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ABSTRACT

Components of national undergraduate geography major curricula are reviewed, followed by discussion of a behavioral approach to curriculum theory and a case study which incorporates behavioral objectives in curriculum development. Surveys in 1968 and 1974 revealed that most undergraduate major geography programs are loosely structured and contain typical courses in introductory physical geography, introductory human geography, a regional course, a techniques course, and a senior seminar. Arguments are presented for and against using specific behavioral objectives to develop student-oriented programs. Proponents argue that learning can be more effectively promoted and individualized if objectives are precisely stated. Critics worry that specification may lead to a focus on trivia and that affective aims are likely to be neglected. A four-stage developmental process is being implemented by the author at the University of Illinois. This involves identification of fundamental concepts and skills comprising the core curriculum, assessment of performance of geography majors in the fundamental areas, assessment of majors' perceptions of their abilities and desired levels of attainment, and development of an inventory of learning experiences provided in various courses. Two appendices list fundamental concepts and show how they are incorporated into specific courses. (Author/AV)

THE GEOGRAPHY MAJOR CURRICULUM: A BEHAVIORAL APPROACH

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This morning I'd like to discuss with you the undergraduate major curriculum in geography, and some ways in which it might be analyzed and put together. In the last few years, we've put a lot of effort into high school curriculum development and into looking at introductory courses and various teaching strategies, but there has really been very little public discussion or writing about geography major programs.

Usually the curriculum is stated in terms of courses and hours. It represents some interpretation of what sub-branches of the discipline are considered important, and it generally assumes that some breadth is necessary, and perhaps that some technique component should be included. It is hard to say what kind of systematic thinking goes into its design. I suspect the situation is similar to that described by Taylor in writing about how teachers in England plan courses--we concentrate on the content, subscribe to some general and unverifiable aims, neglect to assess what methods will be appropriate to the subject matter and for the postulated aims, and also neglect to assess whether we are developing suitable methods of evaluation.

I'd like to look now in a little more detail at what the make-up of major curricula tends to be nationally. In a 1968 study by the A.A.G., the most common pattern was for programs to be loosely structured and permissive, with variations reflecting institutional character and staff

interests. Most common elements were a course in introductory physical geography, one in introductory human, which might be either cultural or economic, a regional course, a technique course - either field or cartography, and perhaps a "capstone" senior course or seminar.

Two years ago I did a brief survey of departments selected to represent a range of institutional types and found relatively few changes of approach since the 1968 study though urban and environmental courses were becoming more common, some additional emphasis was being paid to developing research abilities and internships were being introduced. No marked departures from relatively standard approaches emerged.

In the same 1968 AAG review that I mentioned before, Hart raised some interesting questions about major curriculum design. He noted that the curricula were stated in terms of hours and courses, not in terms of the needs of the students in them. He asked, "Would it be possible or desirable to develop a student-oriented program by thinking through two questions:

1. What do we expect a person with a baccalaureate degree in geography to know, to know about and to know how to do? and
2. How might we structure a program, not just a sequence of courses, to inculcate these attitudes, this knowledge and these skills most efficiently and effectively?

These are the topics which I would like to address to-day, looking particularly at behavioral approach to curriculum design, and describing some work which I have been doing in that direction.

Curriculum Theory and the Behavioral Approach

The first thing I'd like to do, is remind you of aspects of a curriculum which educators think should be considered in the design process, namely

aims, objectives, educational experiences and evaluation. A number of systems have been developed for defining these elements and looking at the relationship between them, but essentially by "aims" are meant broadly defined goals of education. "objectives" refer to more specific intentions, which might be defined in terms of student behavior or specific learning outcomes. "Educational experiences" refers to the teaching strategies developed, methods, materials and so on. "Evaluation" used to be construed to mean evaluation of learning and seen as an end process in a linear approach to design. More recently, it has been interpreted broadly to consider the ways of making judgements about all the elements of the design process, with the idea that evaluation can feedback into modifying aims, objectives or experiences. It is this view of development a continuing process to which I subscribe.

When we look at aims of the curriculum I think Bill Pattison has outlined a useful framework suggesting 3 broad approaches - curricula which are knowledge centered, curricula which are knowledge and skills centered, or curricula which incorporate knowledge and skill goals with the personal development of the student. Of these, the knowledge and skills approach would be most compatible with a design which followed through stating the specific objectives in precise behavioral terms. The knowledge, skill and personal development type, which I favor, might have a component stating objectives behaviorally but I think that the purely behavioral approach objective is either inadequate or awkward when we begin to think about personal development as well.

Let me look for a moment at the arguments advanced for and against using specific behavioral objectives. Proponents note that such designs are student centered, and state clearly what the student is supposed to achieve, under what conditions and to what level. They work within a mastery learning

framework. They argue that learning can be more efficiently and effectively promoted and individualised if objectives are precisely stated, and that the "educational experiences" and evaluation of learning components follow clearly from the statement of objectives.

Questioners of the behavioral approach raise some of the following caveats:

1. If we want students to learn to think for themselves, it is inappropriate for us to prespecify rigidly all the intended outcomes.

2. It is impossible to prespecify all the outcomes anyway, and is so cumbersome to try that it may be a serious waste of the time which could be better devoted to other efforts.

3. Precise specification may lead to a focus on trivia, or at least on lower level objectives which are most easily defined.

4. The affective and broad personal development aims are likely to be neglected when behavioral objectives are formulated. Indeed it may not be appropriate or feasible to pre-specify them in a precise way. Let's look at an absolute such as curiosity which we might like to see developed in students. It is likely to have behavioral manifestations, for example "the student asks questions which go beyond the confines of materials presented in class." But curiosity can be exhibited in many other ways, which are clearly recognizable <u>after</u> the event but which we might not be able to list exhaustively in advance. Even if we did pre-specify them, there are difficult questions to answer. How many behavioral events are required to demonstrate that the student is developing curiosity? What constitutes an acceptable mastery level. The NationalScience Teachers Association several years ago in dealing with this question felt that in the affective areas a large set of indicative behaviors could be identified, and that all that is needed is to look for evidence that some sample of these is occurring.

In sum then, I think that a curriculum which opts for knowledge, skills and personal development aims can incorporate a behavioral approach, but that it would be inappropriate to restrict the design to a precise behavioral objective model. This may be appropriate for a professional education, as we have seen done in the development of performance or competancy based teacher education. I don't think it is adequate for the aims of liberal education.

Developing A Curriculum: A Case Study

Now I'd like to turn to the work we've been doing trying to assess and plan the major curriculum at Illinois. First I'll describe the processes we've been going through, and then I'll review the outcomes and expected outcomes. I should note that the work is still in progress.

The Process

The developmental process has involved four stages.

1. Developing a statement of fundamental perspectives, concepts and skills which we see as making up the core of the curriculum. We have concentrated on this core, on the assumption that beyond a common core we want students to have the option to go into a variety of specialisations. In these specialisations, some of the structure is laid down by us, and some of the work is planned individually by the student.

2. A second task has been to assess the performance of the geography majors in those areas we are defining as fundamental, partly to see how our existing program contributes to their attainment, and to see what modifications might be appropriate.

3. We have been assessing the majors' perceptions of their abilities in certain areas, and of the levels attainment they desire. These measurements are also directed at evaluating the present program and likely changes.

4. We are in the process of developing an inventory of the learning experiences which faculty provide in the various courses, and how faculty evaluate that learning. We want to see how well these relate to program aims and how they contribute to the attainment of objectives as these are represented by the fundamentals listing.

First let me show the listing of fundamentals we have developed, and tell you how we arrived at it.

The process involved two research assistants soliciting written statements on important perspectives, concepts and skills from a couple of faculty members. With these statements providing a basis for conversation, the assistants then interviewed about half the staff, selecting people of different interest areas and approaches. From the interviews, they produced an unsystematic listing. We then took this to a department seminar of faculty and graduate students, asking people to rate concepts etc. listed as essential through non-essential on a 5 point scale. During the seminar we tabulated the responses, then discussed some of the items about which there had been least agreement, as well as the high vs. low ranked items. Overall, support was greatest for general skills - such as being able to define problems, to interpret maps and to analyze. Broad concepts such as expecting spatial patterns and having a systems viewpoint also rated high. Less important, though still supported, were specific concepts for various areas of the discipline, such as distance decay or central place theory. Knowing the history of the discipline and having the ability to work with specialised techniques such as computer applications, field mapping or remote sensing also ranked lower, and it seemed these were associated more strongly with expectations of a graduate than undergraduate program. The most contentious

item was in the values area. Some supported a view that majors should see geography as a vehicle for "making the world a better place." Others argued that defining "better" was a personal issue, and I think there is also a difference of opinion about the appropriateness of scientific detachment versus an advocacy position.

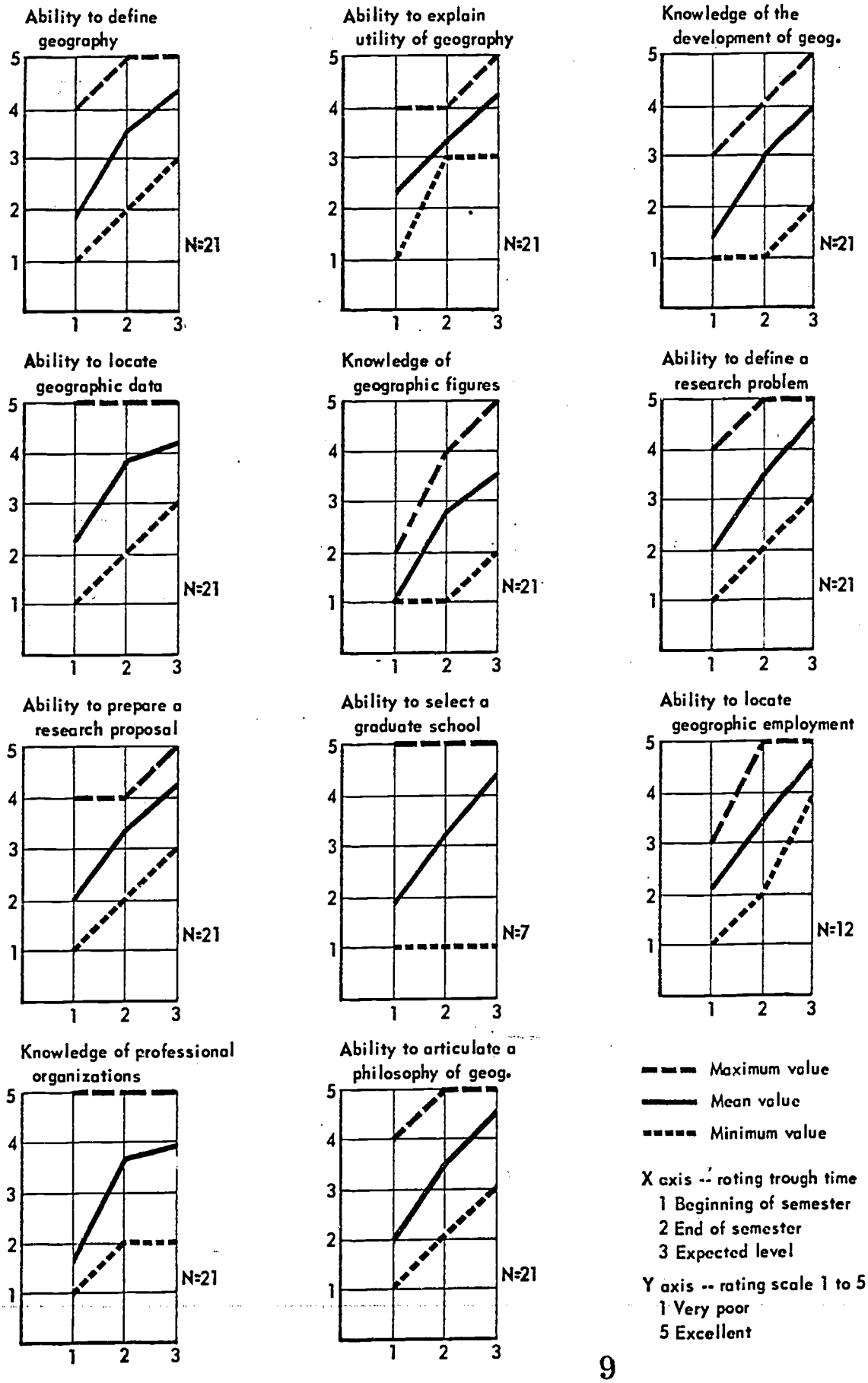
From these discussions, and from statements in the literature, we regrouped and revised the elements in the listing, and produced the statement which you have (Appendix 1).

2. Assessing the Majors' Performance

Next I'd like to review briefly our assessment of the majors' performance. Simultaneously with the curriculum assessment work, we have been examining a course for majors called the Scope and Purpose of Geography. About 40% of our majors were taking the course in the one semester, so we developed a series of diagnostic tests and tasks for them. These included problems such as defining geography and explaining its utility, commenting on selected concepts, identifying well known figures in field, interpreting thematic and topographic maps, and reading graphed data. We also developed a small so-called "treasure hunt" to see if they could locate geographic data, and inventoried the kinds of research papers they had done including the nature of the methodology and asked them to write a short research proposal.

Overall, we found that on tasks which could be scored, students rated from 50% to about 75% successful achievement, but with some marked gaps, particularly in knowing past and current geographers or major ideas from past periods. In some data interpretation areas, such as interpreting a graphic representation of a regression relationship they also had problems. They also had difficulties with defining geographic questions for research and developing methodologies for studying these questions.

Figure 1. Students' perception of their abilities and needs



3. Student Perceptions

The third task involved examining the students perceptions of their abilities to perform certain tasks, and their levels of performance aspiration on these tasks. The results of this work are shown on these graphs. (Fig. 1) Briefly, we asked them to rank on a 5-point scale their perceived level of performance at the start of the semester in which they were taking the Scope and Methods course, at the end of the semester, and a point they would like to have achieved by that date.

We were mainly interested in the distance between the 3 temporal estimates, and the relative weighting of importance of each task. I won't review the graphs in detail, but there are a few points I'd like to note. Some tasks on which they performed poorly--for example in the area of history of the discipline or knowing geographers, are areas where they have lower aspirations. Others, such as being able to define a problem or prepare a proposal, are of higher aspirations, but still lower perceived and actual achievement.

4. Inventorying learning experiences and evaluation methods

The fourth task has been to interview faculty about what kinds of learning experiences they are providing in courses, what general perspectives they think are being developed, and how they evaluate learning. You have a sample of the summarized on the second handout. (Appendix 2) I am still doing these interviews, but several points seem to be emerging 1) There is a difference between the expectations of our physical and social geography staff. The former partly because of lab. and field components in their courses, expect undergraduats to be involved in independent research papers, which are presented either in written or oral form or both. The social geographers on the other hand, focus on readings and examinations. Preparing the inventory has made it possible to initiate

discussion between the staff on the learning experiences in courses and will give a data base for discussing the real and ideal in our program. Harking back to my introductory quote from Taylor--the development process had been focusing on content rather than the learning experiences. Here is a chance to review the contributions being made to the learning experiences and to assess how evaluation procedures relate to objectives.

Outcomes

To conclude, I will indicate the point which we have reached in the development process. We still have a "regular" curriculum statement in terms of courses and hours, which specifies a core curriculum plus elective specialties. The core is intended to provide the student with the basic perspectives, concepts and skills outlined in your handout. (Appendix 1)

The student will be given the statement as an indication of what these fundamentals are. We will continue the diagnostic testing to review these achievements of these goals, and will use those results, plus discussions in advising, to help the student plan individual assignments as seem appropriate. For example, we have already had students doing work for independent credit on improving writing skills, exploring areas of the discipline such as medical geography which they think might provide an interest area for them, or reading independently in areas where they feel or show inadequate grasp of the field.

We are also introducing a new requirement that all students should undertake a project at some point in their curriculum which involves the investigation of geographic problem. This can be carried out either in one of our undergraduate field courses, in an upper division course, or in independent study. To help students prepare for this we have developed a new course "Spatial Analysis" in which we review major concepts and methodologies used in geography, and work with the students on framing geographical questions and developing

proposal for investigating a question. It is possible that our discussions of the "learning experiences" inventory will also lead to some course modifications.

Conclusion

In conclusion, I think what we have been doing is taking a more systematic approach to curriculum development than is usual, focusing on a behavioral approach by examining what we think should make up the core concepts of what a B.A. in geography should know, what general perspectives they should have, and what skills they should be developing. By assessing their performances and perceptions and the present course learning experiences, we are evaluating the gap between our ideal and real circumstances. This provides a basis for program changes. I would define our work as having a behavioral orientation but not as following a strict performance based behavioral objective model. For a degree in a liberal arts program, I think this compromise is appropriate.

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Appendix 1

Perspectives, Concepts and Skills Fundamental In a Core Curriculum for an Undergraduate Field of Concentration in Geography

1. Perspectives

A. Geographic Viewpoints

The signifigance of spatial distributions and associations and of area interrelatedness.

The concept of interacting systems within the physical and human domains and in man-environment relationships.

The significance of scale and time in understanding physical and human systems and the relationship between them.

B. Scholarly Attitudes

Curiosity

Respect for evidence

Awareness of values

C. Professionalization

Knowledge of history and philosophy of the discipline

Cycle of erosion

Environmental determinism

Cultural landscape

Regional concept

Quantitative revolution

Ability to define the discipline's breadth and functions

Knowledge of professional opportunities

II. Concepts in Specific Areas of Geography

A. Man-Environment Relations

Environmental determinism

Cultural ecology

Environmental perception

B. Human Spatial interaction

Territoriality

Perception

Gravity model - distance decay

Diffusion

Region

C. Economic Activities as a System

Location theory

Gravity model - distance decay

Systems of cities - central place theory

City structure and function

Land rent theory

Location - allocation

D. Physical Environment as a System

Econsystem

Interaction of geologic, topographic, climate, biotic and human systems.

Dynamic equilibrium

Energy and water balances

Climatic types and regions

Landform development

Plate tectonics, weathering and erosion, cycle of erosion,dynamic equilibrium.

III. Skills

A. Research Skills

Defining a geographic problem

Hypothesis development

Locating information

Library (abstracts adn principal journals)

Field

Classifying, organizing and interpreting data

Analyzing data

(see below: Geographic Technique Skills)

Assessing evidence

Drawing conclusions

Generalizing

B. Communication Skills

Writing

Reading

Speaking

C. Geographic Technique Skills

Reading maps

Designing and making maps

Interpreting aerial photographs

Observing and recording data in the field

D. Statistical - Mathematical Skills

Description of distributions (mean, variance, standard deviation)

Correlation

Regression

Significance Testing

Constructing and interpreting graphs

Appendix 2

DEVELOPMENT OF SKILLS AND PERSPECTIVES IN SELECTED PHYSICAL GEOGRAPHY COURSES

	Cognitive Skill Development in Class Activities	Perspectives and Attitudes	Evaluation of Learning
Geography 102 (Weather and Climate)	Map interpretation (weather maps) Quantitative--simple arithmetic calculations Graph plotting and interpretation Reading - text	Essentially qualitative introduction to physical science "basic concepts"	Recall and application choice of objective or take home essay test (3 exams) Writing - if choose essay option
Geography 103 (Earth's Physical Systems)	Topographic map interpretation Aerial photo interpretation Photo interpretation Field Observation (vegetation structure) Field data collection (soil texture, etc.) Graph interpretation and extrapolation Classification (rock samples) Hypothesis formulation Generalization from data Analysis (prose, transect sketches)	Ecosystem - "everything is related to everything else" Speculation - open-ended problems Values examination (e.g., wilderness preservation) Human-environment interaction (e.g., land use planning, flood adjustment)	Recall, application, analysis - 2 objective exams Lab practical exam - map interpretation, photo interpretation, soil and rock sample identification Evaluation of lab activities - see cognitive skills list

	Cognitive Skill Development In Class Activities	Perspectives and Attitudes	Evaluation of Learning
Geography 103 (continued)	Synthesis / Evaluation: Writing brief paper on ag. potential of ecosystems Reading - text and selected papers Writing - short answer in lab 3-5 page paper		
Geography 303 (Advanced Physical Geography)	Observation - photo (simulated field) - field Measurement and field use of simple instruments Measurement - morpho-metric Map interpretation (top. maps, thematic maps) Quantitative - simple formula manipulation Computer application (morpho metric) Hypothesis formulation (from field obs.) Problem development (individual field research paper)	Ecosystem concept (dynamic equilibrium, interrelatedness of elements, interaction of factors, feedback) Significance of time as a variable Significance of scale (largely implicit) Scientific method (speculation, multiple hypothesis approach) Placing individual work in context of existing research Application of physical geography to social (environmental) problems - environmental geomorphology theme	Paper - framing research question, Data Collection and analysis (paper) Data analysis (exam) Writing (paper and exam) Recall application analysis and evaluation (exam) Skills listed on labs also evaluated in lab performance - reports