were comprised from the information given therein.

1. List all the countries that border:
   a. China - 
   b. Vietnam - 
   c. Laos - 

2. List three major mineral resources found in India.

3. Several countries in Southeast Asia suffer from a number of natural hazards; (a) list at least four natural hazards that are prevalent in this region, and (b) describe, in detail, at least one of the natural hazards.
   (a) 1.
   2.
   3.
   4.
   (b)
4. Identify, locate (longitude and latitude), and describe the four major islands that comprise Japan.

5. The Tropic of Cancer passes through China and India. Using your atlas, describe: (a) landforms, (b) climate, (c) population distribution, (d) vegetations, and (e) economic activity along the Tropic of Cancer in both countries.
6. Identify and give the mathematical location (coordinates) for the Northwest, Northeast, and Southwest extent of the Himalayas.

7. Identify, locate, and describe the Korean peninsula in terms of: (a) average rainfall, (b) normal annual range in temperature, (c) population density, and (d) natural resources.

8. What are the coordinates of Shenyeng (China)? What is the mountain range to the northwest of Shenyeng? What river is to the north? What adjacent countries are located in this same latitude (east to west) range?
9. With reference to your local newspaper (e.g., Kalamazoo Gazette), find a news report that mentions a specific place in South or Southeast Asia. Then do the following: (a) summarize the major premise of the article, (b) illustrate, by drawing a "free hand" sketch map to show its location, (c) give the mathematical location (longitude and latitude), and (d) identify the predominant cultural aspects of the place (religion, language).

10. Imagine that you are traveling from west to east across the People's Republic of China. What changes would you observe in the vegetation? How is this related to precipitation? Give reasons.
11. Point out the major differences between and/or among the locations of economic activities for: (a) Malaysia, (b) Indonesia, (c) Hong Kong, and (d) Nepal.

a. 

b. 

c. 

d. 

12. Complete the succeeding matrix as fully as possible.

<table>
<thead>
<tr>
<th>Country</th>
<th>Latitude/Longitude</th>
<th>Population Density</th>
<th>Major Agricultural Products</th>
<th>Major Urban Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burma</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bangladesh</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Korea</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13. Locate the countries of Vietnam and Thailand. Then do the following: (a) compare and contrast the natural vegetation for both countries; (b) compare the precipitation and temperature regimes for Thailand and Vietnam; (c) describe the economic activities of Thailand in relation to Vietnam.

a.

b.

c.
1. Lake Victoria forms a natural boundary for a number of East African nations. Make a list of those nations.

2. List all the countries that border the nations of:
   a. Zaire
   b. Zimbabwe

3. Describe the type of vegetation found in:
   a. South Africa
   b. Nigeria
   c. Somalia
   d. Kenya
   e. Zaire
4. Give the location (longitude and latitude) for Equatorial Guinea. Name the countries that border it.

5. Locate the Sinai Peninsula. Describe:
   (a) the natural environment
   (b) its importance to Egypt
6. Give the location of the island country of Madagascar. Further, what is;
(a) the population density? Does it vary in some areas? Why or why not?,
(b) major economic features, and (c) the annual rainfall and an explanation
as to why one part of the island receives more precipitation than the other
areas.

Location -

a.

b.

c.

7. (a) What is a "landlocked" country? (b) Identify at least three countries
in Africa that are landlocked.

a.

b.
8. Carefully study the maps that show vegetation, annual rainfall and mineral resources for Africa. Explain whether or not there is a relationship between the preceding and population distribution.

9. (a) What is the unique geographical situation of Lesotho?
(b) List two disadvantages for this geographical situation.
   a. 
   b. 

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
10. With the help of a sketch map, describe the location of the Atlas mountains.

11. Complete the following matrix:

<table>
<thead>
<tr>
<th>Country</th>
<th>Climate</th>
<th>Mineral Resources</th>
<th>Population Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zaire</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mali</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Libya</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egypt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
12. The country of South Africa is located in the Southern tip of Africa. Bearing this in mind, cite several advantages and disadvantages of its location in relation to (a) Zaire, and (b) Egypt.

a. Zaire

b. Egypt

13. Locate and describe, with the help of a "free hand" sketch map, the major physical features in:

a. Saudi Arabia -

b. Iran -

c. Turkey -

d. Sudan -
14. Compare and contrast the economies of:
   a. Zimbabwe with Uganda -

   b. Nigeria with Egypt

15. Identify three capital cities in Africa. Compare and contrast them in terms of: (a) site and situation, (b) advantages and disadvantages of their respective location(s), and (c) climate (January and July temperatures, etc.).

   Name capital cities:

   a. 

   b. 

   c. 

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
ATLAS EXERCISE #3
SOVIET UNION AND EASTERN EUROPE

You may use any appropriate resources to complete the following assignment. The Goode's World Atlas (16th ed.) (1982), however, is recommended since most of the questions were comprised from the information given therein.

1. (a) What is the general elevation for the cotton producing areas of the Soviet Union?

(b) What is the average annual rainfall for those areas?

(c) What type of soils are found in the cotton growing areas?

2. (a) List the major mineral resources found in the "Ural Industrial Area."

(b) Draw a sketch map to show the location of the Urals and the surrounding major industrial region(s).
3. (a) What is the population density of the area from Berlin to Prague and east to Kiev?

(b) Point out at least two reasons why this population is located in that region (cite atlas page number that provided you with the evidence).

4. List the socialist nations of Eastern Europe.

5. List the Federated Socialist Republics that constitute the Soviet Union.

6. Complete the following chart using maps in the atlas. The first one is partially done for you to give you an idea how to develop the chart.

<table>
<thead>
<tr>
<th>Ecosystem</th>
<th>Soil/Vegetation</th>
<th>Climate</th>
<th>Agriculture</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Broadleaf Forest</td>
<td>Grasses, Mosses, Lichens</td>
<td>Cool-Summer</td>
<td>Crop Farming</td>
<td>Central U.S.S.R.</td>
</tr>
<tr>
<td>b. Needleaf Forest</td>
<td></td>
<td></td>
<td>Dairy Farming</td>
<td></td>
</tr>
<tr>
<td>c. Steppe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Arid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7. (a) What is the major natural resource at Baku?

(b) Explain why it is important to the Soviet economy?

8. With the help of a sketch map, describe the natural vegetation across Siberia.

9. In a magazine, journal, or a newspaper (printed since July, 1983) find an article that refers to a specific place in the USSR or a Soviet Bloc Country. Then complete the following tasks and the matrix.

(a) Summarize the major point of the article.

(b) Draw a sketch map of its location.
(c) Describe the topography, climate, main natural resources, agriculture, and industry associated with the place.

(d) Summarize the points listed under c in the following matrix.

<table>
<thead>
<tr>
<th>Place</th>
<th>Topography</th>
<th>Climate</th>
<th>Population</th>
<th>Agriculture</th>
<th>Natural Resources</th>
</tr>
</thead>
</table>

(e) Cite your source of information in bibliographic/reference form.

10. Compare and contrast the vegetation of the following areas:

(a) Poland to Hungary

(b) Czechoslovakia to Albania
ATLAS EXERCISE #4
WESTERN EUROPE, AUSTRALIA AND NEW ZEALAND

You may use any appropriate resources to complete the following assign­ment. The Goode's World Atlas (16th ed.) (1982), however, is recommended since most of the questions were comprised from the information given therein.

1. What are the Koppen climatic types for Western Europe and write a brief description, along with a symbol, of each (such as Af, Am Tropical Rainforest).

   1. ________________________________________
   2. ________________________________________
   3. __________________________________________________________________
   4. __________________________________________________________________

Australia

   1. ________________________________________
   2. ________________________________________
   3. ________________________________________
   4. ________________________________________
   5. ________________________________________
   6. ________________________________________
   7. ________________________________________
   8. ________________________________________
   9. ________________________________________

New Zealand

   1. ________________________________________
2. List the islands located between Australia and the Southeast Asian mainland.

3. What is the highest peak in the Southern Alps of New Zealand?
   (a) Name________________
   (b) Elevation________________
   (c) Coordinates________________

4. (a) Describe in detail the physiography of Iceland. (b) Are some parts of Iceland greater elevation than others? Explain your answer.
5. Locate Brisbane and Sydney. Then do the following: (a) With the help of a ruler compute the distance between Sydney and Brisbane. (b) Give coordinates for both cities.

6. Identify two nations in Western Europe that have large Jewish minorities.
   1. ___________________________
   2. ___________________________

7. Give examples of several natural hazards that are common to both Western Europe and Australia.

8. With reference to the matrix, prepare data to demonstrate the population density per square mile of land area and cultivated land in: (a) Australia, (b) United Kingdom, (c) France, and (d) Western Germany.

<table>
<thead>
<tr>
<th>Country Name</th>
<th>Total Land Area</th>
<th>Cultivated Land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Germany</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9. With the help of a sketch map, explain the location of the major cities in relation to the physiography of the (a) Alps and (b) Hungarian Basin.

10. Point out the major differences in climate between Western Europe and Australia; January and July.

11. Using the available information in the atlas, identify and analyze the major industrial regions of Australia and Western Europe in terms of site and situation.

12. Compare and contrast vegetation types in terms of climate between Western Europe and Australia/New Zealand.
ATLAS EXERCISE #5
SOUTH AMERICA, CENTRAL AMERICA, THE CARIBBEAN
AND NORTH AMERICA

You may use any appropriate resources to complete the following assignment. The Goode's World Atlas (16th ed.) (1982), however, is recommended since most of the questions were comprised from the information given therein.

1. List three major agricultural regions for:
   (a) South America
      1.
      2.
      3.
   (b) Central America
      1.
      2.
      3.
   (c) North America
      1.
      2.
      3.

2. List three religions practiced in South America.
   1.
   2.
   3.
3. List the physiographic divisions of the United States.

4. What is the percentage of sunshine for the following places in December—February:
   (a) Kalamazoo, Michigan _____________________________
   (b) Imperial Valley, California_______________________
   (c) Miami, Florida________________________________
   (d) Seattle, Washington_____________________________

5. Describe the geographical extent of the three major mountain ranges in Mexico.

6. Name two leeward and two windward islands in the Caribbean.
7. Locate the following areas of Canada on a sketch map. (a) Atlantic Maritime, (b) the Praire Provinces, (c) the Pacific Coast Provinces, and (d) the Territories.

8. What do the Caatinga and Gran Chaco of Brazil have in common?
9. Although Paraguay is a landlocked nation and has a navigable river; determine from the information given in the atlas whether or not there could develop a potential problem in terms of: (a) transportation, (b) economic development, and (c) political relationships with her immediate neighbors. In each case give reasons for your answer(s).
10. With the help of a sketch map, locate three areas of plantation crops in South America.

11. With the help of a sketch map, describe the following for South America: (a) the major population distribution, (b) natural vegetation, and (c) annual average temperatures.
12. Using the sketch maps from questions #10 and #11, describe any association between the variable on the #10 map and the variables on the #11 map.

13. Compare and contrast major agricultural uses of land in Jamaica with that of: (a) Cuba, and (b) Dominican Republic.
14. Differentiate between natural and human landscapes and soil type associated with mountains between 3,000 to 6,000 feet elevation in North America.

15. Compare and contrast the population patterns for California and Hawaii. (Include a sketch map, if necessary).
Appendix F

Sample Data Sheet
<table>
<thead>
<tr>
<th>Country Name</th>
<th>Land Use</th>
<th>Popul./Annual Growth</th>
<th>Religion</th>
<th>Literacy</th>
<th>Govt. Legal Name</th>
<th>Type of Govt.</th>
<th>Capital</th>
<th>GNP</th>
<th>Per Capita</th>
<th>Export Values</th>
<th>Import Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iraq</td>
<td>18% Cultivated 68% Desert, Waste, Urban 10% Grazing 4% Forest</td>
<td>13,134,000 /3.4%</td>
<td>Muslim Christian Other</td>
<td>20%–40%</td>
<td>Republic of Iraq</td>
<td>Republic</td>
<td>Baghdad</td>
<td>$21.4 M</td>
<td>$1720</td>
<td>$11.2 B</td>
<td>$5.8 B</td>
</tr>
<tr>
<td>Jordan</td>
<td>11% Agri. 88% Desert, Waste, Urban 1% Forested</td>
<td>3,104,000 /3.2%</td>
<td>Muslim Christian</td>
<td>55%</td>
<td>Hashemite Kingdom of Jordan</td>
<td>Constitutional Monarchy</td>
<td>Amman</td>
<td>$1.9 B</td>
<td>$870</td>
<td>$310 M</td>
<td>$1.5 B</td>
</tr>
<tr>
<td>Qatar</td>
<td>Negligible Amount Forested, Remainder Desert, Waste, Urban</td>
<td>170,000 /3.2%</td>
<td>Muslim</td>
<td>25%</td>
<td>State of Qatar</td>
<td>Traditional Monarchy</td>
<td>Doha</td>
<td>$4.5 B</td>
<td>$20,000</td>
<td>$2.4 B</td>
<td>$1.2 B</td>
</tr>
<tr>
<td>Israel</td>
<td>20% Cultivated 40% Pasture 4% Forested 4% Desert Waste, Urban 32% Water 29% Irrigation</td>
<td>3,717,000 /2.3</td>
<td>Judaism Islam Christian Other</td>
<td>Jews: 88% Arabs: 4%</td>
<td>State of Israel</td>
<td>Republic</td>
<td>Jerusalem</td>
<td>$12.7 B</td>
<td>$3480</td>
<td>$4.2 B</td>
<td>$7.1 B</td>
</tr>
<tr>
<td>Kuwait</td>
<td>100% Waste, Desert or Urban</td>
<td>1,318,000 /15.9%</td>
<td>Muslim</td>
<td>60%</td>
<td>State of Kuwait</td>
<td>Nominal Constitutional Monarchy</td>
<td>Kuwait</td>
<td>$12.8 B</td>
<td>$11,780</td>
<td>$10.4 B</td>
<td>$4.6 B</td>
</tr>
<tr>
<td>County Name</td>
<td>Land Use</td>
<td>Popul./ Annual Growth</td>
<td>Religion</td>
<td>Literacy</td>
<td>Govt. Legal Name</td>
<td>Type of Govt.</td>
<td>Capital</td>
<td>Econ. GNP</td>
<td>Per Capita</td>
<td>Export Values</td>
<td>Import Values</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------</td>
<td>-----------------------</td>
<td>----------</td>
<td>----------</td>
<td>------------------</td>
<td>---------------</td>
<td>---------</td>
<td>-----------</td>
<td>------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>1% Agri. 9% Desert, Waste, or Urban</td>
<td>8,224,000 /3.0%</td>
<td>Muslim</td>
<td>15%</td>
<td>Kingdom of Saudi Arabia</td>
<td>Monarchy</td>
<td>Riyadh</td>
<td>$64 B</td>
<td>$9800</td>
<td>$45 B</td>
<td>$17.8 B</td>
</tr>
<tr>
<td>Yemen (Aden)</td>
<td>Less than 1% Arable (of which 25% cultivated)</td>
<td>1,797,000 /1.9%</td>
<td>Muslim</td>
<td>10%</td>
<td>People's Democratic Republic of Yemen</td>
<td>Republic</td>
<td>Aden</td>
<td>$550 M</td>
<td>$310</td>
<td>$42.3 M</td>
<td>$384.5 M</td>
</tr>
<tr>
<td>Yemen (Sana)</td>
<td>20% Agri. 1% Forested 79% Desert, Waste or Urban</td>
<td>5,173,000 /1.9%</td>
<td>Muslim</td>
<td>15%</td>
<td>Yemen Arab Republic</td>
<td>Republic</td>
<td>Sana</td>
<td>$1.7 B</td>
<td>$330</td>
<td>$7.1 M</td>
<td>$834.4 M</td>
</tr>
<tr>
<td>Oman</td>
<td>Negligible Amount Forested Remainder Desert, Waste, or Urban</td>
<td>573,000 /3.0%</td>
<td>Muslim, Ibadi, Sunni</td>
<td>10%</td>
<td>Sultanate of Oman</td>
<td>Monarchy</td>
<td>Muscat</td>
<td>$2.6 B</td>
<td>$4,880</td>
<td>$1.6 B</td>
<td>$1.2 B</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>Almost All Desert, Waste, or Urban</td>
<td>862,000/not avail.</td>
<td>Muslim Christian Hindu Other</td>
<td>25%</td>
<td>United Arab Emirates</td>
<td>Federation</td>
<td>Abu Dhabi</td>
<td>$13.3 B</td>
<td>$15,500</td>
<td>$8.6 B</td>
<td>$4.9 B</td>
</tr>
<tr>
<td>Iran</td>
<td>14% Agri. 11% Forested 66% Cultivable 5% Desert, Waste, Urban 8% Migratory Grazing and Other</td>
<td>38,346,000 /3.0%</td>
<td>Muslim Other</td>
<td>37%</td>
<td>Islamic Republic of Iran</td>
<td>Republic</td>
<td>Tehran</td>
<td>$76.3 B</td>
<td>$2160</td>
<td>$21.7 B</td>
<td>$17.7 B</td>
</tr>
<tr>
<td>Country Name</td>
<td>Land Use</td>
<td>Popul./ Annual Growth</td>
<td>Religion</td>
<td>Literacy</td>
<td>Govt. Legal Name</td>
<td>Type of Govt.</td>
<td>Capital</td>
<td>Econ. GNP</td>
<td>Per Capita</td>
<td>Export Values</td>
<td>Import Values</td>
</tr>
<tr>
<td>-------------</td>
<td>---------</td>
<td>-----------------------</td>
<td>---------</td>
<td>---------</td>
<td>------------------</td>
<td>---------------</td>
<td>---------</td>
<td>----------</td>
<td>-----------</td>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Turkey</td>
<td>35% cropland 25% meadows 21% forested 17% other</td>
<td>45,182,000 /2.3%</td>
<td>Muslim</td>
<td>62%</td>
<td>Republic of Turkey</td>
<td>Republic</td>
<td>Ankara</td>
<td>$48.7B</td>
<td>$1,130</td>
<td>$2.3B</td>
<td>$4.6B</td>
</tr>
<tr>
<td>Syria</td>
<td>48% arable 29% grazing 22% forest 21% desert</td>
<td>8,534,000 /3.3%</td>
<td>Sunni Muslim</td>
<td>40%</td>
<td>Syrian Arab Republic</td>
<td>Republic</td>
<td>Damascus</td>
<td>$6.6B</td>
<td>$84</td>
<td>$1.1B</td>
<td>$2.4B</td>
</tr>
<tr>
<td>Lebanon</td>
<td>27% agricultural 64% desert, waste, urban 9% forested</td>
<td>2,981,000 /2.6%</td>
<td>Christian/ Muslim</td>
<td>86%</td>
<td>Republic of Lebanon</td>
<td>Republic</td>
<td>Beirut</td>
<td>NA</td>
<td>NA</td>
<td>$626M</td>
<td>$1.4B</td>
</tr>
</tbody>
</table>
Appendix G

Study Questions Sample

172
173

Soviet Union and Eastern Europe

Exam Study Questions

(#3)

1. Identify on an outline map: a) the Soviet Union including the States, i.e., A.S.S.R., etc. b) the Soviet Bloc nations, i.e., Albania, Rumania, Hungary, etc. (close atlas).

2. Locate Moscow, Moscow River, Caspian Sea, Leningrad, etc.

3. Describe the relationship between the "fertile triangle" and population distribution in the Soviet Union.

4. Identify, locate and describe at least four "physiographic" regions of the Soviet Union.

5. Use your atlas to explain why Siberia cannot support a large population.

6. Describe the role and the status of the religion within the Soviet Union. Name the religions that are still tolerated (use your atlas and cite page number(s) to support your answer.)


8. What mineral resources are found in: a) Poland, b) Rumania, and c) Hungary. What is the GNP for each of the preceding nation(s).

9. Identify, locate and describe the effect of at least one "Natural Hazard" on human activities.

10. Define the concept of "Collective Farms." How have the foregoing helped or hindered the Soviet economy?

11. Support or refute the following statement: "the modern Soviet Union is a complex state of contradictions."

12. Know your lecture notes well!
Appendix H

Examination Sample
1. Define steppe and locate where it is found in Africa.

2. Describe major geography difference between East Africa and West Africa.

3. What two groups dominate the religion of Islam?

4. In which African country would you find the following people: Hausa, Fulani, Yoruba, and Ibo?
5. What waterway is vital to the shipping lanes of the Persian Gulf?

Essay—12 points each

6. (a) Define theory; and (b) describe the theory of continental drift using examples from Africa.

7. "Africa's larger cities (with some exceptions) were founded by foreigners." Discuss.
Slide Questions—2 points each

8. ____________________________________________
9. ____________________________________________
10. ____________________________________________
11. ____________________________________________
12. ____________________________________________
13. ____________________________________________

Atlas—2 points each


15. What type of crops are important in the Nile Valley?
### Africa

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Morocco</td>
</tr>
<tr>
<td>2.</td>
<td>Western Sahara</td>
</tr>
<tr>
<td>3.</td>
<td>Algeria</td>
</tr>
<tr>
<td>4.</td>
<td>Mali</td>
</tr>
<tr>
<td>5.</td>
<td>Mauritania</td>
</tr>
<tr>
<td>6.</td>
<td>Tunisia</td>
</tr>
<tr>
<td>7.</td>
<td>Libya</td>
</tr>
<tr>
<td>8.</td>
<td>Egypt</td>
</tr>
<tr>
<td>9.</td>
<td>Niger</td>
</tr>
<tr>
<td>10.</td>
<td>Chad</td>
</tr>
<tr>
<td>11.</td>
<td>Sudan</td>
</tr>
<tr>
<td>12.</td>
<td>Ethiopia</td>
</tr>
<tr>
<td>13.</td>
<td>Central African Empire</td>
</tr>
<tr>
<td>14.</td>
<td>Cameroon</td>
</tr>
<tr>
<td>15.</td>
<td>Nigeria</td>
</tr>
<tr>
<td>16.</td>
<td>Benin</td>
</tr>
<tr>
<td>17.</td>
<td>Togo</td>
</tr>
<tr>
<td>18.</td>
<td>Ghana</td>
</tr>
<tr>
<td>19.</td>
<td>Upper Volta</td>
</tr>
<tr>
<td>20.</td>
<td>Ivory Coast</td>
</tr>
<tr>
<td>21.</td>
<td>Liberia</td>
</tr>
<tr>
<td>22.</td>
<td>Sierra Leone</td>
</tr>
<tr>
<td>23.</td>
<td>Guinea</td>
</tr>
<tr>
<td>24.</td>
<td>Guinea-Bissau</td>
</tr>
<tr>
<td>25.</td>
<td>Senegal</td>
</tr>
<tr>
<td>26.</td>
<td>Djibouti</td>
</tr>
<tr>
<td>27.</td>
<td>Gambia</td>
</tr>
<tr>
<td>28.</td>
<td>Somalia</td>
</tr>
<tr>
<td>29.</td>
<td>Kenya</td>
</tr>
<tr>
<td>30.</td>
<td>Uganda</td>
</tr>
<tr>
<td>31.</td>
<td>Zaire</td>
</tr>
<tr>
<td>32.</td>
<td>Congo</td>
</tr>
<tr>
<td>33.</td>
<td>Gabon</td>
</tr>
<tr>
<td>34.</td>
<td>Tanzania</td>
</tr>
<tr>
<td>35.</td>
<td>Rwanda</td>
</tr>
<tr>
<td>36.</td>
<td>Burundi</td>
</tr>
<tr>
<td>37.</td>
<td>Malawi</td>
</tr>
<tr>
<td>38.</td>
<td>Mozambique</td>
</tr>
<tr>
<td>39.</td>
<td>Zambia</td>
</tr>
<tr>
<td>40.</td>
<td>Angola</td>
</tr>
<tr>
<td>41.</td>
<td>Namibia</td>
</tr>
<tr>
<td>42.</td>
<td>Botswana</td>
</tr>
<tr>
<td>43.</td>
<td>Zimbabwe</td>
</tr>
<tr>
<td>44.</td>
<td>Madagascar</td>
</tr>
<tr>
<td>45.</td>
<td>South Africa</td>
</tr>
<tr>
<td>46.</td>
<td>Lesotho</td>
</tr>
<tr>
<td>47.</td>
<td>Swaziland</td>
</tr>
<tr>
<td>48.</td>
<td>Comoros</td>
</tr>
<tr>
<td>49.</td>
<td>Equatorial Guinea</td>
</tr>
<tr>
<td>50.</td>
<td>Sao Tome and Principe</td>
</tr>
</tbody>
</table>

### Middle East

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>Suez Canal</td>
</tr>
<tr>
<td>II.</td>
<td>Zaire River</td>
</tr>
<tr>
<td>III.</td>
<td>Niger River</td>
</tr>
<tr>
<td>IV.</td>
<td>Cairo</td>
</tr>
<tr>
<td>V.</td>
<td>Lagos</td>
</tr>
<tr>
<td>VI.</td>
<td>Casablanca</td>
</tr>
<tr>
<td>VII.</td>
<td>Johannesburg</td>
</tr>
<tr>
<td>VIII.</td>
<td>Mediterranean Sea</td>
</tr>
<tr>
<td>51.</td>
<td>Turkey</td>
</tr>
<tr>
<td>52.</td>
<td>Syria</td>
</tr>
<tr>
<td>53.</td>
<td>Lebanon</td>
</tr>
<tr>
<td>54.</td>
<td>Israel</td>
</tr>
<tr>
<td>55.</td>
<td>Jordan</td>
</tr>
<tr>
<td>56.</td>
<td>Saudi Arabia</td>
</tr>
<tr>
<td>57.</td>
<td>Yemen</td>
</tr>
<tr>
<td>58.</td>
<td>P.D.R. of Yemen</td>
</tr>
<tr>
<td>59.</td>
<td>Oman</td>
</tr>
<tr>
<td>60.</td>
<td>United Arab Emirates</td>
</tr>
<tr>
<td>61.</td>
<td>Qatar</td>
</tr>
<tr>
<td>62.</td>
<td>Kuwait</td>
</tr>
<tr>
<td>63.</td>
<td>Iraq</td>
</tr>
<tr>
<td>64.</td>
<td>Iran</td>
</tr>
<tr>
<td>65.</td>
<td>Cyprus</td>
</tr>
<tr>
<td>66.</td>
<td>Soviet Union</td>
</tr>
<tr>
<td>67.</td>
<td>Pakistan</td>
</tr>
<tr>
<td>68.</td>
<td>Afghanistan</td>
</tr>
</tbody>
</table>
Appendix I

Background Data Questionnaire
BACKGROUND DATA QUESTIONNAIRE

Name_________________________________________ Age______________
Major_________________________________________ Class___________
Minor_________________________________________ Section_________

Directions: Please check (√) the appropriate response.

1. Were you exposed to geography in grades Kindergarten through Six?
   ( ) Yes
   ( ) No
   ( ) Don't remember

2. How many geography course(s) did you take at the junior high school level?
   ( ) 1
   ( ) 2
   ( ) 3
   ( ) 4 or more
   ( ) other (please specify)________________________

3. How many geography course(s) did you take at the senior high school level?
   ( ) 1
   ( ) 2
   ( ) 3
   ( ) 4 or more
   ( ) other (please specify)________________________

4. How many geography course(s) have you taken at the college level
   (exclude the one you are enrolled in now)?
   ( ) 1
   ( ) 2
   ( ) 3
   ( ) 4 or more
   ( ) other (please specify)________________________
5. What newspaper(s) do you read?

( ) The New York Times
( ) The Detroit Free Press
( ) The Chicago Tribune
( ) Your local newspaper
( ) Campus newspaper
( ) other (please specify)___________________

6. How often do you read the newspaper?

( ) once a day/night
( ) twice a week
( ) once a week
( ) once a month
( ) other (please specify)___________________

7. Do you watch the world news on any of the T.V. networks?
   If NO, skip #8 and go to #9.

( ) Yes
( ) No

8. How frequently do you watch the world news?

( ) once a day/night
( ) once a week
( ) twice a week
( ) once a month
( ) other (please specify)___________________

9. Do you read any of the popular magazines?
   If NO, skip #10 and go to #11

( ) National Geographic
( ) Newsweek
( ) Time
( ) U.S. News & World Report
( ) other (please specify)___________________

10. How frequently do you read the popular magazines?

( ) once a week
( ) once a month
( ) other (please specify)___________________

11. Do you own an atlas?

( ) Yes
( ) No
12. Do you own a globe?

( ) Yes
( ) No

13. Can you read a map and understand map symbols?

( ) Yes
( ) No

14. How many states have you traveled in?

( ) 1
( ) 2-4
( ) 5-10
( ) 21-30
( ) more than 31
( ) other (please specify)_________________

15. How many foreign countries have you visited?

( ) 1
( ) 2
( ) 3
( ) 4 or more
( ) other (please specify)_________________

16. Do you plan to take any other geography course(s) in the future?

( ) Yes
( ) No
( ) Don't know
Appendix J

Communications with Study Participants
May 24, 1983

Dr. Richard Santer
Department of Geography
Ferris State College
Big Rapids, MI 49307

Dear Dr. Santer:

As a graduate student at Western Michigan University, I am working on my doctoral dissertation as part of the requirements for a doctorate in Educational Leadership. My area of research is geographic place location cognition of undergraduate university and/or college students. In order to complete this investigation, I am requesting your help and cooperation in administering three instruments—Background Data Questionnaire, Map Location Test I, and Map Location Test II. In addition, it will involve treatment through specifically designed instructional materials, namely, cognate materials to enhance geographic place location knowledge of undergraduate students.

I am requesting at this time formally for your agreement to participate in the study. It is endorsed by Dr. Joseph P. Stoltman, Chairman, Department of Geography, Western Michigan University; Dr. Lawrence Schlack and Dr. Uldis Smidchens, both faculty committee members from the Department of Educational Leadership, Western Michigan University.

Your participation in the study is essential and will be greatly appreciated. I look forward to hearing from you as soon as possible regarding your participation.

I am willing to visit your campus to discuss the study in detail. Please suggest a convenient date and time.

With many thanks.

Sincerely,

Sharafat (Shaz) Khan
Doctoral Student
May 24, 1983

Dr. Mike Libbee
Department of Geography
Central Michigan University
Mt. Pleasant, MI 48859

Dear Dr. Libbee:

As a graduate student at Western Michigan University, I am working on my doctoral dissertation as part of the requirement for a doctorate in Educational Leadership. My area of research is geographic place location cognition of undergraduate university and/or college students. In order to complete this investigation, I am requesting your help and cooperation in administering three instruments—Background Data Questionnaire, Map Location Test I, and Map Location Test II.

I am requesting at this time formally for your agreement to participate in the study. It is endorsed by Dr. Joseph P. Stoltman, Chairman, Department of Geography, Western Michigan University; Dr. Lawrence Schlack and Dr. Uldis Smidchens, both faculty committee members from the Department of Educational Leadership, Western Michigan University.

I am willing to visit your campus to discuss the study in detail. Please suggest a convenient date and time. Your participation in the study is essential and will be greatly appreciated. I look forward to hearing from you as soon as possible regarding your participation.

With many thanks.

Sincerely,

Sharafat (Shaz) Khan
Doctoral Student

P

cc: Dr. Wayne E. Kiefer
July 7, 1983

Dear Professor Lindland:

Please find enclosed the Background Data Questionnaire (BDQ), Map Location Test I (MLT I), and cognate materials for use in your world geography courses.

Please administer the BDQ and MLT I the first day the class meets, or soon thereafter, and return these to me. Prior to the administration of these instruments, please read the following statement to your classes:

You are requested to participate in this class (e.g., World Geography) and to complete Map Location Test I and a Background Data Questionnaire as part of the requisite for the completion of this course. One of my responsibilities this semester is to instruct you. During the course of instruction I shall attempt to enhance your present level of geographic knowledge through the use of instructional materials (wall maps, films, transparencies, a map module, globes, book reviews, data sheets, examinations and regional map tests, and readings from Geography: Regions and Concepts book).

I will be passing out a survey instrument (MLT I and BDQ) to be completed by you, which will help me know more about your knowledge of geography (place locations) and, hopefully, help me improve the instructional methods.

Before the semester (or quarter) is over I will explain in detail how the information has been used. If you have any reservations about completing the assigned test, feel free to raise pertinent questions for further discussion and/or clarification.

With regard to cognate materials, please use the following:

Wall Maps to illustrate prominent physical and political entities of the United States; one map of each continent showing both physical and political attributes; world maps depicting physical, religious, economic, population and transportation routes, and a map of the State of Michigan.
Films. Please use two types of films: film(s) for specific purpose of teaching, and film(s) that convey general background on a given topic.

Slides. Please use slides as much as possible.

Transparencies depicting varied subject matter; i.e., maps, charts, etc.

A module on Map, Mapping, and Map Reading to introduce students to elementary concepts of map projections, longitude, latitude, etc. These are to be sold through your bookstore for $3.00. If this cannot be done, please let me know.

Globes to acquaint students with mathematical, nominal, and relative locations. Also introduce the concept of the "great circle."

Book Review. Each student should be requested to select a novel that contains geographical prose. Please suggest such novels as Centennial, Hawaii, Tai Pan, Shogun (Michener), Congo (Crichton, 1981), Travels with Charley in Search of America, (Steinbeck, 1962), etc. In addition, please encourage students to use Lamme's (1977) conceptual model in emphasizing in their review the type of geographical materials contained in the novels: landscape, human ecology, strategy, and regionalism.

A Data Sheet be distributed to students with the following information: country name, land use, population/annual growth, religion, literacy level, government legal name, type of government, capital city, and economic information—GNP, per capita, export and import values.

Examinations. Please administer the regional map tests along with your own examinations.

Finally, please place de Blij's (1981), Geography: Regions and Concepts book on reserve, unless the students own a copy, and assign readings from it throughout the semester.

Specially, I have enclosed the following: Book review instructions, data sheets, regional map tests, the map module, and a copy of Lamme's (1977) article entitled "The use of novels in geography classrooms." You are requested to use appropriate films, slides, transparencies, examinations, wall maps, and globes. However, you may use the cognate materials in any sequence you believe appropriate and/or convenient.
Copies of the final instrument, Map Location Test II, will be sent to you for administration before the end of your quarter session.

In addition to the foregoing, please supply the following information:

1. The course name, number, and description in which you will administer the MLT I, MLT II, and BDQ.

2. The amount of instructional time and the number of days the classes meet each week.

Please permit me to thank you in advance for your help and cooperation, and if there is anything that needs to be clarified, please let me know. I can be reached at the Department of Geography (616-383-1839), home (616-345-4291), or if you prefer write a note.

With many thanks.

Sincerely,

Sharafat Khan
Doctoral Student

/cb

Encl.

cc: Dr. Rick Santer
August 25, 1983

Dr. Mike Libbee  
Department of Geography  
Central Michigan University  
Mount Pleasant, MI 48859

Dear Mike,

Enclosed are the Background Data Questionnaire (BDQ), and Map Location Test I (MLT I).

Please administer the BDQ and MLT I the first day the classes meet, or soon thereafter, and return these to me. Prior to administration of these instruments, please ask students to supply all the information requested, e.g., name, course name/number, age, etc. After they complete the assigned instruments, please ask them to check thoroughly for any missing replies.

In addition to the above, please communicate the following information:

1. The course descriptions where BDQ and MLT I are administered.

2. The amount of instructional time and the number of days the classes meet each week.

Permit me to thank you in advance for your help and cooperation, and if there is anything that needs to be clarified, please let me know.

With many thanks.

Sincerely,

Shaz Khan
/cb
Encl.

P.S. Copies of the final instrument, Map Location Test II, will be sent to you before the end of your Fall Semester, 1983, for administration.
November 7, 1983

Dr. Mike Libbee
Department of Geography
Central Michigan University
Mount Pleasant, MI 48859

Dear Dr. Libbee,

Enclosed is the second part of the place location knowledge test; Map Location Test II.

Prior to the administration of this test, please read the following statement to your students:

I would like you to place all the countries and capital cities in their proper political subdivisions. These appear on the instrument (MLT II) I am handing to you.

Please impose a sixty minute limit for the completion of this test.

In addition to the foregoing, please supply the following information:

1. The course name, number and description in which you will administer the MLT II;
2. the amount of instructional time and the number of days the classes meet each week.

With many thanks.

Sincerely,

Shaz Khan

cb
November 7, 1983

Dr. Gordon Lindland  
Department of Geography  
Ferris State College  
Big Rapids, MI 49307

Dear Dr. Lindland,

Enclosed is the second part of the place location knowledge test; Map Location Test II.

Prior to the administration of this test, please read the following statement to your students:

I would like you to place all the countries and capital cities in their proper political subdivision. These appear on the instrument (MLT II) I am handing to you.

Please impose a sixty minute limit for the completion of this test.

In addition to the foregoing, please supply the following information:

1. The course name, number and description in which you will administer the MLT II;

2. The amount of instructional time and the number of days the classes meet each week.

With many thanks.

Sincerely,

Shaz Khan

cb
Appendix K

Background Data Questionnaire Coding System
Code Book

**Project:** Background Data Questionnaire/MLT I—place knowledge

**Researcher:** Khan, Phone 345-4291 or 383-1839

**File Name:** BDQI

**Computer #** 16260, 16260  
**Protection:** 155

**Coder:** Khan

**Data Storage:** All raw data is stored in the Dec-10 system.

**Format:** (16F1.0, F2.0)

**Date compiled:** Fall Semester, 1983
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Variable No.</th>
<th>Name</th>
<th>Description</th>
<th>Possible responses</th>
<th>Code</th>
</tr>
</thead>
</table>
| 1       | 1            | KSIX | Number of geography classes taken from K-6 | 1 to 3 | 1 = yes  
2 = no  
3 = don't remember  
9 = missing |
| 2       | 2            | JUNIO | Number of geography classes taken at junior high school level | 0 to 5 | 0, 1, 2, 3, 4, 5  
9 = missing |
| 3       | 3            | HIGH | Number of geography classes taken at senior high school level | 0 to 5 | 0, 1, 2, 3, 4, 5  
9 = missing |
| 4       | 4            | COLEG | Number of geography classes taken at college level | 0 to 5 | 0, 1, 2, 3, 4, 5  
9 = missing |
| 5       | 5            | NEWSP | What newspapers do you read? | 0 to 8 | 0 = no newspaper read  
*1, 2, 3, 4, 5, 6, 7, 8  
9 = missing  
(*depicts number of newspapers read) |
| 6       | 6            | OFTEN | How often newspaper read? | 0 to 2 | 0 = zero  
1 = once a day/twice a week  
2 = once a week/month  
9 = missing |
| 7       | 7            | WNEWS | Watch world news on TV? | 0 to 2 | 0 = missing  
1 = yes  
2 = no |
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Variable No.</th>
<th>Name</th>
<th>Description</th>
<th>Possible responses</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>8</td>
<td>FREQ</td>
<td>How frequently watch news?</td>
<td>0 to 4</td>
<td>0 = did not do</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = once a day/night</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = once a week</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = twice a week</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = several times a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>week/month, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 = missing</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>POPMA</td>
<td>Do you read popular magazines?</td>
<td>0 to 4</td>
<td>0 = no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1, 2, 3, 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 = missing</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>WHEN</td>
<td>How frequently read popular magazines?</td>
<td>0 to 2</td>
<td>0 = do not read</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = once a week</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = once a month</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 = missing</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>ATLAS</td>
<td>Own an atlas</td>
<td>0 to 2</td>
<td>0 = missing data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = no</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>GLOBE</td>
<td>Own a globe</td>
<td>1 to 2</td>
<td>1 = yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 = missing</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>MAPSY</td>
<td>Read map/map symbols</td>
<td>0 to 2</td>
<td>0 = missing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = no</td>
</tr>
<tr>
<td>Item No.</td>
<td>Variable No.</td>
<td>Name</td>
<td>Description</td>
<td>Possible responses</td>
<td>Code</td>
</tr>
<tr>
<td>---------</td>
<td>--------------</td>
<td>----------</td>
<td>------------------------------</td>
<td>--------------------</td>
<td>--------</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>USHOW</td>
<td>States traveled</td>
<td>0 to 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = 1-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = 5-30</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = &gt;31</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 = missing</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>NATIO</td>
<td>Nations traveled</td>
<td>0 to 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = 4 or more</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 = missing</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>FUTGE</td>
<td>Take geography in the future</td>
<td>0 th 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = missing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = no</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = don't know</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>17</td>
<td>SCORE</td>
<td>MLT I score</td>
<td>0 to 35</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Varies 0-35</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(# correct)</td>
<td></td>
</tr>
</tbody>
</table>
BIBLIOGRAPHY


Boles, H. W. *Leaders, leading, and leadership: A dynamic theory.* Unpublished manuscript, 1980. (Available from Author and Department of Educational Leadership, Western Michigan University, Kalamazoo, MI)


Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.


Hughes, C. The azanian assignment: A geographical review. Unpublished manuscript, 1981. (Available from author and Department of Geography, Western Michigan University, Kalamazoo, MI)


Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.


Miner, D. Are diamonds really a girl's best friend? (A review of Congo). Unpublished manuscript, 1981. (Available from Author and Department of Geography, Western Michigan University, Kalamazoo, MI)


Saveland, R. N. Map skills around the world: How to test and diagnose place vocabulary capabilities. Social Education, 1983, 47(3), 106-211.


Stoltman, J. P. Maps, mapping, and map reading. Kalamazoo: Department of Geography, Western Michigan University, 1980. (a)


TeleVue: Kalamazoo Gazette (MI), April 2, 1983, p. 3.


