TEACHING LOAD EVALUATION IN AGRICULTURAL ENGINEERING DEPARTMENTS

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ABSTRACT

TEACHING LOAD EVALUATION

IN AGRICULTURAL ENGINEERING DEPARTMENTS

By

STEVEN JACK RATZMAN

The Department of Agricultural Engineering at Michigan State University needed a quantitative method for teaching load evaluation.

A survey on evaluation of teaching loads was designed and sent to 49 Agricultural Engineering Departments throughout the United States. Questioning in the survey pertained to:

1. Administrative matters related to teaching load evaluation
2. Important criteria for evaluating teaching load
3. Methods presently in use for teaching load evaluation
4. Reactions to a sample system for teaching load evaluation

The results of the survey are discussed along with the factors that the respondents considered important in the evaluation of teaching loads.

A system for teaching load evaluation is presented and explained with respect to its design and use. The system yields the estimated time consumed in hours per week for the discharging of a teaching assignment.

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TEACHING LOAD EVALUATION

IN

AGRICULTURAL ENGINEERING DEPARTMENTS

By

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TABLE OF CONTENTS

Page

LIST OF TABLES iv

Chapter

I. INTRODUCTION 1

II. REVIEW OF LITERATURE 3

2.1 Reasons for Faculty Activity Analysis and Uses of the Data 3
2.2 Components of a Faculty Member's Workload 6
2.3 Measures of Faculty Output 9
2.4 Methods of Teaching Load Evaluation 10

III. OBJECTIVES 17

IV. TEACHING LOAD SURVEY 18

4.1 Survey Contents 18
4.2 Design of the Survey 19

V. RESULTS OF THE TEACHING LOAD SURVEY 21

VI. DISCUSSION 27

6.1 Administrative Aspects 27
6.2 Criteria as Related to Methods 29
6.3 Reaction to Sample System 32

VII. SYSTEM FOR TEACHING LOAD EVALUATION 33

7.1 Background 33
7.2 Rationale for the Design of the System 35
7.3 Evaluation of the System 37

VIII. SUMMARY AND CONCLUSIONS 38

8.1 Summary 38
8.2 Conclusions 39

APPENDICES 41

REFERENCES 50

LIST OF TABLES

Table		Page
1	Agricultural Engineering Departments $\frac{\text{SCH Produced}}{\text{FTE}}$ and $\frac{\text{Contact Hours/Week}}{\text{FTE}}$ for the 1971-72 School Year	25
2	Teaching Load Evaluation System	34

I INTRODUCTION

Faculty salaries make up 60 to 80 percent of the operating costs of an institute of higher education. There are approximately 750,000 faculty members in 2,500 institutes of higher education ranging from junior and community colleges to multiuniversities (Romney, 1971). Accounts of faculty's time or production will become increasingly necessary with the coming of more public scrutiny.

On the administrative side of higher education, there is a need for measures of faculty output in order to make decisions such as need for additional staff, budgeting, salary adjustments and faculty promotions. Measures of output are also needed for providing equitable workload distribution among faculty members.

The author is interested in teaching loads and their evaluation in the Agricultural Engineering Department at Michigan State University. A set of special circumstances listed below affects the teaching loads and their distribution at that department:

1. One-half of the teaching load (by student credit hours produced) is in Agricultural Technology.
2. Agricultural Technology is quite vocational in nature and many of the courses are oriented toward acquisition of skills.
3. Teaching of vocational skills ranks low when it comes to consideration for promotion at Michigan State University. Also, most of the younger faculty have not been recruited for this purpose.

4. Agricultural Technology courses often require multiple laboratory sections which are inherently limited in size (high contact hours).
5. Enrollments in the four-year and graduate courses are generally low; thus a limited student credit hour production.
6. During Fall and Winter terms, the departmental teaching load is large compared to Spring and Summer terms.

The object of this study is to determine a quantitative method for teaching load evaluation in terms of faculty time consumed for the Agricultural Engineering Department at Michigan State University.

II REVIEW OF LITERATURE

2.1 Reasons for Faculty Activity Analyses and Uses of the Data

The faculty at Michigan State University, as well as faculty at many other universities, has been required to participate in various kinds of faculty activity analyses. These analyses are usually administered by the university for its own use. The purpose of this section of literature review is to explore the reasons for making faculty activity analyses and the uses of the data resulting therefrom.

Cannell (1959) listed the uses of faculty activity data as follows:

1. checking inequalities,
2. detecting trends,
3. guiding assignment changes,
4. supporting scheduling refinements,
5. suggesting variations in the number of sections needed per course,
6. establishing measures of output to support budget requests,
7. determining subsequent staffing needs.

Isaacs (1971) makes the following comment with respect to the use of faculty load data:

> "Such data are most commonly used as a basis for allocation of resources, which perhaps inflates the importance of such data far beyond its probable accuracy."

The argument used by Romney (1971) for justification of faculty activity patterns is that pressures now exist on our society that affect every level of it, higher education included. The pressures are:

1. economic,
2. population,
3. cultural,
4. public policy changes, and
5. labor market conditions.

and he concludes that: "The forces which currently press upon society, higher education and faculty members demand that faculty activities be identified . . ."

Stecklien (1969) suggests that the purposes of making a faculty activity analysis are to:

1. identify inequities in load,
2. obtain load assignment guidelines,
3. discover what activities consume faculty time,
4. recommend promotions and salary increases, and
5. support changes in staffing and curriculum requests.

Data on faculty activity may be a source for understanding individual and departmental morale problems. Hill (1969) states that heavy loads produce drudges who lack initiative and produce little; and light loads lack challenge.

Bolton (1965) claims that the analysis of loads carried by individual faculty members can be useful for the purpose of acquiring an adequate number of faculty and equitably delegating responsibilities among faculty members. Patten and Beams (1969) agree that faculty workload data are essential for apportioning the teaching load among faculty available.

Hauck (1969) states that faculty activity data have an important use for the correction of assignment inaccuracies that have come about due to differences in requirements of preparation and contact hours.

According to Blee (1960), faculty activity data are important for coordinating decisions. He further states that decisions of this nature require something more than data alone (i.e., judgment based on experience), but if suitable measures of faculty effort are not found, the continued use of crude measure will be necessary.

Coffelt (1966) says that the studying of faculty teaching loads provides:

1. Faculty load and educational program data that are helpful for statewide planning and coordination.

2. Objective data of value for governing boards for assessing the general efficiency of institutional operations, planning future expansion of programs and determining staffing pattern needs.

Doi (1960) states the following with respect to faculty activity data:

1. Information assists administrative officers in assessing the general efficiency and economy of instructional programs.

2. Load studies assist in the development of objective criteria for determining instructional loads and staffing needs.

3. Load data can be used to stimulate experimentation with instructional techniques and various class sizes.

4. Data can be useful for the planning of future expansion and changes in instructional programs. Institutions should be able to detect shifts in student interests and in the emphasis that faculty members should give to various subjects, including changes in the level of courses taught.

5. Faculty load studies can be used for determining the allocation of funds. The data are essential for identifying the needs for additional staff members.

2.2 Components of a Faculty Member's Workload

Douglass and Romine (1950) state that faculty load:

> ". . . includes the sum of all activities which takes the time of a college or university teacher and which are related either directly or indirectly to his professional duties, responsibilities, and interests . . ."

The fact that teaching duties vary not only from institution to institution, but also vary between individuals was recognized by Reeves and Russell (1929).

From the above, it can be seen that it becomes necessary to standardize definitional comparability and agreement as to the components comprising faculty load.

Knowles and White (1939) suggest the following as components of instructional load:

1. number of courses for which an instructor is responsible,
2. the nature and degree of difficulty of the courses,
3. the number and characteristics of the students enrolled in each course, and
4. time devoted to conferences with students in relation to classes.

Bolton (1965) presents the following factors for consideration in a faculty member's load:

1. Contact hours--to be adjusted for preparation, class size, laboratory and first time taught.

2. Student advisees--should be weighted as to graduate student versus undergraduate advisee.
3. Committee memberships.
4. Administrative duties.
5. Service activities.

Activities thought worthy of looking at concerning teaching load according to Davis (1924) are as follows:

1. number of minutes devoted to conducting classes,
2. number of minutes consumed in making specific preparation for conducting classes,
3. number of minutes required to grade papers, make reports and attend to clerical matters pertaining to classes,
4. engaging in civil and social affairs to supplement work of the university or aid instructor to a better understanding of his teaching material and to acquaint himself with the needs and experiences of his students,
5. visiting other institutions of learning,
6. preparation of publications, and
7. private professional teaching to improve his power and skills.

Lorentz (1971) categorizes professional development as an activity that may or may not be included as professional duties of a faculty member. It is possible to think of professional development as an expected activity and something that an institution of higher education might not feel obligated to support.

The following twenty-five components of workload for university faculty are identified by Miller (1968):

1. Number of lower division credit hours taught.
2. Upper division credit hours taught.
3. Graduate division credit hours taught.
4. Laboratories taught.
5. Seminars taught.
6. Classes with more than 40 students.
7. Designing the course of study for a correspondence course.
8. Number of students taught by correspondence.
9. Student advisees.
10. Master's theses directed.
11. Doctoral dissertations directed.
12. Dissertation or thesis committee memberships.
13. Official counselorships for student organizations.
14. Memberships held on institutional committees.
15. Chairmanships held on institutional committees.
16. The job of being department chairman.
17. Number of employees supervised.
18. The job of major officer of a regional or national professional organization.
19. Amount of research engaged.
20. Amount of publication.
21. Travel done connected with institution.
22. Consultant work as an institutional employee and as a private endeavor.
23. Public relations activities.
24. Number of speeches to prepare for groups.
25. Attendance at required meetings.

Isaacs (1971) presents the following variables affecting teaching loads as listed by a survey of Deans of Resident Instruction:

1. contact hours,
2. numbers of students per class,
3. repetitive class instruction,
4. numbers of separate preparations,
5. whether the contact hours are laboratory or lecture hours,
6. level of course (freshman, sophomore---graduate),
7. developing new course,
8. developing new methods,
9. instructor teaching existing course for the first time,
10. thesis or individual instruction,
11. special problem instruction,
12. advising and counseling,
13. tutorial load,
14. advising student organizations,
15. advisory committee work for graduate students,
16. administrative duties related to teaching (scheduling, registration),
17. committee assignments, and
18. availability of supporting staff (technicians, graduate assistants, paper graders, etc.).

2.3 Measures of Faculty Output

According to Stickler (1960) the credit hour is a reliable index of faculty load. He seems to be in conflict with most of the other literature on the subject. In their study, Knowles and White (1939) found that total time spent by a faculty member per credit hour

varied from 2.9 to 5.5 hours and Stewart (1934) found the time to range from 2.2 to 7.7 hours per credit hour. Michell (1937) states that a 15 credit hour teaching load usually requires approximately 50 hours per week, but may require as many as 84 hours of work. In the Ohio Study (1970) it was stated that the credit hour, contact hour, student credit hour, and student contact hour were found to be unacceptable indicators of faculty workload by themselves or together.

Percentage of time has been used as a measure of faculty activity. Tyndall and Barnes (1962) state the following with respect to percentage of time:

> ". . . it has one major disadvantage that can be illustrated best by a single example: If two faculty members teach separate sections of a single course, each having the same salary and spending nine hours each week in contact with students and in "preparation" for class (including the grading of exams and course assignments, office hours, etc.), but one states that he spends 25 percent of his (36 hour) work week teaching, whereas the other spends 16 2/3 percent of his (54 hour) work week on teaching, quite different amounts will be charged to instruction in the two cases by the percentage-of-time approach. This seems clearly unreasonable. To say that teaching costs more in the case of the man with the 36 hour work week because he does less research would indeed be strange; the same cost should be charged in each case."

2.4 Methods of Teaching Load Evaluation

When an administrator assigns a teaching load to a faculty member, he almost always makes the assignment within some guidelines. The guidelines he uses may come from state legislation, university or college regulations; or the decision may rest completely on the administrator's judgment. The latter being the case in many instances

has given rise to "rules of thumb" regarding teaching load. The inadequacies of various "rules of thumb" have in turn given rise to qualitative and quantitative methods of teaching load evaluation in the literature.

The Ohio Study (1970) made the following statement:

> ". . . the convenient descriptive load of fifteen credit hours (with an average of two hours preparation and grading for each credit hour taught) has persisted throughout higher education. Two reasons account for this persistance. First, the fifteen hour load presents a simple description of a complex phenomenon. By adding preparation time one arrives at a work week of forty-five hours, which seems intuitively sound . . . Second, no better substitute measure was available."

Better substitute methods do exist now that take into account more aspects of teaching than just credit hours taught. Hauck (1969) suggests the following formula:

$$T = T_p + N_c T_c + N_s T_s$$

where T = time spent on course (hours/week)

T_p = time spent preparing for class (hours/week)

T_s = time spent in instruction outside of class, per student (hours/week)

T_c = time spent in class

N_c = number of sections

N_s = number of students

The N - factors are furnished by the registrar and the T - factors must be determined by executive decision. The judgment of the faculty, according to Hauck, may be helpful in establishing appropriate values. T - factors should be established separately for lecture and laboratory instruction so that they could be calculated

as two distinct courses. Special recitation sections may be calculated in this way also.

Hill (1969) puts forth the idea of the equivalent student credit hour (ESCH).

$$ESCH = L + 1.85U + 4.0G + 2m + 12M$$

where L = lower division student credit hours taught

U = upper division student credit hours taught

G = graduate student credit hours taught

m = number of undergraduate majors

M = number of graduate majors

This system uses lower division student credit hours as the base. It gives extra weight to upper division student credit hours and graduate student credit hours. Also determined are some factors for undergraduate advisement and miscellaneous time and also for non-course time taken by graduate students. Hill indicates that this formula is not very useful for comparing one department to another but does have use in watching changes in load over time within one department. An argument given for the equivalent student credit hour is the ease with which it is interpreted by administration. He concludes his article by saying:

> "Those scales (of teaching load evaluation) which are used with the administration must be in terms that the administration can understand. Apparently, they can understand only such terms as student credit hours and credit hours. Therefore, a good approach is to use equivalents of these which reflect more accurately the actual situation."

The system of teaching load evaluation devised by Isaacs (1971) can be found summarized in table format in Appendix 1. This system attempts to estimate the preparation, presentation, and grading time per week required for various instructional activities. The FTE (full time equivalent) is then calculated by assuming a 40 hour work week. Repetitive sections of the same course are considered in the reduction of preparation time. Class size is considered by use of an arbitrary division enrollment factor.

Splinter (1972) discussed the system for determination of teaching loads at the University of Nebraska as follows:

> "The system base is 12 semester credit hours per semester--for example, 4, three-credit lower level courses of 15 to 45 students each per semester. To this is added a system of adjustments. A normal class number for upper level course is 10 - 30 students and for graduate level courses 5 - 20 students. For each 35 additional lower level students in class or for each 20 upper level or graduate level students one additional credit is allowed. One additional credit is allowed for teaching a graduate level course."

Student advisement is considered in the Nebraska system, also. One credit is given for each 20 undergraduate advisees, two Master's advisees and one Ph.D. advisee. For developing a new course or teaching a course for the first time, one or two credits are given. Laboratory courses receive one credit for each credit hour if there is only one section of laboratory. If multiple laboratory sections exist, one credit is allotted for each three hours per week actually spent in the laboratory.

In the West Virginia Teaching Load Study (1964), faculty

teaching loads are broken down into load hours with ten to twelve load hours being considered a full load. The load hours are calculated as follows:

1. One load hour for each lecture hour.
2. Two-thirds load hour for each laboratory hour.
3. One load hour for each graduate student registered for thesis.
4. One load hour for an approved course with one student.
5. One-half of the full load credit for an approved course with more than one student but less than the minimum.

In an appendix to the West Virginia study, criteria are recommended to take into consideration the special cases of independent study courses, courses without credit, research course, student advisement, committee work and course level.

The following two quantitative formulas are offered by Isaacs and McFee (1972):

A. A COURSE LOAD FOR EACH COURSE FOR ONE INSTRUCTOR

$$Y = [.1C\ (.875 + .005N_C)]\ [1 + .67\ (D_C - 1)] + [.18L\ (.875 + .005N_L)]\ [1 + .67\ (D_L - 1)] + [.5W\ (.1C + .18L)] + [.09R\ (.875 + .005N_R)]\ [1 + .67\ (D_R - 1)] + .025H$$

where

Y = Load for a staff member in a course as a decimal of a FTE.

C = Contact hours of lecture in one division of the course.

L = 0 if no lab, L = 1 if there is a single, two or three hour lab taught in the course, and L = 2 if there are 2 labs in each section of the course.

N_C = Average number of students in lecture divisions taught by this instructor in the course.

R = Number of recitations (1 hour sessions) a student attends in that course per week.

N_R = Average number of students in recitations taught by this instructor in this course.

N_L = Average number of students in labs taught by this instructor in the course.

D_C = Number of divisions of lecture taught in this course by this instructor.

D_L = Number of divisions of labs taught in this course by this instructor.

D_R = Number of divisions of recitations taught in this course by this instructor.

W = 1 if this is A. The first time this instructor has taught this course.

B. A major revision in the instruction of the course.

W = 0 if A or B do not apply.

H = Scheduled hours instructor spends per week in study center tutorial activities.

B. THE INDIVIDUALIZED INSTRUCTION LOAD FOR A PROFESSOR

$$Z = .08\ (M + P) + .02\ (Ma + Pa) + .04S + .005Na + .01A + .06T$$

where

M = Number of Masters candidates directly under the professor's supervision.

P = Number of Ph.D. candidates directly under the professor's supervision.

Ma = Number of Masters candidates in absentia.

Pa = Number of Ph.D. candidates in absentia.

S = Number of special problem students under his direction.

T = Number of students registered for topical research.

Na = Number of undergraduates advised (a minimum of .05 is given if any students are advised).

A = Number of M.S. and Ph.D. advisory committees on which the professor has membership.

III OBJECTIVES

The objectives of this study are as follows:

1. To determine what methods of teaching load evaluation are presently used by Agricultural Engineering Departments.
2. To determine the most critical factors contributing to teaching load evaluation by:
   1) Questioning Agricultural Engineering department chairmen,
   2) Surveying the literature, and
   3) Obtaining the opinions of faculty members of the Agricultural Engineering Department at Michigan State University.
3. To suggest an equitable method of teaching load evaluation for the department of Agricultural Engineering at Michigan State University.

IV TEACHING LOAD SURVEY

In order to gain some insight as to what factors are considered important and what methods are actually in use with respect to teaching load evaluation, a teaching load survey for Agricultural Engineering Departments was sent to forty-nine Agricultural Engineering department chairmen throughout the United States. The survey was designed with the help of Dr. Thomas Freeman of the Office of Institutional Research at Michigan State University. A sample of the survey can be found in Appendix 1.

4.1 Survey Contents

The questioning in the survey was directed at five different areas.

The first area of questioning was directed toward administrative matters pertaining to teaching load such as who determines teaching load policy, who actually assigns the teaching loads and if there exists a particular method for teaching load evaluation at that department.

The second area pertained to criteria for teaching load evaluation. At this point the respondents were given the opportunity to express what their primary basis is for their method of teaching load evaluation and were asked to attach relative importance to seven criteria that might be used in evaluating teaching loads.

The third set of questions asked whether or not various factors that affect teaching load are considered. If they are, explanations

were sought. Factors such as laboratory courses versus lecture courses, teaching of new courses, class size, direction of graduate students, course level and committee assignments were included.

In the fourth part of the survey, a sample system for teaching load evaluation designed by Isaacs (1971) was presented. The purpose was not only to obtain reactions and opinions to the system presented, but also to ascertain whether or not assigning arbitrary values to factors that consume faculty time is an acceptable approach to teaching load evaluation. The respondents were directly questioned as to whether or not the system was realistic and if it would be applicable to their own departments. Reactions and suggestions were also sought with respect to the sample system.

In the last part of the survey, supplemental information was requested including the courses taught by the respondents' department for the 1971-1972 school year along with the credits and number of students in each of the courses. Also requested was the number of Full Time Equivalent (FTE) teaching faculty and any written statements concerning teaching loads that applied to the respondents' department. Space for additional comments and information was provided between the parts of the survey and explanations were requested with the responses to most of the questions.

4.2 Design of the Survey

The survey instrument as a whole and the individual questions were designed primarily for ease of completion on the part of the respondents. All possible responses were numbered for the convenience

of the respondent in the event that he wished to refer to his response later in the survey form. The form was made as brief as possible, also in keeping with the idea of ease of completion.

V RESULTS OF THE TEACHING LOAD SURVEY

The following presentation of results is in the form of a paraphrased version of the actual teaching load survey which can be found in Appendix 1. Forty-five out of forty-nine departments returned the survey. As will become apparent, not all of the respondents answered all of the questions.

Part I ADMINISTRATIVE MATTERS

1. Faculty load policies are determined by: (43 responses)

the legislative level	2%
the university level	25%
the college or school level	9%
the departmental level	23%
combination of the above	41%

2. Each faculty member is required to submit an account of his departmental responsibilities and activities: (43 responses)

No	28%
Yes	72%

3. The actual teaching load is assigned: (43 responses)

by department chairman	37%
by teaching coordinator	0%
in consultation with the faculty member and the department chairman	58%
other	
by area leader	2%
by department chairman and dean	2%

4. A particular method or formula exists as a guideline for teaching load evaluation: (43 responses)

No	28%
Yes	72%

Part II CRITERIA FOR TEACHING LOAD EVALUATION

6. Which of the following is your primary basis for evaluating teaching loads? (41 responses)

credit hours taught	15%
student credit hours produced	7%
classroom contact hours	10%
consideration of total working hours	68%

7. The following criteria which might be used in teaching load evaluation were numbered by the respondents in order of importance. The results are as follows:

Criteria	attached most importance (41 responses)	attached least importance (43 responses)
class size	12%	40%
course level	5%	19%
number of course preparations	15%	5%
graduate student thesis direction	0%	23%
designing and teaching new course	27%	2%
teaching existing course first time	0%	9%
total contact hours	41%	2%

Part III METHODS AT YOUR DEPARTMENT

9. Laboratory courses are given a different load equivalency rating than lecture courses: (43 respondents)

No	30%
Yes	70%

10. Teaching of a new course is given a load equivalency rating: (42 responses)

No	61%
Yes	39%

11. Class size is given a special load equivalency rating: (42 responses)

No	62%
Yes	38%

12. Direction of graduate student research is given a load equivalency rating: (43 responses)

No	37%
Yes	63%

13. Teaching of a graduate level course is given a different load equivalency rating than teaching undergraduate courses: (42 responses)

No	43%
Yes	57%

14. Faculty committee assignments are given a special load equivalency rating: (43 responses)

No	67%
Yes	33%

Part IV SAMPLE SYSTEM

System of Course Load Evaluation Used in an Agricultural Engineering Department

Activity	Hours Per Week Work Time			FTE
	Preparation	Presentation	Grading	Hrs/40
Lecture (1 hr)	2	1	1	0.10
Lecture (1 hr) repeat	-	1	1	.05
Laboratory (3 hr)	2	3	1	.15
Laboratory (3 hr) repeat	-	3	1	.10
Laboratory (2 hr)	2	2	1	.12
Laboratory (2 hr) repeat	-	2	1	.08
Spec. Prob.	-	2		.05
M.S. Thesis	-	3		.08
	-	1		.04
Ph.D. Thesis	-	3		.08
	-	1		.04

The size of class divisions is considered by a Division Enrollment Factor (DEF) to the FTE derived from the above table. The DEF is determined as follows:

Class Division Size	Devision Enrollment Factor, DEF	
	Lecture	Laboratory
0 - 16	1.0	1.0
17 - 25	1.0	1.3
26 - 45	1.2	1.6
46 - 55	1.4	1.9
56 - 65	1.6	2.2
66 - 75	1.8	
76 - 85	2.0	

16. The above system of course load evaluation is used in a department of agricultural engineering. After examination of this system:

    a. Do you think the method is generally realistic? (34 responses)

No	18%
Yes	82%

    b. Would it be applicable to your department? (36 responses)

No	33%
Yes	67%

Seventeen respondents supplied sufficient supplemental information so that it was possible to calculate the number of student credit hours produced per FTE and the contact hours per week per FTE for the 1971-72 academic year. This information can be found in Table 1.

The statements received from the respondents pertaining to guidelines for teaching load assignment in their particular situations ranged from philosophical statements to methods and formulas, some of which are found in the literature review section of this work. The philosophical statements with general guidelines are very pleasing to read. But, in a case where a department chairman is making a teaching load assignment, they offer little help in estimating the time a faculty member will have to spend in order to carry out his assignment.

Table 1

Agricultural Engineering Departments
$\frac{\text{SCH Produced}}{\text{FTE}}$ and $\frac{\text{Contact Hours/Week}}{\text{FTE}}$
For 1971-72 School Year

School	No. of FTE	$\frac{\text{Contact Hr./Week}}{\text{FTE}}$	$\frac{\text{SCH Produced}}{\text{FTE}}$*
A	3	21.6	853.5
B	1.65	39.39	717
C	11.5	34.5	686
D	6.5	26.3	627
E	8.5	---	595
F	4.0	52.25	571.2
G	10.28	36.9	537
H	3.0	21	504.9
I	4.34	39.4	494.2
J	6	---	469.5
K	1.6	---	462.75
L	2.88	30.5	439.5
M	4.33	19.1	415.5
N	11	16.2	356.25
O	4.0	---	351.1
P	8.14	19.3	282
Q	3.0	---	269
	$\bar{x}$ = 5.5	$\bar{x}$ = 29.7	$\bar{x}$ = 507.7
	sd = 3.25	sd = 10.9	sd = 156.9

* Those schools giving information on a semester basis were changed to a quarter base by multiplying by 3/2.

The basis for teaching load evaluation presented in statements by the respondents fell into 4 categories. These were based on:

1. Credit hours. Either a certain number of credit hours was stated simply as a full time load or the credit hour stipulation was weighted for such factors as course level, class size, student advising and multiple laboratory sections.
2. Student credit hours produced. Here, again, either a number of student credit hours to be produced was stipulated or a base number was set and then weighted for certain factors as mentioned above.
3. Load hours or load units. Teaching loads are calculated similarly to the West Virginia Teaching Load Study (1964) by assigning an absolute value of load units or load hours to certain components of teaching load and then stipulating how many load units or load hours constitutes a full time teaching load.
4. Individual formulas. The formulas presented by Isaacs and McFee (1972) calculate teaching load as a percentage of a full time equivalent by assigning rather arbitrary time values to teaching activities.

VI DISCUSSION

6.1 Administrative Aspects

Since 41 percent of the respondents indicated that faculty teaching load policies are formulated by more than one policy making body, any formula or method adopted for the evaluation of teaching loads would have to be acceptable to all policy making bodies concerned. In some cases, the method would have to meet the approval of the legislative body that has ultimate budgeting control over the institution. The question then arises as to whether it is indeed possible to arrive at a method which is satisfactory to all parties concerned.

It is the opinion of this writer that, not only is it possible for a method of teaching load evaluation to be satisfactory for legislatures as well as faculty, but it is imperative that one be found. The reason is that both groups are seeking a measure of faculty output. Although their reasons may differ, it would seem very likely that the same measure of output that is used for the allocation of financial support could be used as well for the equitable distribution of teaching duties at the departmental level. If this is not the case the legislature could be apportioning money to a department for teaching on a completely different formula than the department uses to arrive at salaries for its teaching faculty. Such situations give rise to difficulty in communication between institutions of higher education and the legislative body when the subject of allocations of financial resources is discussed.

Methods of measuring faculty teaching load that come directly from legislative levels usually specify a certain number of credits or contact hours that are to be taught or a number of student credit hours that are to be produced over a time period for a full time teaching load. Simplistic solutions such as these leave voids in accounting for other teaching activities that do not fit nicely into the categories of credit hours, student credit hours produced or contact hours. These other activities include teaching variables such as undergraduate and graduate student advisement, course level, special problem courses, laboratory courses versus lecture courses and new course development. All parties concerned would have a clearer picture of teaching faculty activity if such activities were accounted for. This is a main concern as evidenced by the fact that 72 percent of the respondents have the requirement that faculty members must submit an account of their activities periodically. Also evidencing a concern for clearer understanding of faculty activity is the 58 percent of the respondents that indicated teaching loads are assigned in consultation with the faculty member. In this manner, the needs of the department can be taken into consideration in light of the total teaching and non-teaching activities of the faculty member.

The utility of workable guidelines for teaching load evaluation is evidenced by 72 percent of the respondents indicating that they are using some form of a method to aid them in the evaluation of teaching loads at their departments. More convincing is that all but one of the remaining respondents indicated that either they are presently in need of a method or anticipate a need in the near future. Only one respondent

indicated no problems at all in the area of evaluating teaching loads and he did not anticipate any at his department. The respondent in this particular case stated to the effect that assignment of teaching loads needs no further guidelines than sound administrative judgment based on experience.

6.2 Criteria as Related to Methods

In Part III, Question 6, a fault in the survey writing most probably exists because the answer which received 68 percent of the responses is an extremely broad category compared to the other available responses to this question. The result of this is that the response most likely served as a "catch-all" answer.

Credit hours taught and classroom contact hours were the primary basis for evaluating teaching loads in 25 percent of the responses. Bases such as these, if not used with compensating factors for various teaching variables, can result in a very incomplete picture of a faculty member's teaching load as pointed out before. Wide variations in total time spent per credit hour taught have been found and it would seem reasonable that the same relationship would be found for contact hours.

When ranking teaching load criteria in order of decreasing importance, 41 percent of the respondents attached greatest importance to total contact hours. Thus, contact hours are considered an important factor to be considered in teaching load evaluation, but are not well accepted as the base factor upon which a system should be built.

The fact that 27 percent of the responses attached greatest importance to designing and teaching of new courses indicates that significant allowances should be made for this type of activity in any suggested method of teaching load evaluation. A paradox seems to arise when comparing the importance attached to designing and teaching of new courses compared with methods that are in use in various departments -- 61 percent stated that they do not give a load equivalency rating for teaching a new course. The results of this question are rather predictable when comparing the criteria that were considered least important to the criteria which were considered most important.

Graduate student direction was never considered an important factor and 23 percent attached least importance to it when considering the choices available. In Part III, Question 12, it is indicated that 63 percent of the respondents do give equivalency ratings for direction of graduate student research. Thus, it could be that most of those who attached least importance to graduate student direction, do not see this as a teaching activity. It is quite logical to consider graduate student direction as part of a faculty member's research activities. Much time if often spent discussing graduate student research which is usually part of the faculty member's overall research program. Problems of definition beset this particular question.

Class size did not show itself to be of great importance with 12 percent attaching most importance and 40 percent attaching least importance to this item. Sixty-two percent of the respondents also did not give a load equivalency for class size. Class size may be unimportant to the respondents because Agricultural Engineering does

not usually have many large classes. The reader is referred to Part II, Question 7 and Part III, Question 11 in the survey. Fewer responses are tabulated for most important as compared with least important criteria in Part II, Question 7 because, in two cases, respondents listed two first choices of criteria that they considered to be equally important. These responses were not tabulated.

The importance of differentiating between laboratory and lecture courses was evidenced by 70 percent of the respondents giving different load equivalency ratings to laboratory courses than lecture courses.

Since 67 percent of the respondents do not give load equivalency ratings to committee assignments, it may be that: (i) committee work is not considered under the definition of teaching by many of the respondents, or (ii) this type of activity is expected from a faculty member and does not warrant special consideration.

6.3 Reaction to Sample System

Since 82 percent of the respondents to the questions in Part IV of the survey thought the sample system presented was generally realistic, a concensus is implied that favors assigning arbitrary time values (based on experience) to various teaching activities. Teaching load evaluation in this manner is an acceptable approach to the problem. Of those responding to this part of the survey, 67 percent thought that the system would be applicable in their departments. In all cases where the respondents indicated that the method was realistic, but not applicable to their department, comments were made that for legislative reasons it could not be used.

It is highly tempting to allude to conclusions of very high degrees of acceptability of the sample system. This cannot be done because of the small number of responses to Part IV of the survey. Questions that consumed some time in order to accurately answer them received low response. This being the case, it becomes extremely difficult to conjecture as to how they would have responded had they taken the time. The analysis is less meaningful due to the low response to these questions.

VII SYSTEM FOR TEACHING LOAD EVALUATION

7.1 Background

A method of teaching load evaluation, found in Table 2, was formulated by the Departmental Teaching Committee of the Agricultural Engineering Department at Michigan State University. The basic design of the system was introduced to the committee by Dr. George Merva, Associate Professor of Agricultural Engineering. The author was a representative to that committee during the formulation of the system. The system takes into account the following aspects which were agreed upon as important teaching activities by the teaching faculty of the Agricultural Engineering Department:

1. Contact hours.
2. Class size.
3. Number of credits taught.
4. Course level.
5. Number of sections.
6. Course newness.
7. Placement training.
8. Job training.
9. Recruitment.
10. Undergraduate student advising.
11. Graduate student advising.
12. Serving on graduate student guidance committees.
13. Special problems courses.

TABLE 2 TEACHING LOAD EVALUATION SYSTEM

			Base Factor	Problem Set Frequency Factor		Difficulty Factor			N Section Factor	Newness Factor*			Existing** Course Revision Factor			
				>1 per Week	<1 per Week	000 299	300 499	500 999	N=no. of Sections	1st Time Offered No. Book	1st Time Offered Book or Lab Manual Available	1st Time Existing Course	70% to 90%	50%	10% to 30%	0%
Hours per Contact hr.	Teaching-------	Lec	1	1	1	1	1	1	N	1	1	1	1	1	1	1
		Lab	1	1	1	1	1	1	N	1	1	1	1	1	1	1
	Preparation----	Lec	2	1.1	1.05	1	1	1.3	1	2	1.6	1.2	1.5	1.25	1.0	0.75
		Lab (hardware)	1/2	---	---	1.3	1.0	1.0	1	2	1.6	1.2	1.5	1.25	1.0	0.75
		Lab (saftware)	1/2	---	---	.25	.5	1	1	1	1	1	1	1	1	0.75
Hours per Student per week per credit	Course Adminis-------- tration	Correct Papers	.02	1.75	1.2	1	1.3	1.6	1	1	1	1	1	1	1	1
		Special help	.01	2.0	1.2	1	1	1	1	1	1	1	1	1	1	1

*Use only one column of newness or course revision factors per row.
**A course is defined as "existing" if notes and/or books are available. A 100% revision of a course implies a first time offered factor.

The following nine activities have been listed with suggested ranges of time allotment. The actual time allotment for these items will be decided upon in conference with the department chairman and the faculty member.

1. Placement Training. 0.4 - 1.0 hours per student per week. This assumes the student is enrolled for 3 credits of placement training.

2. Job Placement. This category includes writing letters of recommendation and contacting prospective employers. 0-0.15 hours per week for each letter or contact placement per week.

3. Recruitment. This category will be considered in terms of hours per week spent on rectuiting assignments.

4. Undergraduate Student Advising. .05-.1 hours per student per week.

5. Graduate Student Advising. 0.25-0.50 hours per student per week. This is assuming that 1/2 contact time with graduate students is a teaching function. The other 1/2 of the contact time will be assumed a research function.

6. Serving on Guidance Committees.
   a. Term of candidates oral exam-0.5 hours per student per week.
   b. Other terms-no allocation unless justified.

7. Special Problem Courses (AE 459 and AE 811). 1.0 hour per student per week.

8. Committee Work (teaching, graduate, curriculum, student club)
   a. Chairman-0.75 hours per committee per week.
   b. Members-0.5 hours per committee per week.

9. Other Teaching Related Duties (not included in the above)
   These duties will be considered in hours per week spent on these assignments.

14. Committee work.

15. Course administration.

16. Course revision.

The system yields the number of hours per week for each course taught. This is done by assigning base factors of time for teaching, course preparation and course administration, and by using multiples on the base factors for course level, number of sections, amount of homework given, newness of the course and course revisions.

The base factors for course preparation and teaching are stated in hours of time per contact hour. The base factors for course administration are in terms of hours per student per credit per week. In this manner, contact hours, class size and course credits are adjusted for use in the system.

7.2 Rationale for the Design of the System

Because of the nature of hardware laboratories (which require setting up and removal of equipment), as opposed to software laboratories (which are essentially problem solving sessions), it was seen that more time should be allocated for preparation of hardware laboratory sessions. At the lower course levels, more time was allocated for preparation of these sessions because most of the skills oriented courses are at this level and inherently require more set-up time than upper division or graduate level laboratory sessions.

Coordination of a course between more than one instructor is to be considered preparation time. It is possible for more than one person to receive preparation time for the same laboratory session in

the case of an instructor having laboratory teaching assistants.

Exam preparation is considered to be built into the system, because it takes the place of preparation for one classroom contact hour. Thus, an instructor is given two hours preparation time for a one hour exam.

Final exam week is covered by exam preparation and grading. If one's average weekly load is 20 hours of teaching, then 20 hours will be considered consumed by exam preparation and grading.

Because more special help is likely to be required with greater numbers of problem sets, the base factor for special help looks rather low. Also, ten minutes (per credit per week) is owed as special help to the students because actual teaching time is 50 minutes per hour.

A revision factor is not awarded to software laboratory preparation time because of the problem solving - recitation nature of this type of class. If the lecture material is changed, the laboratory problems will be changed also. Time for this is allocated in a revision factor for the lecture part of the course.

The system is designed to encourage course revision by recognizing this in a multiplier factor for preparation time. Also, if a course is not revised the instructor is, in effect, penalized on his preparation time.

This teaching load evaluation system is designed to be used only as a guide for the department chairman and faculty to estimate total teaching time in hours per week. It is recognized that administrative judgment is necessary and no method, no matter how comprehensively designed, fits all cases.

7.3 Evaluation of the System

The system was evaluated by applying it to calculate the teaching loads in the Michigan State University Department of Agricultural Engineering for Fall term 1972. The results were compared with the faculty member's estimate of his teaching activities. The correlation coefficient between the results and the faculty estimates was 0.97.

It was the opinion of the Agricultural Engineering Departmental Teaching Committee and the author that the results of the system correlated very well with the faculty's estimates and realistically portrayed time consumed in teaching activities. The system is now before the Voting Faculty of the Department of Agricultural Engineering at Michigan State University for adoption.

VIII SUMMARY AND CONCLUSIONS

8.1 Summary

A teaching load survey was designed and sent to 49 Agricultural Engineering Department chairmen throughout the United States. Forty-five surveys were returned, but not all of the returned surveys were complete. Questioning in the survey pertained to:

1) Administrative matters related to teaching load evaluation
2) Important criteria for evaluating teaching load
3) Methods presently in use for teaching load evaluation
4) Reactions to a sample system for teaching load evaluation

The survey showed that the methods of teaching load evaluation presently used in Agricultural Engineering Departments throughout the United States were unsatisfactory (with a few exceptions) because of the following:

1) The methods are not based on hours/week or are not readily convertible to this basis and/or
2) The methods fail to consider various critical factors which contribute to a faculty member's teaching load; e.g., newness of a course, number of different courses taught, number of contact hours.

A method of teaching load evaluation which takes into account factors important in teaching load evaluation as defined by the Michigan State University Agricultural Engineering faculty is presented. This method is composed of two parts. The first allows for the conversion of classroom and laboratory instruction into hours per

week devoted to teaching, preparation for teaching and course administration. The second provides time allowances for other teaching activities such as graduate and undergraduate student advising, serving on guidance committees and departmental committee work related to teaching.

Estimates of individual faculty teaching loads using the system were found to agree with faculty member's estimates of their teaching activities with a correlation coefficient of 0.97. A correlation of 0.84 was obtained when faculty estimates of teaching time were compared with the results of the system designed by Isaacs (1971). The increase in the correlation coefficient results from the inclusion of additional factors which enter into the teaching load but were not considered by Isaacs (1971).

8.2 Conclusions

The conclusions from this study are as follows:

1) Time consumed by a teaching assignment is an acceptable basis for teaching load evaluation.
2) Credit hours, contact hours and student credit hours produced are unacceptable as sole bases for teaching load evaluation.
3) Critical factors with respect to teaching load evaluation as suggested by the teaching load survey are:
    1) Classroom contact hours
    2) Newness and difficulty of courses taught
    3) Number of different courses taught

4) Agreement as to what faculty activities comprise the teaching load is necessary before starting to formulate a method for teaching load evaluation.

APPENDICES

APPENDIX 1

TEACHING LOAD SURVEY FOR

AGRICULTURAL ENGINEERING DEPARTMENTS

STEVEN J. RATZMAN, GRADUATE ASSISTANT
DEPARTMENT OF AGRICULTURAL ENGINEERING
MICHIGAN STATE UNIVERSITY
EAST LANSING, MICHIGAN 48823

MARCH 1972

PART I. ADMINISTRATIVE MATTERS PERTAINING TO TEACHING LOAD

1. Are faculty load policies determined by:

____ 11 legislative level

____ 12 university level

____ 13 college or school level

____ 14 departmental level

____ 15 combination of the above or other; please describe

2. Do you require each faculty member to submit an account of his departmental responsibilities and activities?

____ 16 no

____ 17 yes

If yes, how is this done?

____ 18 special survey form

____ 19 verbal account

____ 20 other; please describe

3. Is the actual teaching load assigned

____ 21 by department chairman

____ 22 by teaching coordinator

____ 23 in consultation with faculty member and department chairman and/or teaching coordinator

____ 24 other; please explain

4. Do you have a particular method or formula as a guideline for teaching load evaluation?

____ 25 no

____ 26 yes

If yes, please describe your method below or attach a copy of the method or formula.

5. Please add any comments or additional information you may have been dealing with the above four questions.

PART II. CRITERIA FOR TEACHING LOAD EVALUATION

6. Which of the following is your primary basis for evaluating faculty teaching load?

____ credit hours taught
27

____ student credit hours produced
28

____ classroom contact hours
29

____ consideration of total working time in all departmental
30 activities (teaching and other faculty responsibilities)

____ other; please explain
31

7. Listed below are certain criteria that might be used in evaluating total teaching load. Please number the criteria in the order that you would attach importance to them (i.e., 1 most critical, 2 is next, etc.)

____ class size
32

____ course level
33

____ number of different course preparations
34

____ graduate student thesis direction
35

____ designing and teaching of a new course
36

____ teaching existing course for first time
37

____ total contact hours
38

8. At this point, please add any comments or additional information you may have pertaining to criteria for teaching load evaluation.

PART III. METHODS AT YOUR DEPARTMENT

9. Are laboratory course assignments given a different load equivalency rating than lecture assignments?

____ no
39

____ yes; please state your policy.
40

10. Is teaching of a new course given a load equivalency rating?

____ no
41

____ yes; please explain.
42

11. Is class size given a special load equivalency rating?

____ no
43

____ yes; please state policy.
44

12. Is direction of graduate student research or independent study given a load equivalency rating?

____ no
45

____ yes; please state policy
46

13. Is teaching of graduate level courses given a different load equivalency rating than teaching undergraduate courses?

____ no
47

____ yes; please state policy.
48

14. Are faculty committee assignments given a load equivalency rating in your system of teaching load determination?

____ no
49

____ yes; please state policy.
50

15. At this point, please add any additional comments you may have about methods used at your department or comments on the last five questions.

PART IV. SAMPLE SYSTEM

Table V. System of Course Load Evaluation Used in the Agricultural Engineering Department

Activity	Hours Per Week Work Time			FTE
	Preparation	Presentation	Grading	Hrs./40
Lecture (1 hr)	2	1	1	0.10
Lecture (1 hr) repeat	-	1	1	.05
Laboratory (3 hr)	2	3	1	.15
Laboratory (3 hr) repeat	-	3	1	.10
Laboratory (2 hr)	2	2	1	.12
Laboratory (2 hr) repeat	-	2	1	.08
Special Problems	-	2		.05
M.S. Thesis	-	3		.08
	-	1		.04
Ph.D. Thesis	-	3		.08
	-	1		.04

The size of class divisions is considered by a Division Enrollment Factor (DEF) to the FTE derived from the above table. The DEF is determined as follows:

Class Division Size	Division Enrollment Factor, DEF	
	Lecture	Laboratory
0 - 16	1.0	1.0
17 - 25	1.0	1.3
26 - 45	1.2	1.6
46 - 55	1.4	1.9
56 - 65	1.6	2.2
66 - 75	1.8	
76 - 85	2.0	

16. The above system of course load evaluation is used in a department of agricultural engineering. After examination of this system:

    a. Do you think the method is generally realistic?

    ____ no
    51

    ____ yes
    52

    b. Would it be applicable to your department?

    ____ no
    53

    ____ yes

c. What are your reactions and suggestions with respect to this method? Please state:

PART V. SUPPLEMENTAL INFORMATION

17. If it is within the policy of your department to send the following information it would be useful and greatly appreciated:

a. The lecture and laboratory hours of each course taught by your department, fall through spring terms for the 1971-72 school year.

b. The course credits of the above courses.

c. The number of students in each course.

d. The number of FTE faculty members in your department.

e. Any written statements you may have concerning teaching load policy that applies to your department.

f. A sample report or survey form upon which faculty members submit accounts of their responsibilities and activities.

g. Additional comments or explanations pertaining to any aspects of teaching load evaluation at your department or any comments on this survey.

APPENDIX 2

LIST OF RESPONDENTS

Surveys were returned from the Agricultural Engineering Departments of the following institutions:

Auburn University
The University of Arizona
The University of Arkansas
The University of California
California State Polytechnic College
Clemson University
Colorado State University
University of Connecticut
Cornell University
University of Delaware
University of Florida
University of Georgia
University of Hawaii
University of Idaho
University of Illinois
Purdue University
Iowa State University
Kansas State University
University of Kentucky
Louisiana State University
Louisiana Tech University
University of Maine
University of Massachusetts
University of Maryland
University of Minnesota
Mississippi State University
University of Missouri
Montana State University
University of Nebraska
North Carolina State University
North Dakota State University
The Ohio State University
Oklahoma State University
Oregon State University
The Pennsylvania State University
South Dakota State University
The University of Tennessee
Texas A & M University
Texas Tech University
University of Vermont
Virginia Polytechnic Inst. and State University
Washington State University
West Virginia University
University of Wisconsin
University of Wyoming

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