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Robert E. Yager
University of Iowa

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In order to implement this part of the accountability model, there is an obvious need for coordination. Many teachers will need in-service to develop the skills necessary to write performance-based, behavioral objectives. Many teachers will require in-service to accept the notion that such objectives are desirable and possible to write. In Iowa City, we have assembled an interdisciplinary Instructional Resource Team (IRT) having primary responsibility for such coordination activity. The members of this team represent a wide range of subject matter backgrounds and a high level of teaching competence. Their immediate task is to develop within the teaching staff the necessary skills to develop programs which are accountable. They will work closely with the teachers in assessing current programs and implementing program modifications as they are deemed necessary. At first their efforts will be directed along subject matter lines, but eventually the goal is to eliminate these artificial and bothersome divisions and work toward a unified program that is truly interdisciplinary.

We have only begun the process of becoming accountable. There is much work yet to be accomplished. It is not clear at this time just how long it will take to establish a goal-oriented, performance-based instructional program in the Iowa City Community Schools. The greatest unknown variable appears to be the extent to which the educators, teachers and administrators alike, will be willing to accept the demand to become accountable.

SECONDARY SCIENCE TEACHER EDUCATION: WHERE WE ARE GOING AT THE UNIVERSITY OF IOWA

Robert E. Yager, Coordinator
Science Education Center
University of Iowa
Iowa City, Iowa 52242

In September of 1970 a grant was awarded by the National Science Foundation to the Science Education Center at the University of Iowa for the development of pre-service programs for teachers of secondary school science. The program was called Iowa-UPSTEP. (Undergraduate Pre-Service Teacher Education Program). The rationale for this program and a report of its progress is a response to "Where We Are Going" at the University of Iowa. This also

represents our analysis of the problems of teacher education for the eighties and our plans for meeting these challenges.

Iowa-UPSTEP was conceived with the idea that a new kind of science teacher is needed. Too many persons were persons who aspired first for medicine, engineering, or some other related vocation. The staff at Iowa was concerned that too few secondary teachers actively recruit some of their best students for their own profession. Instead teachers are more concerned and interested in recruitment for medicine, engineering, and similar professions.

An important part of Iowa-UPSTEP is recruitment in the high schools of Iowa (and the Midwest generally). Secondary Student Training Programs (SSTP) are available for several hundred sophomore and junior high school students for a six week period during the summer. Ultimately most of the UPSTEP participants will have been involved with us first as participants in one of our Iowa-SSTP Programs prior to selection. Iowa-UPSTEP participants and all SSTP students are outstanding high school students--fully capable of making any vocational choice. Thirty students are identified as UPSTEP students prior to enrollment as freshmen students at the University each fall. They are visited in their high schools. Hopefully, all will have been on the campus for a full summer prior to enrollment as full-time freshmen students as SSTP participants. If they were not SSTP students, they are invited to spend several days on the campus following high school graduation and prior to enrollment as freshmen in the fall. As UPSTEP participants, the students are treated as members of an Honors group for indeed they are Honors students.

The first phase of the Iowa-UPSTEP program provides an opportunity for the participants to meet and interact with some of the most prominent scientists at the University of Iowa. Weekly seminars are conducted which add to the student experience with various areas of science and various scientists. Such interaction, with persons recognized as leaders in their fields, is a unique experience for freshmen students at the University. The Iowa-UPSTEP participants are invited to visit research laboratories, participate in field excursions, and conduct individual investigations in the several areas of science.

The second phase of year one of the Iowa-UPSTEP program emphasizes problems in communicating science and an analysis of the communicative

process itself. The Iowa-UPSTEP staff believes that one of the most important aspects of science teaching is to be able to communicate effectively. Therefore, communication becomes the logical area for investigation for students who are considering science teaching as a career. Potential science teachers should be aware of the methods and modes of communication that are available. A series of weekly seminars demonstrate that different methods are required to communicate with different people at various stages of physical and mental development. The problem of communication in science in "Our Changing Society" ends phase two of the freshmen year.

During phase one of the second year of Iowa-UPSTEP, the sophomore students are involved in role playing, simulations, and micro-teaching experiences involving their peers. Additional inquiry teaching techniques which include the use of audio-visual materials are emphasized. Teacher behavior in the classroom is coded by utilizing the interaction analysis instrument developed by Amidon and Flanders (1963).

Throughout the second phase of the second year, the sophomore students are participating actively in early exploratory experiences in public schools of Iowa City. The purpose of this early exploratory experience is twofold: first, to provide the opportunity to observe and participate in the duties and responsibilities of teaching in order that a rational decision can be made concerning the suitability of teaching as a career; and second, to provide the student with firsthand experience to insure maximum gain from advanced, professional education course work through the interaction and communication with the cooperating teachers.

The program goals and experiences for the early classroom experience are as follows:

1. Develop insights and skills involved in establishing empathetic relations with school age children and youth.
2. Come to respect and understand each child as a unique person.
3. Gain information about characteristics, interests, needs, and developmental processes of children and youth through observation of their behavior in a variety of settings.

4. Gain insights and appreciation of the social interactions, value systems, environments, and concerns of public.
5. Gain knowledge of the way pupils think and learn.
6. Assess potentialities and interests in teaching as a prospective occupation.
7. Secure firsthand experience and knowledge of the organizational structure and interpersonal relationships of the professional staff of public school systems.
8. Gain knowledge and some experiences with instructional processes and media in schools.
9. Develop an appreciation of the interrelationships and joint responsibilities of teachers and parents in guiding the educational growth of children.
10. Participate in, and become familiar with, professional interrelationships, activities, and organizations of teachers.
11. Participates in some types of community-school organizations and activities.

Several types of early experiences are available. These are:

1. Observing classroom instructions and procedures.
2. Aiding the classroom teacher with routine clerical and administrative experiences.
3. Assisting in working with individual pupils and small groups in learning situations.
4. Assisting in selecting and preparing learning materials.
5. Assisting in diagnosing learning problems for individual pupils.
6. Assisting in supervision of play activities and some extra-curricular activities.
7. Involvement in parental conferences.

In addition, bi-monthly seminars are held where the Iowa-UPSTEP staff and participants discuss various aspects of the early experiences. Because the early exploratory experience is an experimental program prior to

student teaching, several group discussions are conducted in which students, cooperating teachers, and the Iowa-UPSTEP staff collectively evaluate the program.

At the beginning of the junior year, the Iowa-UPSTEP participant is encouraged to apply formally for the teacher education program at the University. At this point, Iowa-UPSTEP participants follow the usual sequence of professional courses--although all of these are specially structured because of the new student needs stimulated by the Iowa-UPSTEP program.

Special new courses have been developed for the junior-senior Iowa-UPSTEP participants. These courses are available for all UPSTEP students--those committed to a teacher education program, those still undecided about their vocations, and those planning to enter other professions. We find that Iowa-UPSTEP continues to be a viable experience for students with a variety of career goals. In addition, persons not identified previously as UPSTEP participants are invited into the group as science teaching majors. Special courses for the junior year include:

1. One in the student's major field to explore the rationale underlying the organization and presentation of introductory courses.
2. Meaning of Science which considers the elementary philosophy and logic that characterize science.
3. Multi-media Instructional Techniques which provide the students with opportunities to develop and utilize multi-media.
4. History of Science which examines the major steps in the development of twentieth century science.
5. New concepts for secondary schools including computer assisted instruction, learning modules, programmed sequences, open classroom, differentiated staffing, and new curriculum structures.

Another unique experience of the Iowa-UPSTEP program is the summer institute where Iowa-UPSTEP students interact with experienced high school teachers and graduate students in science education. The summer experience is designed to provide assistance in the preparation of specific teaching materials in each of the major disciplines. The experienced teachers are the

cooperating teachers the following academic year for the student teaching experiences. The graduate students are concerned with evaluation and assist with research designs created to evaluate new curriculum materials, new course organization and sequences, and new teaching styles.

During the senior year, the Iowa-UPSTEP participants follow a program similar to the present professional semester at the University of Iowa. Because of the background which the Iowa-UPSTEP students bring to the professional semester, all of the discussions and activities have more meaning and can be dealt with in greater depth. The total program has operated closer to classrooms and teachers. Indeed, one of the major developments is a cooperative program involving men of science, teacher educators, in-service teachers, and real schools as learning laboratories.

The major effort of the last undergraduate semester is an original research project initiated and supervised in the major science area. Here the UPSTEP students learn what science is through a direct experience. They also gain new experience in communication and in working with people.

The Iowa-UPSTEP students who accept teaching assignments in cooperating midwestern high schools are involved in a three week summer conference following graduation and prior to commencement of teaching duties. The conference involves former participants in NSF in-service programs, directors, and instructors of similar programs as well as several regular teachers who will be co-teachers the following year with the Iowa-UPSTEP graduates. The faculty of the Iowa-UPSTEP program at the Science Education Center does not want to send the Iowa-UPSTEP students to their first teaching assignment without knowing the school, personnel, curriculum, and many of the students. We feel this conference can help complete the cycle as we strive for a cooperative approach to teacher education.

Iowa-UPSTEP, with an initial focus on recruitment, is evolving into a program of societal awareness concerning problems, issues, and objectives of science and teaching. It is proving to have an important general education function within the University and also an important community focus statewide. Students in the UPSTEP program have been identified as having the capacity to become leaders in scientific fields. Those who decide to

continue in science have had the opportunity to become intimately familiar with the many problems of public education in our free society. They have contributed through their presence in classrooms to making that education more meaningful. They have also had the opportunity to develop communication and teaching skills, and they are all familiar with modern concepts in activity-centered teaching.

The University of Iowa Teacher Education Program is strengthened by the involvement of UPSTEP students and other University and community leaders brought in as part of the UPSTEP program. Currently discussions are being held with representatives from the other twenty-eight colleges in Iowa with teacher education programs. One outcome of these discussions is a plan to establish cooperative centers in Iowa where in-service work with teachers, interaction among staff members from a variety of colleges, and a semester long internship for student teachers from several colleges can be implemented. Iowa-UPSTEP can then be a model for statewide improvement of teacher education.

We are striving for greater communication with ourselves as a staff, with our students, with teachers and administrators in the schools of Iowa, with other teacher educators. We operate from the premise that we are all limited by our past experiences and that we can only grow by trying the new and gaining insight from others. We certainly can not raise our sights and improve our society (and our schools as a microcosm of that society) if we are isolated from one another and if we are satisfied with the status quo.

PHYSICS TEACHERS: The spring meeting of the Iowa section of the American Association of Physics Teachers will be held at Grinnell College on the afternoon of April 28. William Azbell, Secretary-Treasurer, Waverly, Iowa.

INTERDISCIPLINARY ENVIRONMENTAL EDUCATION PROGRAM FOR TEACHERS

James E. Murphy
Research Assistant
Science Education Center
The University of Iowa
Iowa City, Iowa 52240

Environmental education offers a unique opportunity for innovative teaching because no one is around to say, "But, I always did it this way." Thus new environmental programs do not have to overcome the educational inertia of tradition which has stopped many new instructional movements dead in their tracks. The science education center at the University of Iowa has seized this opportunity to promote the interdisciplinary study of environmental issues at all grade levels. Uninhibited by the educational folklore of yesteryear, environmental instruction can follow its natural course in a wide variety of academic disciplines. The fact is that only delightfully demented educational taxonomists would place environmental studies in a single subject area. With few people who like to be considered educational taxonomists and even fewer who like to be considered delightfully demented, things can move along at a rapid pace. And so they have, with the development at the University of Iowa of a summer institute and an in-service program, designed to aid teachers in developing instructional materials that will help their students understand the environment.

The summer and in-service programs have the same basic design with slightly different mechanics caused by time factors and the background of the teachers attending. The goal is to have teams of teachers from more than one academic area develop complete interdisciplinary instructional units appropriate to the needs of their students. Hence, the program begins by having the teachers experience a number of awareness activities that can be used to provide them an idea of the environmental knowledge, attitudes, and interests. This is a little like the traditional aptitude tests used to determine the background of students in a particular subject area. Awareness activities are not only concerned with knowledge but also interest levels and attitudes. They are conducted as a learning activity for the student to become sensitive to his environment and what he or she thinks about it. The idea is for teachers to use this information to build environmental instructional units based on the