non which can cause this sort of apparent change. The phenomenon involves a tendency for measurements of human characteristics, being only partially reliable, to regress to the average of all such measurements. Therefore, if non-Honors students are, indeed, comparable to Honors students, the former group's scores may simply be depressed during the freshman year and may gradually rise, then, to the level of their Honors counterparts.

As the writer has cautioned previously, additional comparisons should be made before the present results are acted upon. The results do raise some questions concerning the extent to which this Honors Program is accomplishing a number of the goals attributed to it. By the same token, three goals have been identified whose accomplishment seems to be affected by the Program. The value placed upon reaching these goals, openness in the advising relationship, realism in occupational thinking, and, possibly graduate school attendance, especially away from the University of Nebraska, will have to be determined by the individual member of this academic community, and, perhaps ultimately, by the College collectively. Perhaps even more important, the present report has stimulated some discussion of the desirability of achieving the goals whose attainment appears questionable and of the means which are being used and which might be used to attain such goals. In any event, the participants' positive feelings about the Program provide the bedrock upon which the Honors Program is built. If students and faculty felt the Program to be unimportant, attempts to improve it would seem wasted.

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A THEORETICAL UNDERGRADUATE ANIMAL SCIENCE CURRICULUM

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Possibly the most pressing dilemma in developing an undergraduate animal science curriculum is to provide for a broad, general education and yet enable students to be specialists in their knowledge of animal science. This situation is further aggravated by the fact that the preparation must be limited to an undergraduate period of four years. A balance between these two components of an education (breadth and depth) is essential lest we produce either a generation of technicians without technical knowledge, or a generation of technicians without imagination. When the diverse occupations within the field of animal science is also considered, an undergraduate curriculum must retain a great amount of flexibility in order to be relevant to individual student needs and desires. Therefore, a well designed program must contain significant areas of

1) liberal or "general education" courses, 2) general agriculture or "preprofessional" courses, 3) agriculture science or "foundation" courses, 4) livestock management or "production" courses, and 5) free or guided "electives."

An undergraduate college education, even in a vocationally oriented area such as animal science, must reward the student by better preparing him to search for a better quality of life. Urbanization, increased leisure time, improved communication and increase emphasis of aesthetics, have all contributed to the importance of a liberal education. The farmer, the feed salesman, as well as the university professor should be able to appreciate a good book, understand the workings of our political system, apply the principles of psychology in dealing with people and develop and follow a satisfying philosophy of life. It must be remembered that the students in colleges and universities today are not going to live in the 1950's or 1960's as their professors have, but will be living in the future. Their university training must give them the skills and tools to live during the next half century. Will young men and women of today reach their maximum potential in the year 2000, using the knowledge, ideas and methods that are considered adequate for today?

Technical animal science training is important and necessary to maintain and increase the production of food and fiber for future needs. The content of courses to impart this knowledge is often debated and is constantly changing as new knowledge becomes available and teaching methods are improved. Nevertheless, the job still remains to acquaint the student with a general agricultural background, the physiological basis of animal production, present cultural and management practices as well as future trends of the industry. The primary objective of this technical training should be to develop the background that will foster new ideas and enable the students to discriminate between productive and unproductive new developments in the animal science industry.

One of the greatest pitfalls of undergraduate animal science education is to create over specialization. Geneticists have long upheld the idea that a broad genetic diversity is valuable for adaptation to change. Likewise, a broad agricultural background will be valuable for animal scientists to adapt to changes that are sure to come with time. This foundation of knowledge should not only include animal science, but the entire agriculture industry, since changes in crop production, economic conditions or mechanization may have tremendous impact on animal production. It is true that specialization must be developed in some students that will be leading the industry in research and development of new ideas, but this specialization should be reserved for graduate education and not at the expense of undergraduate diversity. A general overall plan for a four-year undergraduate animal science curriculum is presented in figure 1.

THE FIRST TWO YEARS:

With the recent advent of two-year or junior colleges, an attempt to define their responsibility has resulted in breaking the curriculum plan of students into two distinct areas: 1) preprofessional and general education courses during the first two years, and 2) professional and elective courses during the last two years. In order to maintain interest of future animal science students as well as to begin a sequence of background material for advanced professional courses, junior colleges have begun widespread offerings of a first course in several academic areas of agriculture. The most efficient utilization of junior college resources will probably dictate that they offer mostly general education courses and a limited number of introductory or preprofessional agriculture courses. A sample curriculum that would provide this general background is given in table 1.

Among the general education courses offered should be courses in written and oral communication, courses in social and

Figure 1
Overall curriculum plan for four year Animal Science program

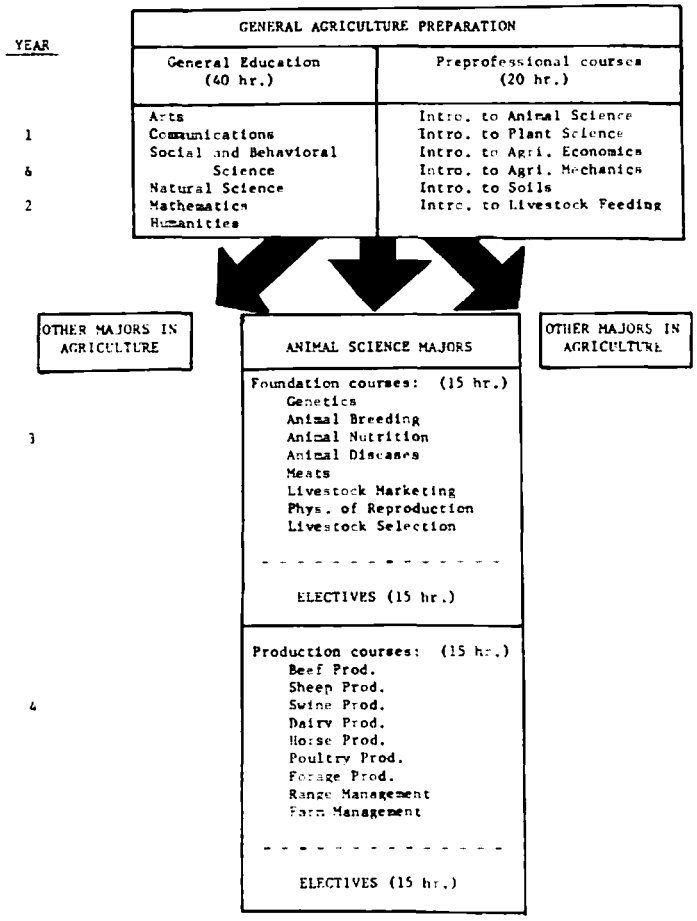

Table 1
A sample curriculum for year 1 and 2, including general education courses and preprofessional courses. Typical of junior college offerings of first two years at a 4-year school.

Freshman Year	
Semester I	Semester II
English communication	Speech Communication
U.S. History	Psychology
Zoology	Intro. to Plant Science
Intro. to Animal Science	Mathematics
Art Appreciation	Chemistry

Sophomore Year	
Semester III	Semester IV
Intro. to Ag. Mechanics	Ag. Economics
Livestock Feeding	Soils
Economics	Sociology
Chemistry	Business
English Literature	World Geography

behavioral science, humanities, the arts, and appropriate courses in natural sciences and mathematics that will best fulfill the student needs. Four-year universities and junior colleges should decide which agriculture courses are most appropriate at the freshman and sophomore level and these courses should be incorporated into programs at both types of institutions. It would seem that introductory courses in animal science, livestock feeding, plant science, soil science, agriculture mechanics and agriculture economics would be the ones most often offered during the freshman and sophomore years. The content of these courses should be similar at both two- and four-year schools.

After completion of the first two years a student should possess a broad background of knowledge in liberal arts and also an agricultural background that will serve as a base for the development of depth in a special field of agriculture. This specialization should be regulated according to the occupational goals of the student. The same basic program during the first two years should prepare students for any academic major in agriculture. Courses in the major field (animal science, agronomy, etc.) would then be reserved for the last two years of the undergraduate program.

THE THIRD AND FOURTH YEARS:

The last two years of the undergraduate program should allow for concentration of course work in the major area and enough elective courses to provide flexibility for differences in the students occupational goal. The animal science courses should be divided into two general categories – "foundation" courses and "production" courses. The "foundation" courses would include such subjects as genetics, breeding, nutrition, physiology, livestock selection, and meats. These courses should be taken during the junior year. The content of Introduction to Animal Science should have developed a background and vocabulary for these "foundation" courses, and the "foundation" courses will in turn prepare the student to handle the "production" courses offered during the senior year. A sample curriculum with this suggested sequence is shown in table 2.

Table 2
A sample curriculum for years 3 and 4, including foundation, production, and elective courses. Typical of last two years of a 4-year degree program for a student planning to attend graduate school in animal science.

Junior Year	
Semester V	Semester VI
Animal Genetics	Reproductive Physiology
Anatomy and Physiology of Animals	Animal Breeding
Animal Nutrition	ELECTIVE (Livestock Marketing)
ELECTIVE (Livestock Selection)	ELECTIVE (Statistics)
ELECTIVE (Mathematics)	ELECTIVE (Chemistry)

Senior Year	
Semester VII	Semester VIII
Beef Production	Dairy Production
Poultry Production	Swine Production
Forage Crop Production	ELECTIVE (Farm Management)
ELECTIVE (Physics)	ELECTIVE (Bacteriology)
ELECTIVE (Data Processing)	ELECTIVE (Crop Production)

Thirty to forty hours of elective courses are necessary to enable this curriculum to prepare students for various professions and to fulfill individual needs. It is this core of courses that will enable students planning to teach to take professional education courses, graduate school candidates to gain more background in science, and students planning to enter business to take courses in that field. In fact, a listing of "guided" electives could be prepared for the use of students entering many different animal science related occupations. Selection of electives that will best help students to reach their professional goals will necessitate close articulation between a given student and his academic advisor. Students will generally have their occupational desires formulated by their junior year.

The results of a general acceptance of the animal science curriculum as herein outlined, could increase the overall efficiency of the educational process. Junior colleges would have course offerings similar to the first two years at four-year institutions, making transfer easy. The sequence of "preprofessional" –

"foundation" – "production" courses is logical in that first a general knowledge of all areas of agriculture is developed, then scientific principles of animal science are studied, and finally, production management systems are related to the previously acquired information. The implementation of such a curriculum would necessitate considerable discussion of course content between junior colleges and senior colleges as well as between the teachers of "foundation" courses and "production" courses. This coordination should be directed toward preventing excessive overlapping of subject matter and encouraging continuity of the educational process. The "production" courses (Beef, Dairy, Pork, etc.) may need to be slightly different from traditional concepts of livestock science, in that they should emphasize management and management decisions. The student will have already acquired the scientific basis for production in the "foundation" courses, leaving the methods of implementation and discussion of systems of production for the "production" courses.

The proportioning among "general education" (40 hours), "preprofessional" (20 hours), "foundation" (15 hours), "production" (15 hours), and "electives" (30 + hours), seems to give an acceptable balance to encourage breadth, depth and flexibility.

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GRADUATE COURSE IMPROVEMENT THROUGH EVALUATION: A CASE STUDY

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INTRODUCTION

"Not to prove but to improve" – is the theme of the Phi Delta Kappa Study Committee Report on Educational Evaluation.[1] This report, along with other literature, provides many reasons for doing course evaluation:

1. To determine if course and students are making desired progress.
2. To provide data on to whom instructors and administrators are accountable.
3. To provide status and reinforcement to curriculum planners and instructors.
4. To enhance the decision-making process on curricular planning.

This fourth reason is correctly identified by the P.D.K. report as the most useful, pragmatic reason for conducting formalized evaluation. This stress on evaluation for improving decisions and thus improving curriculum and courses, implies a strong future orientation. Evaluation is a useful tool only when it is used to improve future efforts.

I agree with the P.D.K. concept. Yet, I am bothered by the lack of real evidence supporting formalized evaluation as a pragmatic, future-oriented concept with the capacity to improve curriculum. Most evaluation reports, for example, are summary in nature, thus providing little encouragement to teachers that evaluation is a useful tool for improving course work. One can easily see why many instructors feel threatened or insecure when peers or administrators suggest they evaluate their courses. These instructors feel the only reason others wish them to evaluate is to see how proficient they are – period!

The seeming void in the literature on the validity of formal, systematic evaluation is my concern. The focus of this article is to help fill this void by providing comparative evidence showing how a course was improved through systematic evaluation. The case study reported here is about a formal evaluation of a graduate college course I teach.

THE SETTING

In 1971 I began teaching the course – "Program Planning in Extension," a key course to graduate students both in and out of the Department of Agricultural and Extension Education, University of Wisconsin. Generally, students of this course are action-oriented, have a technological background as undergraduates, and often from international schools, thus unaccustomed to nonlecture, discussion type learning experiences.

Prior to teaching this course, my experience was limited to informal non-continuous settings with volunteer groups (both youth and adults) as an extension agent. Thus, my lack of experience in teaching a graduate course for students from all over the world provided an opportunity for seeing whether systematic evaluation could be a strategy for course improvement.

PROBLEMS AND DECISIONS

One reason I wished to evaluate the course was to learn how to plan and implement a graduate course practicing the philosophies, and educational theories I had learned.

Second, at the "course level," I had to decide just how "prestructured" or "teacher organized" a course had to be and how unstructured some parts of the course should or could be. I wondered whether I had to set specific objectives for graduate students to achieve.

Third, the work load, the pace of the class, and realistic expectations of students had to be assessed.

Fourth, the appropriateness and exclusiveness of the course content needed evaluation. Was it too much? Enough? Were there other, more important concepts to be taught?

Fifth, I had to decide on appropriate teaching procedures, organization, and methods for each concept to be taught, to build a strong connection between planning ideas and reality (theory and practice).

PROCEDURES

A systematic, formal evaluation is not a research effort. Instead of determining truths to generalize to other situations, as in research, it determines the value of course content and processes as judged against certain criteria.[2]

Systematic, formal evaluation also means that, rather than depending on single measurements, one relies on multiple measurements. Many sources of evidence are important. I used the following sources to discover weak points of the course, to probe unanticipated happenings, and to make the decisions outlined above:

1. Discussions with fellow professors on the feedback they were getting from students and others.
2. Direct student feedback in class and during individual conferences with each student.
3. Observations of class and individual efforts.
4. Student advisory committee discussions.
5. Evidence from extensive surveys at the end of the semester.

The survey form at the end of the course did not replace the need for the other sources of evidence but rather complemented the other sources by:

1. Getting reactions from those who did not speak out.
2. Filling in the gaps on things some students didn't respond on.
3. Probing more deeply certain issues that may have arisen during the course.

The reliability and validity of these approaches was checked in several ways. First, the survey form was reviewed and pretested by fellow departmental professors and the class advisory committee to see that questions would be understood and would actually obtain desired information. Second, the multiple measurement concept had inherent reliability tests built into it. For example, the survey results could be compared with the visual observations and/or the feedback from fellow professors.