

FACULTY OUTPUT AND SALARY COSTS OF STATE-RELATED UNIVERSITIES

---

ANALYSIS OF REPORTS SUBMITTED UNDER 1973 ACTS 22A, 23A AND 24A

STAFF REPORT OF THE JOINT STATE GOVERNMENT COMMISSION / APRIL 1975



## INTRODUCTION

In 1972, Senator Richard A. Snyder introduced amendments to the appropriation acts for Pennsylvania's three State-related universities requiring reports on faculty output and salary costs for the following year. These amendments became law in December 1972, and similar amendments calling for a second report were enacted as Act Nos. 22A, 23A and 24A of 1973.

The Snyder amendments reflect the Legislature's concern with the ever-increasing appropriation requests by Pennsylvania State University, the University of Pittsburgh and Temple University and the not readily explainable differences among the universities. Specifically, the reporting initiated by the Snyder amendments deals with information concerning the number of students, faculty, student credit hours, faculty workload and salaries for all programs except the medical program.

The data furnished by the State-related universities in both 1973 and 1974 have been extensively analyzed for the General Assembly by the staff of the Joint State Government Commission. In compliance with the intent of the Snyder amendments, this analysis does not imply any ranking of the performance of the universities. It does present the facts

concerning quantifiable faculty output and salary costs and proposes a rationale for equitable university reimbursement. In short, the purpose of this analysis is to encourage the provision of quality higher education within the means of Pennsylvania students and taxpayers.

DONALD C. STEELE  
Research Director  
Joint State Government Commission  
Room 450, Capitol Building  
Harrisburg, Pennsylvania

CONTENTS

INTRODUCTION . . . . . iii

SUMMARY OF FINDINGS . . . . . vii

ANALYSIS OF FACULTY OUTPUT AND SALARY COSTS . . . . . 1

    I. School Output: 1972-1973 and 1973-1974 . . . . . 1

    II. Faculty Workload . . . . . 4

    III. Faculty Count . . . . . 13

    IV. Faculty Salaries . . . . . 14

    V. Comparison with Other Public Universities . . . . . 17

    VI. Conclusion . . . . . 23

TABLES

1. School Output 1972-1973 and 1973-1974 . . . . . 3

2. Distribution of Fulltime Faculty by Reported Work-related Hours per Week for Specified Colleges and Departments and University Averages, Fall 1973 . . . . . 5-8

3. Contact Hours Spent per Week by Full-time Faculty Members in Specified Departments or Colleges and University Averages, Fall 1972 and Fall 1973 . . . . . 9

4. Number of Assigned Credits and Average Class Size . . . . . 12

TABLES (cont.)

5.	Comparison of 1972-1973 and 1973-1974 Production and Faculty Cost Data . . . . .	15
6.	Distribution of Student Credit Hours by Level of Instruction, Pennsylvania State-related Universities and Comparable Public Universities of Illinois, 1973-1974 . . . . .	18
7.	Comparison of Average Faculty Compensation by Rank of Pennsylvania State-related Universities and Comparable Public Universities of Illinois . . . . .	20

FIGURES

1.	Comparison of Average Contact Hours and Average Assigned Credits for Fall 1972 and Fall 1973 . . . . .	10
----	---	----

## SUMMARY OF FINDINGS

1. The full-time faculty members at the three universities generated an average of 347 student credit hours during the 30-week academic year starting with the fall term in 1973. The comparable average production in 1972 was 350.
2. The average class size at the three universities was 18.78 in 1972-1973 and 15.89 in 1973-1974.
3. Activity reports submitted by full-time faculty members of the three universities for fall 1973 showed an average of less than nine hours spent in classroom contact a week.
4. Average total time per week spent by the faculty on university-related activities (class contact, preparation, research and public service) was reported as 53 hours for fall 1973.
5. Faculty salary paid from the university funds averaged \$37.22 per student credit hour in 1973-1974--the comparable expenditure in 1972-1973 was \$33.92.
6. The total number of student credit hours produced by the three universities was 2,991,000 in 1973-1974 and 2,896,000 in 1972-1973.

7. The total number of degrees awarded by the universities, excluding associate degrees and M.D. degrees, was 22,240 in 1972-1973 and 21,979 in 1973-1974.
8. The three universities produced 10.1 percent of their total student credit hour output for 1972-1973 during the summer terms and 9.7 percent of the total output for 1973-1974 during their summer terms.
9. As compared with Pennsylvania's university-funded faculty salary cost per student credit hour of \$37.22 for 1973-1974, the average unit cost for three comparable public senior universities in Illinois was \$31.93--slightly less than the 1972-1973 Pennsylvania costs.
10. The average university-funded salary of Pennsylvania State-related faculty members producing 347 student credit hours was \$12,900 in 1973-1974. For this salary expenditure, 404 student credit hours were produced on the average at the three public senior universities in Illinois.
11. The total faculty salaries paid from university funds for 1973-1974 were \$111.3 million. This was 77 percent of the total amount appropriated by the Commonwealth in Act Nos. 22A, 23A and 24A of 1973 to the three universities for instruction.



## ANALYSIS OF FACULTY OUTPUT AND SALARY COSTS

The 1973 appropriation acts of the State-related universities (Acts 22A, 23A and 24A, 1973) require respectively that Pennsylvania State University, the University of Pittsburgh and Temple University provide the Pennsylvania General Assembly with statistics concerning actual university output and faculty workloads for summer 1973 and for the twelve-month period beginning September 1, 1973.<sup>1</sup> The acts require these statistics for all programs of the university except the Doctor of Medicine program. On the basis of the information provided, the Joint State Government Commission has prepared the following summary, which focuses on a comparative analysis of school production, use of faculty time and salary costs of the three universities for two twelve-month periods beginning September 1, 1972 and September 1, 1973.

### I. School Output: 1972-1973 and 1973-1974

The tasks of large universities are multiple and vary between the undergraduate and graduate levels of instruction. By nature, some of the services--such as research, continuing education and public service--are not readily measured quantitatively; and a comparison of such services among universities having widely varying output patterns tends to be misleading. The following comparative analysis concentrates on the quantifiable measures of instructional output--student credit hour production, course and section offerings and degree production.

---

1. Appropriations Act 20A, 1973, required that Lincoln University submit similar statistics for the twelve-month period beginning September 1, 1973. These statistics were not available as of April 1, 1975.

Student credit hours generated by faculty at the three universities are presented as the primary measurable instructional output. Table 1 indicates the distribution of student credit hours between the undergraduate and graduate levels and a comparison of total student credit hours produced by the three universities for the school years starting in fall 1972 and fall 1973. Specific data for the fall and summer terms are included as an indication of the maximum production and the production problem of the summer term. In the two years under observation, student credit hour production for Penn State and Pittsburgh increased 5 and 4 percent respectively, while Temple's production fell .4 percent, due to a 20 percent decrease in student credit hours for the summer sessions of 1974. Graduate credit-hour production at the three universities was relatively stable, as can be observed in Table 1.

The largest number of undergraduate student credit hours is produced during the fall term at each university. For Penn State, with four terms of 10 weeks each, fall term undergraduate student credit-hour production is roughly one-third of the total undergraduate production. Pittsburgh and Temple, whose fall terms cover about 15 weeks, produce closer to one-half of their total undergraduate student credit hour production during the fall term. Summer student credit hour production increased at the undergraduate level except at Temple University. It may be noted that the production during the summer continues to be a small part of the total output. This is also reflected in the number of courses offered during the summer.

As demonstrated in Table 1, there was in general a decrease in the number of degrees granted. The degree output at Penn State declined except for masters degrees. At Temple University, there was at least some increase

Table 1

SCHOOL OUTPUT  
1972-1973 AND 1973-1974

Type of Output	Pennsylvania State University		University of Pittsburgh		Temple University	
	1972-73	1973-74	1972-73	1973-74	1972-73	1973-74
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Student credit hours (in thousands)						
Undergraduate	1,291	1,361	578	603	510	505
Graduate	133	134	199	200	185	188
Total	1,424	1,495	777	803	695	693
Number of undergraduate student credit hours (in thousands)						
Fall	424	449	265	270	236	238
Summer	64	72	72	77	52	40
Number of graduate student credit hours (in thousands)						
Fall	36	36	77	79	81	84
Summer	30	31	47	46	28	24
Number of courses offered						
Fall	3,697	3,762	3,411	3,447	2,475	2,433
Summer	1,541	1,595	2,272	2,095	1,006	1,095
Degrees granted						
A.B.	7,879	7,647	3,701	3,951	3,301	3,350
M.A.	1,533	1,582	2,300	2,038	1,588	1,600
1st Prof.	N.A.	N.A.	332	254	595	610
Ph. D.	425	376	420	411	166	160

SOURCE: Reports provided by the individual universities.

NOTES: University of Pittsburgh summer data include spring term, spring session and summer session data. Temple University estimates of numbers of undergraduate and graduate student credit hours have been calculated on the basis of information furnished.

in the number of degrees produced at all levels except for Ph. D. degrees. Pittsburgh had the largest increase in AB degrees, but a decline in production of graduate level degrees.

## II. Faculty Workload

Each full-time faculty member at the three universities estimated for the fall term the average number of total hours per week he spent on university-related work, e.g., teaching, instructional support, continuing education, research and public service. Table 2 presents a distribution of the full-time faculty members of specific departments and colleges by the average total hours per week worked for fall 1973 and the range of average hours reported. The wide range of total hours spent per week demonstrates individual variation in instructional time required due to credit hour assignments and accompanying preparation as well as variation in work habits and difficulty in estimating the average time spent weekly in other activities--such as research and public service--which are subject to fluctuations from week to week. While the university averages on Table 2 indicate the median number of total hours per week of university-related work at the three universities to be approximately 53 hours, in all but five relevant observations the difference within departments between the lowest and highest reported number of hours per week worked was greater than 30 hours. In the Department of Vocational Education, Penn State and Pittsburgh had a difference between lowest and highest number of hours of less than 30 hours while the spread as reported at Temple was 114 hours.

Table 3, which provides data for main campuses only in the case of individual departments, focuses on the average number of contact hours spent

Table 2

DISTRIBUTION OF FULL-TIME FACULTY BY REPORTED WORK-RELATED <sup>1/</sup>HOURS PER WEEK FOR  
SPECIFIED COLLEGES AND DEPARTMENTS AND UNIVERSITY AVERAGES  
FALL 1973

(1) College or Department	Distribution of Faculty by Average Total Hours per Week							Number of Faculty (9)	Range of Hours per Week	
	(2) Less than 30	(3) 30-39	(4) 40-49	(5) 50-59	(6) 60-69	(7) 70-79	(8) 80 or more		Low (10)	High (11)
<b>Liberal Arts and Sciences</b>										
<b>Science Courses</b>										
Penn State	2	2	102	101	36	8	3	254	10	86
Pitt	---	1	36	91	25	7	4	164	36	82
Temple	8	1	10	25	11	11	4	70	15	104
<b>Foreign Languages</b>										
Penn State	---	---	27	33	7	3	---	70	41	74
Pitt	---	1	12	13	14	2	1	43	35	85
Temple	---	1	6	11	8	6	4	36	36	90
<b>Mathematics</b>										
Penn State	---	5	57	37	9	2	---	110	32	77
Pitt	---	---	12	14	14	5	---	45	41	78
Temple	2	4	10	16	7	4	---	78	6	78
<b>Political Science</b>										
Penn State	---	---	4	14	7	1	---	26	41	75
Pitt	---	2	1	5	10	2	1	21	37	92
Temple	---	1	2	8	9	1	2	23	32	92
<b>English</b>										
Penn State	---	2	45	90	19	6	1	163	37	83
Pitt	---	---	7	17	11	12	2	40	41	105
Temple	1	2	18	34	34	17	9	115	28	107

<sup>1/</sup> Includes preparation, research and public service, as well as classroom contact hours.

Table 2 (cont.)

College or Department (1)	Distribution of Faculty by Average Total Hours per Week							Number of Faculty (9)	Range of Hours per Week	
	Less than 30 (2)	30-39 (3)	40-49 (4)	50-59 (5)	60-69 (6)	70-79 (7)	80 or more (8)		Low (10)	High (11)
History										
Penn State	--	1	30	18	7	3	--	59	35	78
Pitt	--	1	4	10	6	2	--	23	38	75
Temple	--	--	10	30	8	1	--	49	41	77
Department of Education										
Vocational Education										
Penn State	--	1	2	5	2	--	--	10	36	63
Pitt	--	--	2	3	1	1	--	7	48	71
Temple	6	--	4	6	7	3	2	28	5	119
Counselor Education										
Penn State	--	--	4	5	--	--	--	9	45	56
Pitt	--	2	6	5	2	1	--	16	38	74
Temple	--	--	3	5	2	1	1	12	45	83
Special Education										
Penn State	--	1	6	8	3	--	--	18	36	64
Pitt	--	2	5	8	1	1	--	17	37	71
Temple	--	1	1	7	1	3	--	13	34	76
Curriculum and Instruction										
Penn State	--	--	4	14	9	--	--	27	46	66
Pitt	--	--	2	5	4	1	--	12	40	72
Temple	--	--	1	--	--	--	--	1	47	47

Table 2 (cont.)

(1) College or Department	Distribution of Faculty by Average Total Hours per Week							Number of Faculty (9)	Range of Hours per Week	
	(2) Less than 30	(3) 30-39	(4) 40-49	(5) 50-59	(6) 60-69	(7) 70-79	(8) 80 or more		Low (10)	High (11)
<u>School of Engineering</u>										
Penn State	3	6	166	126	17	6	1	325	13	85
Pitt	--	2	19	41	23	8	2	95	31	81
Temple	1	2	3	13	6	2	1	28	8	80
<u>University Averages and Ranges</u>										
Penn State	13	64	1,304	1,052	285	64	16	2,798	2	86
Pitt	--	53	422	550	328	101	35	1,489	30	105
Temple	44	49	227	392	266	148	100	1,226	4	147

SOURCE: Information furnished by full-time faculty members, Fall 1973.

NOTE: Distribution of total hours per week for full-time faculty for specified colleges includes hours of faculty at Penn State main and branch campuses, and of faculty at Pitt and Temple main campuses; University Averages and Ranges include all full-time faculty reporting from the three universities.

per week during fall 1973 as reported by the full-time faculty members, and compares these averages to those of fall 1972. At Temple University, the average of faculty-reported contact hours decreased from the fall 1972 reports for each department specified, as was true of the overall university average. In addition, of eight of the ten departments specified, Temple faculty had lower averages in fall 1973 than either of the other two schools.

While average contact hours for the majority of the specified departments increased in the case of both Penn State and Pittsburgh, university-wide only Pittsburgh's full-time faculty increased their average contact hours. The faculty at the branch campuses of Penn State and Pittsburgh reported significantly higher numbers of contact hours than did main campus faculty. However, at both the main and branch campuses of Penn State the average number of contact hours decreased from fall 1972. The average of less than nine hours per week spent by faculty at the three universities in classrooms for fall 1973 can be compared to a median of 53 hours per week reported as spent in preparation, research and public service as well as in the classroom.

It is generally assumed that assigned credits reflect classroom contact hours of faculty members and that assigned credits could therefore be used as the measure of faculty workload. Contact hour data reported by full-time faculty members at Penn State for fall 1972 and fall 1973 are very close to their average assigned credits for a period of 15 weeks of teaching, as is shown on the following chart. For purposes of comparison among the universities, it is necessary to consider the average assigned credits for one and one-half of Penn State's 10-week terms as opposed to the one semester of roughly 15 weeks at Pittsburgh and Temple. Temple's average assigned credits of full-time faculty for both fall periods were less than the average contact



Table 3  
 CONTACT HOURS SPENT PER WEEK BY FULL-TIME FACULTY MEMBERS IN  
 SPECIFIED DEPARTMENTS OR COLLEGES AND UNIVERSITY AVERAGES  
 FALL 1972 AND FALL 1973

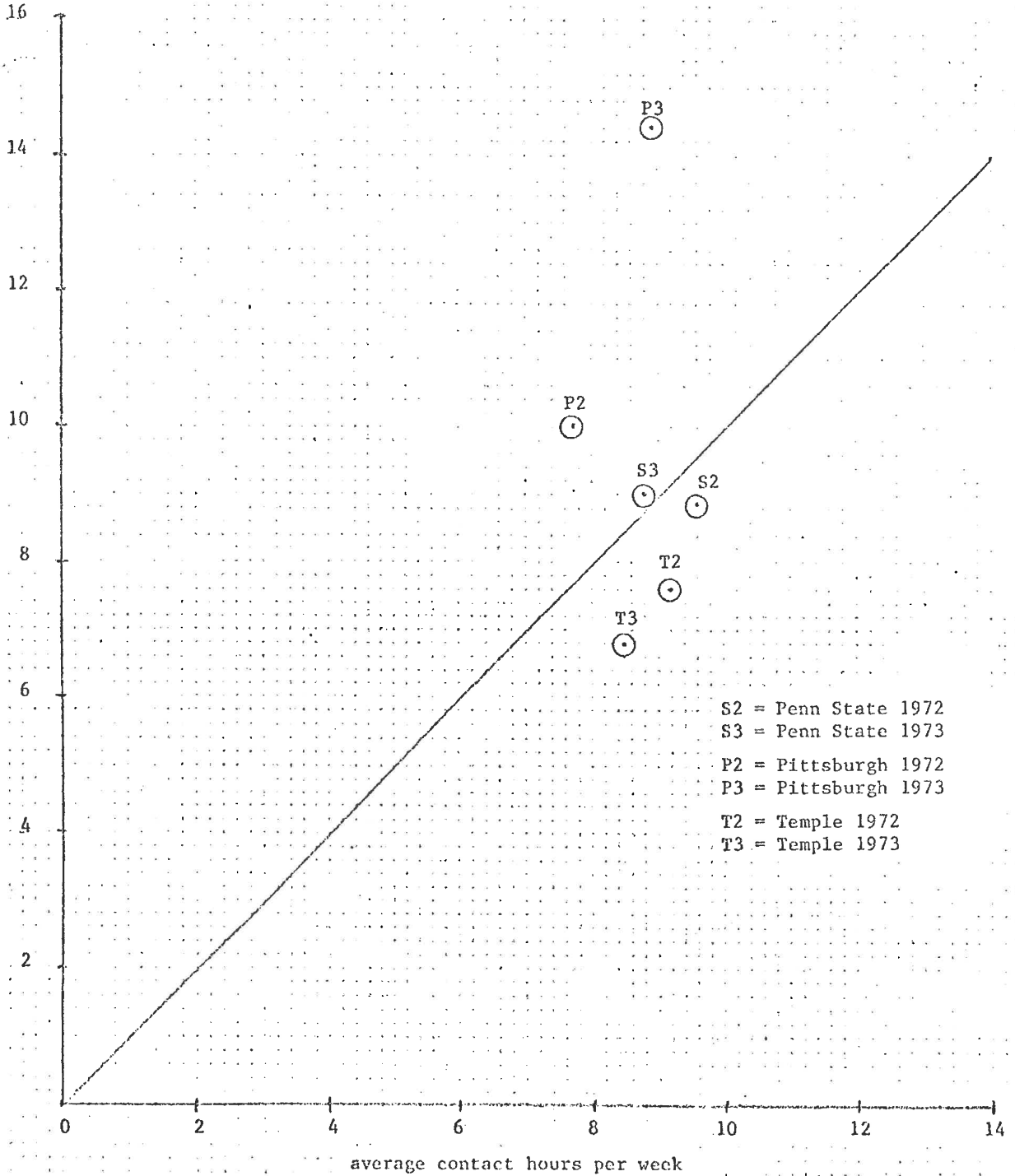
Department or College	Weekly Contact Hours					
	Pennsylvania State University		University of Pittsburgh		Temple University	
	Fall 1972	Fall 1973	Fall 1972	Fall 1973	Fall 1972	Fall 1973
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Main Campus</u>						
<u>Liberal Arts and Sciences</u>						
Science Courses	8.6	8.8	4.8	4.6	8.0	5.7
Foreign Languages	9.7	9.8	7.6	9.4	10.5	8.0
Mathematics	9.6	8.3	6.7	8.0	9.4	7.8
Political Science	9.6	8.3	5.9	7.5	8.8	7.3
English	9.7	8.5	9.6	9.3	9.5	7.8
History	11.2	9.7	6.9	6.8	9.3	6.5
<u>Department of Education</u>						
Vocational Education	6.7	7.5	6.7	12.4	8.1	6.1
Counselor Education	11.1	14.2	12.6	12.8	7.5	7.4
Special Education	8.8	14.0	7.4	10.8	8.6	6.0
Curriculum and Instruction	13.7	11.0	4.2	7.5	8.9	N.A.
<u>School of Engineering</u>	8.0	8.4	7.8	8.2	11.4	11.1
<u>University Averages for Full-time Faculty</u>						
Main Campus	7.9	7.0	7.1	8.3	N.A.	N.A.
Branch Campuses	13.8	13.0	12.4	13.6	N.A.	N.A.
Total	9.6	8.8	7.7	8.9	9.2	8.5

SOURCE: Information furnished by full-time faculty members.

FIGURE 1

COMPARISON OF AVERAGE CONTACT HOURS  
AND AVERAGE ASSIGNED CREDITS FOR  
FALL 1972 AND FALL 1973

average assigned  
credits for 15  
weeks



S2 = Penn State 1972  
S3 = Penn State 1973  
P2 = Pittsburgh 1972  
P3 = Pittsburgh 1973  
T2 = Temple 1972  
T3 = Temple 1973

SOURCE: Reports provided by the individual universities.

hours reported. Pittsburgh's average assigned credits were well above the average contact hours reported for fall 1972 and for fall 1973, and in the latter period the assigned credit hours were more than 50 percent greater than the average contact hours. In fact, as the chart observations indicate, the average contact hours of full-time faculty for the three universities in fall 1973 are relatively stable, ranging from 8.5 to 8.9 while the assigned credits for a period of 15 weeks of teaching ranged from 6.8 to 14.4. Such fluctuation in the number of assigned credits raises the question of validity of using this statistic as the sole measure of faculty workload.

Table 4 presents the assigned credits for the three universities together with class-size statistics. As the table indicates the advantages of Pittsburgh's increase in average credit hour assignments were offset by a decrease in average class size from 15 to 10 from 1972-1973 to 1973-1974. Penn State's average class size decreased slightly, while Temple increased its average class size slightly. In consideration of Table 4, it should be noted that the fall term at Penn State represents a 10-week period, while the fall terms at Pittsburgh and Temple represent roughly 15 weeks of instruction.

Average summer assignments of full-time faculty members continued to be a small portion of the average fall assignment for Penn State and Temple as can be noted from Table 4. Only Pittsburgh reported an increase in the average assignment in the summer for full-time faculty. However, this increase was offset by a decrease in the average summer class size of Pittsburgh. The average undergraduate class size was less than half of the fall 1973 class size, and the average graduate class size for summer 1974 was only three.

Table 4  
NUMBER OF ASSIGNED CREDITS AND AVERAGE CLASS SIZE

	Pennsylvania State University		University of Pittsburgh		Temple University	
	1972-73	1973-74	1972-73	1973-74	1972-73	1973-74
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total Assigned Credits	73,910	81,020	50,385	78,000	29,930	29,265
Undergraduate	52,135	57,235	22,090	32,090	19,245	17,165
Graduate	21,775	23,785	28,295	45,910	10,685	12,100
Average Full-time Assigned Credits for Two Semesters (30 weeks)	17.2	18.7	19.9	31.0	14.7	13.7
Average Class Size	19.3	18.4	15.4	10.3	23.2	23.7
Undergraduate	24.8	23.8	26.1	18.8	26.5	29.4
Graduate	6.1	5.6	7.0	4.4	17.3	15.5
Undergraduate Assigned Credits						
Fall <sup>1/</sup>	16,570	17,230	8,860	11,605	8,505	7,790
Summer	4,155	4,210	4,440	6,775	2,730	1,855
Graduate Assigned Credits						
Fall <sup>1/</sup>	5,540	5,655	10,005	14,540	4,470	5,195
Summer	5,730	6,085	8,910	15,235	1,980	1,465
Average Assigned Credits for Full- time Faculty Only						
Fall <sup>1/</sup>	5.9	6.0	10.0	14.4	7.6	6.8
Summer	3.8	3.9	7.5	15.8	6.9	4.7
Average Undergraduate Class Size						
Fall	25.6	26.1	29.9	23.2	27.7	30.6
Summer	15.4	17.1	16.2	11.4	18.9	21.6
Average Graduate Class Size						
Fall	6.4	6.3	7.7	5.5	18.0	16.1
Summer	5.3	5.1	5.3	3.0	14.0	16.1

SOURCE: Reports provided by the individual universities.

NOTES: University of Pittsburgh summer data includes spring term, spring session and summer session data. Temple University estimates of numbers of undergraduate and graduate assigned credits have been calculated on the basis of information furnished.

<sup>1/</sup> Fall term for Penn State is ten weeks, for Pittsburgh and Temple, 15 weeks.

### III. Faculty Count

In the 1973 staff report of the Joint State Government Commission, a full-time equivalent faculty count was estimated on the basis of "faculty-weeks" of teaching. In order to make this estimate, each part-time faculty member was counted arbitrarily as one-third of a full-time faculty member for the term, or in the case of graduate assistants, one-fourth of a full-time faculty member. Data requested for this report included a distribution of part-time faculty members by percent of full-time employment. However, the number of students enrolled in the summer terms is significantly less than that of the 30-week academic year starting in the fall. As a result, the average class size is generally smaller and thus the number of student credit hours generated per faculty member is a fraction of the fall production. Actual summer student credit hour production at the three universities for summer 1974 ranged from 20 percent to 35 percent of that for fall 1973.

Therefore, in this report, rather than a count of full-time equivalent faculty members based on the number of full-time equivalent faculty for the academic year and summer term, the count is based on the average student credit hour production of full-time faculty members during the academic year starting with the fall term. The number of full-time equivalent faculty members has been calculated as the quotient of the total student credit hours produced during the entire 12-month period divided by the average number of student credit hours generated by full-time faculty members on the staff during the academic year of 30 weeks starting with the fall term.

As this calculation is dependent upon similar data reported by the three universities, it provides a more straightforward comparison of the number of

full-time equivalent faculty members at the three universities than the full-time equivalent faculty estimates made by the individual universities. The number of full-time equivalent faculty members of the three universities, computed each year on the basis of average student credit hours of full-time faculty members, increased slightly at Penn State and Pittsburgh from school year 1972-1973 to 1973-1974 and by 6 percent at Temple. Although the increase in faculty at Temple reflects the decrease in average student credit hour production, the effect is somewhat offset by a slight decrease in total student credit hour production.

Table 5 presents the average class size for the 12-month period and average assigned credits per full-time faculty for the academic year of 30 weeks. The product of these two factors, produces in each case a slightly smaller number than the average number of student credit hours produced per full-time faculty member during the academic year 30-week period, column (4), because of smaller class sizes in the summer. This average production increased by only 1 percent from 1972-1973 to 1973-1974 at both Penn State and Pittsburgh which had identical averages. Temple University full-time faculty produced an average of 361 student credit hours for the academic year 1972-1973, the highest of the three universities' average number of student credit hours. In 1973-1974, with a 6 percent decline in production, Temple's average was less than either of the other universities.

#### IV. Faculty Salaries

The 1973 staff report of the Joint State Government Commission discussed certain factors affecting the cost of the production of student credit hours. In particular, it noted a combined increase in the class size and in the average

Table 5

## COMPARISON OF 1972-1973 AND 1973-1974 PRODUCTION AND FACULTY COST DATA

	Academic Year of 30 Weeks						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average Class Size For All Terms	Average Assigned Credits per Full-time Faculty	Average Student Credit Hours per Full-time Faculty	Average Total Salary per FTE Faculty <sup>1/</sup>	Average University Salary per FTE Faculty <sup>1/</sup>	University Salary Cost per Student Credit Hour		
Pennsylvania State University							
1972-1973	19.3	17.2	347	\$15,035	\$12,066	\$34.77	
1973-1974	18.4	18.7	350 + 1%	15,571	13,148 + 9%	37.58	
University of Pittsburgh							
1972-1973	15.4	19.9	347	15,271	11,940	34.45	
1973-1974	10.3	31.0	350 + 1%	14,461	12,065 + 1%	34.52	
Temple University							
1972-1973	23.2	14.7	361	11,874	11,406	31.63	
1973-1974	23.7	13.7	338 - 6%	13,863	13,396 + 17%	39.59	

SOURCE: Reports provided by the individual universities.

<sup>1/</sup> FTE faculty equals the total student credit hours divided by the average number of student credit hours generated per full-time faculty member for the academic year (column 4).

number of assigned credits would result in reductions in faculty salary cost per student credit hour. The report recognized the fact that faculty salaries were only one of the many costs involved but that they could be used as an indicator of the magnitude of the total instruction costs. University-funded faculty salary costs were calculated per student credit hour and a comparison of these factors for the year 1972-1973 and the year 1973-1974 is shown on Table 5.

In spite of the finding of the 1973 report that significant savings could be achieved by increasing the average class size together with the average number of assigned credits, there appears to have been little effort to reduce the unit costs. Although the University of Pittsburgh reported an increase in the average number of assigned credits by roughly 50 percent, this was accompanied by a similar increase in the number of sections and a decrease in the average class size. These offsetting factors which result in a minimal impact on the output indicate the possibility of a change in reporting procedures at Pittsburgh. Penn State accomplished an identical increase with a slightly reduced average class size and slightly increased average assignment per full-time faculty member for the academic year 1973-1974.

Since the full-time equivalent faculty number is determined on the basis of the workload of a full-time faculty member for the 30-week academic year starting in the fall, the average full-time equivalent faculty salaries reflect the average salary paid for an academic year of 30 weeks of full-time teaching. The difference between total salary and university salary, as shown in columns (5) and (6) of Table 5, is the result of payments from Federal Government and other sources. This difference could perhaps be considered in a determination of State subsidies. Temple, whose faculty



members receive the smallest payments from the Federal Government and other sources, showed the largest increase in average total salary for the academic year from 1972-1973 to 1973-1974--almost \$2,000. Pittsburgh faculty members, on the other hand, took a reduction in average total salary.

#### V. Comparison with Other Public Universities

When faculty salaries are considered in conjunction with production figures, it becomes apparent that a reduction in university-funded faculty salary costs per student credit hour is feasible without a reduction in current average university-funded salaries. Current Pennsylvania State-related university average compensation appears to be in line with other public universities as reported in The Chronicle of Higher Education. Faculty credit hour and unit cost data of public senior universities of the State of Illinois, as reported by the Illinois Board of Higher Education,<sup>2</sup> are useful for the purposes of comparison with Pennsylvania's State-related universities. From those submitting data to the Illinois Board of Higher Education, four public universities of Illinois have been selected as comparable with the three Pennsylvania universities in size, level of instruction, research and public service responsibilities and average faculty compensation.

Table 6 indicates the degree of comparability regarding the size and level of instruction of the four Illinois universities with the three

---

2. "Fall 1972 Faculty Credit Hour Study, Public Senior Universities," State of Illinois Board of Higher Education, September 1973. "Fall 1973 Faculty Credit Hour Study, Public Senior Universities," State of Illinois Board of Higher Education. "1972-1973 Unit Cost Study Data," State of Illinois Board of Higher Education, June 1974. "Preliminary 1973-1974 Unit Cost Study Data," State of Illinois Board of Higher Education, March 11, 1975.

Table 6  
 DISTRIBUTION OF STUDENT CREDIT HOURS BY LEVEL OF INSTRUCTION  
 PENNSYLVANIA STATE-RELATED UNIVERSITIES AND  
 COMPARABLE PUBLIC UNIVERSITIES OF ILLINOIS  
 1973-1974

(1)	Total Number of Student Credit Hours (Thousands) (2)	Level of Instruction			
		Lower Division (3)	Upper Division (4)	Graduate I (5)	Graduate II (6)
Illinois State University	535	43%	49%	7%	1%
Northern Illinois University <sup>1/</sup>	591	38	51	9	2
Southern Illinois University	871	38	48	12	2
Carbondale	563	39	48	10	3
Edwardsville	308	38	47	15	0
University of Illinois	1,649	40	42	11	7
Chicago Circle	565	44	50	4	2
Urbana	1,084	38	38	14	10
Penn State University	1,495	91%			9%
University of Pittsburgh	804	75			25
Temple University	693	73			27

SOURCE: 1972-1973 Unit Cost Study Data, State of Illinois Board of Higher Education, June 1974; Preliminary 1973-1974 Unit Cost Study Data, State of Illinois Board of Higher Education, March 11, 1975; Reports provided by Pennsylvania State-related universities.

NOTE: Graduate I - Master's and first professional programs.  
 Graduate II - Ph. D. programs.

<sup>1/</sup> 1972-1973 data; 1973-1974 data not available.

Pennsylvania State-related universities. It shows the distribution of student credit hours produced at the three public universities of Illinois by four levels of instruction and at the three Pennsylvania universities simply by undergraduate and graduate student credit hours only since more detailed information was not available. In fact in the case of Temple, the distribution is estimated to the extent that unclassified student credit hours were allocated between the undergraduate and graduate levels in the same proportion as the classified student credit hours were distributed. While information furnished in the reports is insufficient to divide the undergraduate credits into the lower division and upper division levels, the distribution of the graduate student credit hours may be partially evaluated by noting the distribution of graduate degrees at the different levels as shown on Table 1.

Table 7 presents the average compensation (salary plus fringe benefits) for a nine-month period for each faculty rank as reported in The Chronicle of Higher Education by the three Pennsylvania and the four Illinois universities for 1972-1973 and 1973-1974. Except in the case of the rank of professor, where greater variation in compensation can be expected, the average compensation within each faculty rank did not vary more than \$1,400 for 1973-1974. However, Pittsburgh's average compensation was consistently high while compensation paid to Penn State faculty was more in line with the compensation paid at Illinois universities.

Because of the comparable average faculty compensation for the universities, the average university faculty salary costs per student credit hour furnish a comparison of the efficiency of the universities. The costs of the Illinois universities' distribution of student credit hours by level of instruction are as follows:

Table 7

COMPARISON OF AVERAGE FACULTY COMPENSATION BY RANK OF PENNSYLVANIA STATE-RELATED UNIVERSITIES  
AND COMPARABLE PUBLIC UNIVERSITIES OF ILLINOIS  
(In Thousands)

(1)	Professor		Associate Professor		Assistant Professor		Instructor	
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	1972-73	1973-74	1972-73	1973-74	1972-73	1973-74	1972-73	1973-74
Penn State University	\$22.4	\$23.1	\$17.2	\$17.6	\$14.2	\$14.3	\$11.7	\$11.7
University of Pittsburgh	25.0	25.7	18.4	18.8	14.7	15.4	12.1	12.4
Temple University	25.8	25.8	18.7	18.7	15.2	15.2	12.0	12.0
Illinois State University	21.7	22.4	17.9	18.4	14.3	14.9	10.7	11.2
Northern Illinois University	22.6	23.5	18.2	18.8	14.3	14.8	10.5	11.0
Southern Illinois University (Carbondale)	21.7	22.4	17.2	17.5	14.5	14.8	11.4	11.7
Southern Illinois University (Edwardsville)	21.1	22.0	17.3	17.9	14.5	14.7	11.4	11.8
University of Illinois (Chicago Circle and Urbana)	24.4	25.3	17.7	18.3	14.7	15.1	11.7	12.2

NOTE: Compensation equals faculty salary plus fringe benefits for nine months, or adjusted to nine months where necessary, as reported by the universities.

SOURCE: The Chronicle of Higher Education, Vol. VII, No. 30, April 30, 1973; and Vol. VIII, No. 30, April 29, 1974.

	University salary cost/SCH		
	1972-73	1973-74 (preliminary estimates)	Percentage increases from 1972-73
Illinois State University	\$23.99	\$25.56	+6.5%
Northern Illinois University	25.60	not available	
Southern Illinois University	26.11	28.96	+10.9%
Carbondale	25.25	28.80	
Edwardsville	27.76	29.27	
University of Illinois	33.45	35.56	+6.3%
Chicago Circle	25.20	27.35	
Urbana	38.13	39.84	

All of these universities, with the exception of Southern Illinois University at Edwardsville, have graduate instruction at the Ph. D. level. Taking into account the distribution of student credit hours by level of instruction of these universities presented in Table 6, these salary costs per student credit hour can be compared with those of the three Pennsylvania universities listed on Table 5.

Even though Pittsburgh's average compensation is comparatively high, it is the only one of the three Pennsylvania universities whose faculty salary cost per student credit hour falls within the range of Illinois' preliminary estimates of these unit costs. None of the percentage increases in these unit costs reported for the four universities equalled Temple's 25 percent increase over 1972-1973 figures. Only at the Urbana campus of the University of Illinois did the unit costs reach Temple's high of \$39.59 for 1973-1974. However, Temple had a larger percentage of graduate student credit hours than any of the other universities. On the other hand, Penn State's cost per student credit hour was \$37.58 while their graduate credit hours produced were less than 9 percent of their total student credit hour production. Only

Illinois State University, whose university faculty salary cost per student credit hour was \$25.56, had a lower graduate student credit hour percentage.

When salaries are maintained at a similar level, university salary cost per student credit hour can be reduced only by a higher average production per faculty member. The average university salary cost per student credit hour for the three Illinois universities reporting in 1973-1974 is \$31.93. For a university-funded salary of \$12,900, the weighted average fulltime equivalent university-funded salary for the three Pennsylvania universities, the average fulltime faculty member at the Illinois universities has produced 404 student credit hours.

If full-time faculty of the three Pennsylvania universities were to attain a workload of an average of 400 student credit hours, assuming the current full-time equivalent average university-funded salaries for 1973-1974 as shown on Table 5, the university-funded salary costs per student credit hour would be for Penn State \$32.87, for Pittsburgh \$30.16, and for Temple \$33.49.

These figures represent more than a 12 percent reduction in university salary cost per student credit hour from the actual costs reported. The actual increases in student credit hour production per full-time faculty member which would be necessary, range from 50 student credit hours in the case of Penn State and Pittsburgh to 62 student credit hours in the case of Temple. The effect of such an increase in workload can be evaluated in light of the fact that 60 student credit hours are generated by a one-semester three-credit-hour course for a section of 20 students, roughly an addition of one-and-one-half contact hours per week, averaged over the academic year of 30 weeks. Alternatively, the average class size could be increased by 12 percent.

## VI. Conclusion

A review of the instructional output of the three universities indicates an overall 3 percent increase in student credit hours produced over 1972-1973 and a 13 percent increase in university-funded faculty salary dollars. Recommendations to calculate Commonwealth subsidies on the basis of measurable output and to increase class size and average credit hour assignments of faculty were made in the previous appropriations acts report. Had these recommendations been implemented increases in individual faculty salaries could have been accommodated without significant increases in Commonwealth appropriations.

An allocation for costs made on the basis of student credit hour production and degree production must necessarily account for the levels of instruction and their differing costs. An indication of the differences in these costs is provided from the data furnished for faculty teaching undergraduate courses only, graduate courses only and both levels of courses. The difficulty with this breakdown is that the salaries of the large group of faculty members who teach both undergraduate and graduate courses has not been apportioned between the undergraduate and graduate levels.

Costs on the basis of direct teaching university faculty salary are available by level of instruction. Direct university faculty salary is the salary paid from university funds to teaching faculty only and excludes salary paid to nonteaching faculty engaged in instructional support, research and public service. In the case of Temple direct teaching faculty salary has been estimated.

The average direct university faculty salary cost for teaching at the undergraduate level only per student credit hour for the three Pennsylvania

universities equalled \$20.96 for 1973-1974. It can probably be assumed that a large portion of the courses taught by faculty teaching undergraduate courses only are lower division undergraduate courses. The unit salary cost for faculty teaching both graduate and undergraduate courses is \$33.39. In this instance it can be assumed that the majority of the courses could be upper division undergraduate courses, with possibly less than a quarter of them being first level graduate courses.

The comparable unit salary cost for teaching at the graduate level only was \$68.99 or 3.3 times the undergraduate cost per student credit hour. In this instance, the majority of courses are probably a composite of second level graduate courses, work toward Ph. D. degrees, and courses leading to first professional degrees. These assumptions are admittedly rough but provide some basis of comparison with the information from the Illinois report by level of instruction.

Direct teaching salaries were reported in the Illinois study for 1973-1974 by level of instruction, including lower division, upper division, first level graduate (master's and first professional programs) and second level graduate (Ph. D. programs). For purposes of comparison a grouping of the levels of the three Illinois universities reporting in 1973-1974 produces an average direct university faculty salary cost per undergraduate student credit hour of \$20.40, which cost differs from the cost of the three Pennsylvania universities by less than one dollar. However, the \$20.96 average cost for the Pennsylvania universities is the salary cost for faculty members teaching undergraduate courses only, which as noted above in general can be expected to be mostly lower division courses.



The cost at the three Illinois universities per graduate student credit hour was \$54.19 or 2.7 times the undergraduate cost per student credit hour. The difference between \$54.19 and \$68.99 is due principally to the faculty salary costs at Penn State for those teaching graduate courses only. These costs were significantly greater than those reported by the other universities (7.3 times the undergraduate costs). Again it should be noted that these costs of Pennsylvania universities reflect salary costs for faculty teaching graduate courses only.

On the basis of these figures, an expenditure by the Commonwealth of \$25 per undergraduate student credit hour and \$75 per graduate student credit hour would more than cover direct teaching salary costs. However, combining all undergraduate credit hours and all graduate credit hours may not sufficiently account for the additional resources required for individual work for degrees. Such a subsidy formula should probably include an additional \$400 for each degree awarded.

A refinement of expenditures per student credit hour for direct teaching salary costs is possible by consideration of data furnished by Illinois in conjunction with Pennsylvania salary costs per student credit hour. A comparison can be made on the assumption that, as noted above, the costs for courses taught by faculty assigned to undergraduate courses alone approximate the costs of lower division undergraduate credit hours, costs for courses taught by faculty assigned to teach both undergraduate and graduate courses indicate costs of upper division undergraduate courses, while the courses taught by faculty teaching graduate courses only reflect the composite cost of first and second level graduate courses.

The data in the following table indicate that an expenditure by the Commonwealth per student credit hour of \$20 for lower division undergraduate, \$40 for upper division undergraduate, \$60 for graduate level one (master's and first professional programs) and \$100 for graduate level two (Ph. D. programs) student credit hours would adequately cover reasonable direct teaching salary costs. In this instance the differentiation in levels reflects the individual work required for degrees and no separate subsidy for degrees awarded would be necessary.

DIRECT TEACHING FACULTY SALARY COST PER STUDENT CREDIT HOUR, 1973-1974

	<u>Undergraduate</u>		<u>Graduate</u>		<u>Total</u>
	<u>Lower</u>	<u>Upper</u>	<u>I</u>	<u>II</u>	
Illinois State University	\$14.46	\$24.03	\$45.88	\$86.73	\$21.79
Southern Illinois University	15.25	21.49	44.28	67.87	22.69
Carbondale	14.11	19.30	44.40	67.87	21.30
Edwardsville	17.34	25.62	44.13	N.A.	25.24
University of Illinois	16.26	26.75	47.76	71.53	28.16
Chicago Circle	16.75	27.78	73.65	77.02	25.80
Urbana	15.97	26.03	43.81	71.01	29.39
Average of the three universities	15.64	24.63	46.41	71.32	25.49
Percent of total student credit hours	40.0%	45.0%	10.3%	4.7%	100.0%
	<u>Teaching Undergrad Only</u>	<u>Teaching Undergrad and Grad</u>		<u>Teaching Grad Only</u>	<u>Total</u>
Penn State University	\$19.24	\$29.53		\$140.89	\$26.86
University of Pittsburgh	24.73	32.08		57.49	32.90
Temple University	22.56 *	38.72 *		51.17 *	37.61 *
Average of the three universities	20.96	33.39		68.99	31.00
Percent of total student credit hours	49.4%	40.1%		10.5%	100.0%

\* Estimated to reflect salaries of teaching faculty only.

In the event the Legislature were to implement a policy of reimbursement on the basis of actual student credit hours produced the previous year, the Legislature would have further policy decisions to make, including:

1. What process should be applied in determining an acceptable direct teaching salary expenditure per student credit hour applicable to all universities.
2. Should acceptable direct teaching salary expenditures be determined for the average undergraduate credit hour and the average graduate credit hour or should these levels be further subdivided.
3. Should the universities be considered individually with regard to the ratio of direct teaching salary costs to total instructional costs.
4. Should the universities be considered individually with regard to the percentage of instructional costs to be provided by the Commonwealth.

Alternative formulae for the university reimbursement by the Commonwealth, using the above proposed direct teaching salary expenditures per student credit hour, are:

$$A_1 = [\$25 \times \text{undergrad. SCH} + \$75 \times \text{grad. SCH} + \$400 \times \text{degrees awarded}] \frac{P}{R}, \text{ or}$$

$$A_2 = [\$20 \times \text{lower div. SCH} + \$40 \times \text{upper div. SCH} + \$60 \times \text{grad. I SCH} + \$100 \times \text{grad. II SCH}] \frac{P}{R}$$

P = Percent of instructional costs to be subsidized. One percentage could be applied equally for each university, or it could be adjusted for each university on the basis of the availability of other funds to the university.

R = Ratio of direct teaching salary costs to total instructional costs. One ratio could be determined generally and applied for each university, or it could be adjusted to reflect the specific characteristics of the university, such as the amount and type of graduate work, specific courses offered including adult education courses and extent of involvement in public service.

As an illustration, if the decision were made to reimburse each of the universities for example at 50 percent of their costs (P in the above formulae), and if the ratio of direct teaching faculty salaries to instructional costs is 35 percent (R in the above formulae), the total reimbursement would be 1.43 times the direct teaching salary expenditure.



