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## FACULTY WORKLOAD MEASUREMENT AT PENN STATE

LEE C. EAGLETON  
*Pennsylvania State University  
University Park, Pennsylvania 16802*

**T**HE PURPOSE OF THIS paper is to describe the Faculty Workload Formula developed in the Department of Chemical Engineering at Penn State during the past 5 years. We started with a scheme developed by the college administration that was carefully thought out but not tested. Also, the department previously had a form used by faculty for reporting activities of all kinds and another format for organizing material in faculty resumes. A small committee selected the types of activities to be included in the workload formula, estimated the effort required for each item, and produced an initial formula. The entire faculty discussed the weighting or credit for each activity and the initial formula was thus established. The formula was tried for the 1971-1972 academic year by having a single faculty member compute the workload for everyone else based on data supplied by the individual faculty member. Next, the department head scheduled a half hour meeting with each faculty to discuss the changes that should be made to have the workload come closer to representing the work accomplished. On the basis of notes of these conferences, the faculty was able to agree on a "final" formula. Over the past several years minor changes have been made in an attempt to correct inequities, and presumably small changes could continue into the indefinite future. At present the workload is computed once a year for the previous 3 terms ex-

cluding the summer. Penn State has 3 terms during the academic year, and the formula was developed for a school on the term system. The formats presented at the end of this paper for the semester and quarter formats were adapted from the term formula but have not been tested.

Recently we have given up the concept that the workloads should be computed entirely by a single individual. A faculty member (but it could be a secretary or administrative aide) converts the data for our courses into points for each of the faculty. Information on graduate and undergraduate student advising is also entered on a form. The percent of each person's salary that



Lee C. Egleton studied chemical engineering at MIT and Yale. After a postdoctoral position at Columbia, he joined the chemical engineering department at the University of Pennsylvania and moved to Penn State in 1970. He was Chairman of the Chemical Engineering Division of ASCE in 1971-72.

is on research funds is also noted. Each faculty member is then asked to complete the form by including the items that he alone can provide such as time spent on papers, proposals, graduate student advising that duplicates sponsored research, etc. Somewhat more reliable or uniform results would result if someone then looked over all workload computation to spot instances of non-uniformity or suspiciously inflated claims for certain activities. However, until it is clear that workload numbers are going to be used for some purpose, additional effort to achieve maximum accuracy or uniformity is probably not warranted.

#### OBJECTIVES OF A WORKLOAD ANALYSIS

**C**ONSTRUCTING A MEANINGFUL workload measurement scheme involves considerable and continuing effort that can be justified only if important objectives are met. The objectives usually given are listed below.

- For use outside the department and, particularly, outside the university to show what work is undertaken by the faculty.
- For use by the department head or individual faculty in an attempt to show that the department on average or particular faculty are either "overloaded," "under-worked," or about right.
- Use by the department head in attempting to balance workloads among faculty members through assignment of tasks.
- Use by the individual in optimizing his time. That is, the individual faculty member may neglect those activities which receive little or no credit in the workload analysis.

The utility of workload formulas has probably not been established sufficiently that a criterion for a successful formula is known. In other words, anyone can construct a workload formula that might be superior to the one presented here or elsewhere in this session. There are a few decisions that need to be made and rather subtle points to be resolved. Some of these are discussed briefly here.

Work in the various categories occurs at different times throughout the year but we desire an average over some particular period. For example, at first we thought that an average workload for the entire year would be most desirable but have since realized that individuals and administrators would like to compare workloads for each term or semester. We do not compute workloads for the summer.

There are a number of choices for the units to be used in reporting workload. We attempted

to avoid controversy by using "points." Points for a "full load" can be made anything, but there is psychological advantage in a scheme in which most faculty achieve 100 points or more. Another approach would be to use "points" with an implied meaning such as teaching credit equivalence or standard or nominal hours per week. In deciding the number of points to be awarded for a particular task, it is difficult to avoid relating the points to a certain number of hours of work. If points are to be totaled for a period such as a term, there is the need to assume how many hours of work occur in a week or a term. By assuming there are 40 hours of work in a week even though faculty work longer hours, the number of points in a workload will be somewhat greater than one might expect from the relationship between points and hours that have been chosen.

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We hope that all faculty will spend an appreciable amount of time keeping up with the literature in his field. Unfortunately, no rational scheme has been suggested for evaluating this activity. There is no easily recognized output for the work and no one seems interested in asking the faculty to estimate hours spent reading the literature.

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#### PROBLEMS IN DEVELOPING A FORMULA

**I**DEALLY, A WORKLOAD formula should probably measure the work accomplished instead of the amount of time spent. Unfortunately, there is no simple way to assign points to a particular activity without either simply relating points to time spent or else establishing some arbitrary relationship that might be inappropriate in many cases. Probably the teaching activity is about as well understood as any other. It is recognized that some courses are easier to teach than others. Therefore one could attempt to assign a certain number of points to each course after consulting with those who have taught it. Our formula simply bases the points for a course on the number of credits, number of students, where undergraduate or graduate, whether a laboratory or not, and whether the course is a new one. The influence that each of these factors has on the points for a course is little more than an educated guess, and

no simple formula can be appropriate for all courses. For such activities as preparing papers and other scholarly work, it is recognized that the work required varies tremendously depending upon the details of the activity. Presumably no formula would be sufficiently complete to more or less automatically account for these many factors. We simply allow a range of points and ask the faculty member to select the appropriate amount. The faculty member may be tempted to select the maximum number of points allowed in each category.

The concept of released time for sponsored research is well established. Therefore, it is attractive to relate points in a workload formula to the percent of salary covered by research funds. When this is done, the assumption is made that the amount of work is related to the salary distribution, which, of course, is not necessarily the case. For example, it is customary to cover a certain percentage of a salary on a particular grant for a year without bothering to make adjustments for the fact that during some periods work on the project is much more extensive than during others. When the percent of salary on a particular project is included in a workload formula, one should attempt to adjust the salary distribution each term or semester in order to reflect changes in research effort at different times of the year. In any event, a serious disadvantage of including research funding in a formula is that duplication is inevitable unless specifically avoided. That is, any complete workload formula will include points for time spent directing graduate research. If the research is also supported by research funds, the same research advising activity will be counted twice.

In view of the fourth item of the list of objectives, it would be possible to award fewer points than might be appropriate for some tasks and more points for others in an effort to encourage faculty to allocate their efforts in certain desired areas. The formula presented here does not employ that tactic. Instead, an effort is made to assign the points for each activity in proportion to the work that would be involved.

Some desirable activities are rather nebulous. For example, we hope that all faculty will spend an appreciable amount of time keeping up with the literature in his field. Unfortunately, no rational scheme has been suggested for evaluating this activity. There is no easily recognized output for the work and no one seems interested in

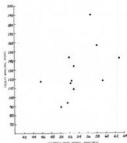


FIGURE 1. Workload vs hours worked.

asking the faculty to estimate hours spent reading the literature. On the other hand, when the activity is part of a sponsored research project, credit may be awarded indirectly through item II.4. of the formula. Therefore, one inequity that has not been resolved is the credit for this type of scholarly work for some faculty and not for others. As a matter of fact, in general it appears that those with a substantial amount of sponsored research obtain more points than those equally busy but without these grants and contracts.

#### TYPICAL RESULTS

THE ATTACHED WORKLOAD formula was applied to each faculty member of the department for the 3 terms during the academic year 1975-76. The average of the 3 terms is shown in Figure 1. At a time not related to the workload analysis, faculty are asked to estimate the hours per week devoted to University related work. In plotting the average workload points against the hours claimed, there is no intention to imply that a correlation exists. Figure 1 is simply a way of showing the workload points obtained. It is known that faculty estimates of the time they spend are quite unreliable. Very few faculty record their various activities and the time spent. Therefore, when asked for the amount of time worked per week, most faculty simply guess. There is also a problem in the definition of what type of activity is working and what is more or less overhead related to routine daily activities. The 12 faculty in

Figure 1 represent everyone on campus during the year except the department head. The most striking feature of the workloads shown in Figure 1 is the large spread in values obtained. This phenomenon probably reflects a number of different factors. We have clearly not succeeded in developing a formula in which the total points are linearly dependent on the amount of time or work expended, and perhaps there is no reason that a formula should have this property. We know that faculty will take on various activities to fill the time available. For example, a faculty member with one course and no other activities could probably spend most of his time on the course plus reading in the literature. He would have a very low workload as measured by our formula and would be quite busy. Presumably this course would be more successful than others, but our data do not suggest a correlation between workload and instructor or course acceptance by the students. That is, we ask the students in each class to rate the course and the instructor. It is not true that the instructors who are rated the best have the lowest workload as measured by our formula or by vice versa. Those with high workloads are spending less time on some tasks than are those with lower workloads in view of the fact that the total time spent by the faculty does not show a large variation. Either some faculty are more efficient than others or they are doing a poorer job by cutting corners (or some of both).

the faculty. Since the meaning of the numbers remains to be established, it is not possible to say whether a particular faculty member with a certain workload is overworked or not. On the other hand, there is undoubtedly a significance to the fact that some faculty have workloads of 150 and more while others are nearer 100 or slightly less.

One has a feeling that it should be possible to measure the work accomplished by faculty. We feel that it remains to be shown that this objective can be reached in a practical way.

The following comments were recognized early in our efforts and were reported at the ASEE meeting in 1973. They seem equally applicable today in spite of the considerable effort made in the past 3 years.

- The subject of workload analysis is not popular with most faculty members. Some resent the concept. Others, realizing that efforts toward quality teaching (for example) do not show, worry about "injustities." Although it is made clear that workload analysis is not the same as faculty evaluation, faculty with low workload "scores" worry that they will be evaluated as inferior in productivity.
- Data for workload analyses must come from individual faculty. Ideally, a single faculty member should calculate all workloads in a department, but it is time consuming for one individual to assemble the needed information. It seems inevitable that the faculty member will, to a large extent, compute his own workload.
- Because we all schedule work to fill the time available, a workload analysis cannot be based principally on

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## CONCLUSIONS AND COMMENTS

**A**LTHOUGH WE HAVE been experimenting with a workload formula for five years, the benefits, if any, remain to be demonstrated. We are simply still gaining experience. A review of the four objectives listed earlier suggests that none have been attained. That is, no one outside the department has asked to see our workloads. Although the department head could use the workload numbers in assigning teaching duties, these assignments can be made just as well by simply thinking about the major activities for each of

statements by faculty regarding the time spent on various jobs. Yet, only the individual knows the magnitude of some important activities.

- A workload scheme represents a compromise between the complexity accepted, and the validity of the results.
- Many workload formulas, including the one presented here, do not give adequate credit for professional development items such as reading books and papers.
- Because of the third item above and other factors, it does not seem possible to construct a workload scheme that gives numbers that are in some way linear in the amount of work being performed.

A table follows showing the calculations of faculty workload for a semester calendar. □

**TABLE 1. FACULTY WORKLOAD  
For Schools with Semester Calendar**

Basic: Sixteen week semester (640 hrs.) 1 point for 6.4 hrs. of work  
Full Load = about 100 points/semester

**I. TEACHING AND ADVISING**

1. Undergraduate Advising, 6.12 per semester per advisee (0.5 hr.)

**2. Instruction**

A 3 credit course meets three 50 minute periods per week for 15 weeks plus a final exam period.

UG— $2.3 \times c (1 + (n-25)/100)$

c = credits, n = no. of students

Grad— $10 \times c (1 + (n-15)/100)$

Lab—Multiply UG by 1.5

New Course to department—Add  $5.3 \times c$

New Course to instructor—Add  $2.3 \times c$

Independent study or research (undergraduate or non-thesis graduate), 4 x no. of projects, one-three students/project

2-3 credits of Design involving meetings with groups of 2-5 students—4 x number of groups

**II. RESEARCH AND GRADUATE STUDY**

1. Graduate Research Advisor

Each of students 1 & 2—8

Each of students 3 & 4—6

Each of students 5 & 6—4

2. Research Proposals—4 to 12 (3 day to 10 day)\*

3. Papers—4 to 12 (3 day to 10 day)\*

4. Sponsored Research Administration, Supervision, and Technical Reports—% salary

support reduced by credit under 1, 2, 3 if applicable.

5. M.S. Committees—0.6 (1 day/2 semesters) (Chm. credit is given under 1.)

6. Ph.D. Committees—0.8 (1-1/2 day/2 semesters) (Chm. credit is given under 1.)

**III. SERVICE TO UNIVERSITY, PROFESSION, AND PUBLIC**

1. Committees and Offices

University, College, and Department—2.5 (10-32 hrs.) according to workload plus 2.5 if chairman. Ignore minor or inactive committees.

Professional Organizations—2.5 according to work involved plus 2.5 if chairman.

2. Dept. Administration—assigned duties, variable credit\*

3. Seminar Presentation—off campus 2.5 (2 day) —on campus 1.5 (1 day)

4. Meeting Paper Presentation and Preparation 4-7.5 (3-6 day)\*

5. Technical Meeting Symposium Chairman—4-6 (3-5 day)\*

**IV. SCHOLARSHIP AND PROFESSIONAL DEVELOPMENT**

1. Meeting Attendance—1 each (3 day) or as appropriate for length of meeting\*

2. Paper and Proposal Reviews—0.5 to 1.5 (1/2 day - 1 day)\*

3. Literature Reading—no specific credit

\*Credit determined after evaluation of work involved in consultation with the individual faculty member.

## FACULTY WORK LOAD MEASUREMENT AT NJIT

D. HANESIAN

*New Jersey Institute of Technology  
Newark, New Jersey 07102*

**T**HIS STUDY WAS undertaken by the Faculty Council of New Jersey Institute of Technology in the Spring 1971 to gather data pertinent to the faculty loads at various schools. The survey was made involving 101 universities of which 66 replied.

In order to collect as much data as possible a preliminary letter with six questions was sent to 101 schools. A month and a half later, a follow up

letter was sent to those schools who didn't reply. A total of 66 schools finally replied. After initial analysis of the data a third letter was sent to 46 schools of the 66 who had attempted to answer the questions initially asked.

The results of the survey are summarized in Tables 1-4. Table 1 shows that 65.3% (66 schools) contacted returned replies. Of these 69.6% (46 schools) answered the questions asked and hence 45.6% (46 schools) of the total survey (101 schools) were tabulated in Table 2. Of the schools who sent general replies and could not be tabulated (20 schools or 19.8% of total survey), most indicated load reductions are granted. About 97% of all schools surveyed indicate some load reduction. Table 2 shows the distribution of the schools based on the questions asked.