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ABSTRACT

While granting college credit by examination seems to be increasing in popularity, few educational researchers seem to be assessing the effect of proficiency credit on student educational variables. For this purpose, the transcripts of 349 students who had graduated from the University of Illinois at Urbana-Champaign during the academic year 1970-1971 were examined. The following are among the more important findings: (1) Students who gain proficiency credit tend to graduate with more total credit hours, although with fewer credit hours in enrolled courses than those who graduate with proficiency credit. (2) Students who gain proficiency credit graduate with more credit hours earned by completing upper-division courses than other graduates. (3) Students with proficiency credit also tended to graduate sooner than others. (4) Students with proficiency credit graduated with higher grade-point averages than those with no proficiency credit. (5) The relationship between proficiency credit and GPA was stronger within 100 level courses than within 200 and 300 level courses. (Author)

Research Report

TITLE

A STUDY OF THE EDUCATIONAL BENEFITS OF PROFICIENCY TESTING FOR STUDENTS

AUTHOR(S)

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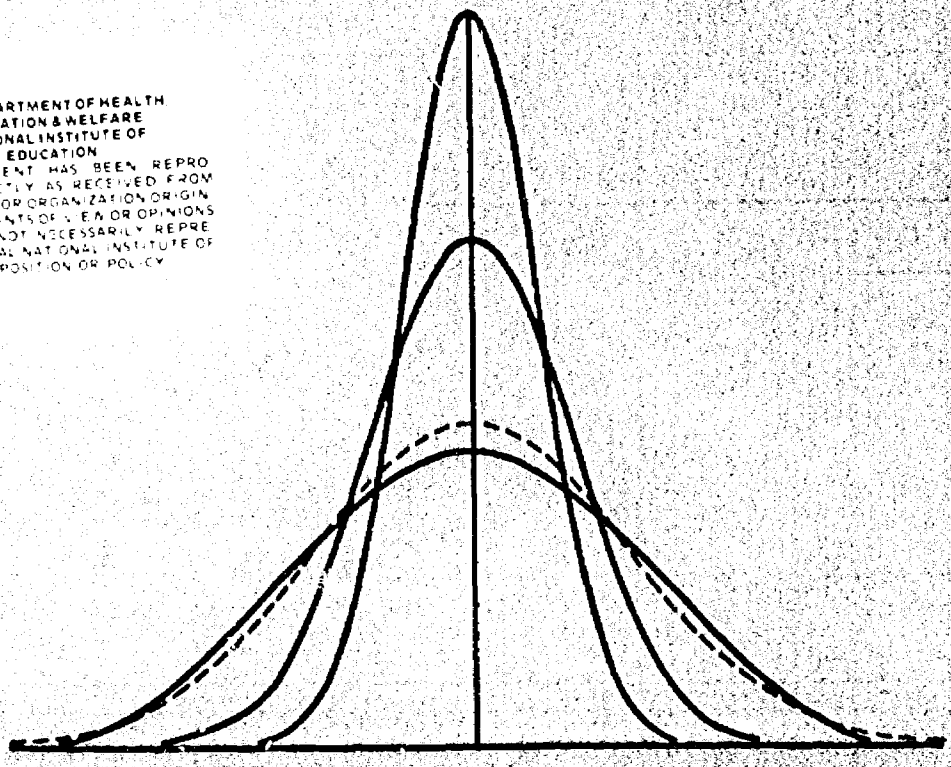

REPORT # 354

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MEASUREMENT AND RESEARCH DIVISION - OFFICE OF INSTRUCTIONAL RESOURCES
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Abstract

While granting college credit by examination seems to be increasing in popularity, few educational researchers seem to be assessing the effect of proficiency credit on student educational variables. For this purpose, the transcripts of 349 students who had graduated from the University of Illinois at Urbana-Champaign during the academic year 1970-1971 were examined.

The following are among the more important findings:

1. Students who gain proficiency credit tend to graduate with more total credit hours, although with fewer credit hours in enrolled courses than those who graduate with proficiency credit.
2. Students who gain proficiency credit graduate with more credit hours earned by completing upper division courses than other graduates.
3. Students with proficiency credit also tended to graduate sooner than others.
4. Students with proficiency credit graduated with higher grade point averages than those with no proficiency credit.
5. The relationship between proficiency credit and GPA was stronger within 100 level courses than within 200 and 300 level courses.

A STUDY OF THE EDUCATIONAL BENEFITS OF PROFICIENCY TESTING FOR STUDENTS

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The recent stress on accountability coupled with the press for optimum placement of students in courses has accelerated the use of proficiency testing, and it is to the use of proficiency testing that this paper is addressed.

With rare exception (Stallings, Aleamoni, & Heil, 1972), few have critically examined proficiency testing. Yet proficiency testing or competency testing, synonomus terms both meaning the granting of credit by examination, has been described as "the wave of the future in higher education" in an article significantly entitled "Earn Your Degree...In Three-Quarter Time" (Sorensen, 1972). The influential Carnegie Commission on Higher Education (1971) has recommended that "tests should be fully developed and accepted in lieu of college credit [p. 13]." Others (e.g., Chirst-Janer, 1972) cite statistics showing how much proficiency testing has saved certain institutions in instructional costs. A purveyor (and advocate) of proficiency tests, the College Level Examination Program (CLEP) of the College Entrance Examination Board (CEEB) bombards the television viewer with a commercial showing young Abe Lincoln being turned away by a crusty employment counselor because he, Abe, lacked formal academic credentials.

Proficiency testing simultaneously raises two distinct but important questions. What is its effect in terms of cost-efficiency? And what is its effect in terms of educational benefits for students? We believe the latter question is paramount, and this paper addresses itself to it. Specifically, we wished to look at various components of the educational experience of students as they relate to proficiency testing, such as time between matriculation and graduation and distribution of coursework by level. To achieve this purpose, transcripts from a sample

of students who graduated from the University of Illinois at Urbana-Champaign (UIUC) Campus, during the academic year 1970-1971 were examined.

The characteristics of the UIUC proficiency system have been described elsewhere (Stallings, et al., 1972). Germane to the present report is the following description of how proficiency credit may be obtained:[1]

> *There are at least three ways in which University of Illinois students may earn proficiency credit. First, students who have taken certain college preparatory courses in high school may receive credit by examination on the various Advanced Placement Program (APP) tests. These tests, for which a fee is charged, were developed and administered by the Educational Testing Service for the College Entrance Examination Board. Second, a student may petition to be given a proficiency examination, usually a locally developed test, in virtually any undergraduate course. To receive a "pass," the student must perform at least at the C level. No official record is made of failures in these examinations, and grades received on proficiency examinations are not considered in computing grade point averages. Third, entering students are offered without cost the opportunity to earn college credit in freshmen rhetoric, biology, and five foreign languages by examination. These examinations consist of both standardized and locally developed tests, but all cut-off scores are determined from institutional analysis (Aleamoni, 1973). In the foreign languages and in one biology examination, proficiency is contingent either upon the number of high school units or upon scores on another, but related, proficiency examination.* [Stallings, et al., 1972, p. 612-613.]

Sample

The population of this study consisted of all students who received Bachelor of Science or Bachelor of Arts degrees from the College of Liberal Arts and Sciences (LAS) at UIUC during the academic year, 1970-1971. Excluded from the study were those students who had transferred course work greater than that taken in one summer from another institution and those students who commenced their formal college work prior to graduation from high school. Also excluded from the study were those students receiving degrees in areas prefaced by "The Teaching of," such as "The Teaching of Social Science."

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[1] UIUC now grants proficiency credit for many CLEP examinations. However, the student population of this study predated adoption of credit by CLEP.

The sample was randomly drawn from the four LAS graduation lists for the academic year, 1970-1971 (October, 1970; February, 1971; June, 1971; and August, 1971), such that approximately one student in five would be chosen. This procedure resulted in the selection of 539 students whose degree was not in "The Teaching of." However, 177 of these students had transferred course work greater than one summer from another institution. Seven students had enrolled in college before completing high school. The transcripts of six of the students were either unobtainable or incomplete. Thus, the final sample was comprised of 349 students.

The authors acknowledge that the representatives of the sample to the population was not determined. The relative inaccessibility of the data prevented making the appropriate comparisons.

Selected Characteristics of the Sample

The sample contained 115 females and 234 males. One hundred and forty students received Bachelor of Science degrees, the remaining 209 received Bachelor of Arts degrees. The high school percentile ranks of the sample ranged from 30 to 99, with a mean of 86 and a median of 89. The high school graduation class size ranged from 23 to 5,881, with a mean of 78. Three hundred and thirty-four of the students were residents of Illinois, 15 were not.

Of the total sample, 236 students avoided probationary status. The average semesters of probation for the remaining 113 students was 2.18. Two students were actually on probation for seven semesters, while 49 students were on probation only one semester.

Seventy-six students attended college elsewhere for one summer. Forty-three students transferred into LAS after starting a curriculum in another college. Transfers between departments within LAS were not recorded.

Of the total sample, 144 students received some credit by examination (proficiency credit), while 205 students did not.[2] The total amount of proficiency credit earned by students ranged from two to 36 hours. The mean number of proficiency credits earned by the subset of students who earned some credit was 6.88. The mean for the entire sample was 2.84 hours.

The total proficiency testing program was broken down into four categories: 1) College Board Advance Placement Program (CBAPP); 2) the Measurement and Research Division (MARD) of the Office of Instructional Resources administered Freshman Rhetoric Examination (MARD-RHET); 3) other MARD administered examinations, which include biology and foreign languages; 4) departmental examinations (DEPT).

DEPT examinations can be further divided into the 100, 200, and 300-level courses for which the examinations satisfy the requirements. At UIUC, courses are at four levels. One-hundred level courses are largely introductory in type and are mainly for lower division students. Two-hundred level courses are more advanced (largely sophomore and junior). Three-hundred level courses are for upper division undergraduate and graduate students. Finally, 400-level courses are graduate level, and seldom are undergraduates permitted to enroll in them.

The number of students who gained various credit hours within each category and for the total is found in Table 1. Also found in Table 1 is the mean number of credits within each category. These means are computed for the sample as a whole, and for the subset of students who achieved proficiency credit within a given category.

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[2] In determining these and the following values, proficiency credits for Physical Education activity classes were excluded. Thirty-five students received one hour, four students received two hours, and one student received three hours of proficiency credit for this type of course.

TABLE 1

Means of Credit Hours and Frequency Distribution of Students By Hours of Proficiency Credit Earned Within Categories of Proficiency Examinations[a]

Hours of Proficiency Credit	Category of Proficiency Credit							
	Total	CBAPP	MARD Administration		DEPT (Total)	Departmental Proficiency		
			RHET	Other[b]		100 Level	200 Level	300 Level
2	3				3	2	1	1
3	63	3	85	2	5	4	4	2
4	10	4		11	11	9	3	1
5	5	2		1	5	4		
6	8		16	2	1		1	
7	6				1		1	
8	11	15		8	3	2		
9	2				1			
10	6							
11	12	4		1				
12	2			2	1	1		
13	0	2						
14	5							
15	1							
16	1			1	1	1		
18	2							
19	1							
21	1	1				1		
24	0			1	1			
25	1							
27	3							
36	1							
Total	144	31	101	29	33	24	10	4
MEAN (entire sample)	2.84	0.70	1.00	0.59	0.54	0.39	0.11	0.03
MEAN (those receiving credit in this category)	6.88	7.94	3.48	7.10	5.70	5.70	3.90	3.00

[a]The "Categories of Proficiency Credit" are not mutually exclusive. Therefore, a student may appear in more than one category, which makes the rows non-additive. For example, a student could earn three hours of "Proficiency Credit" in "CBAPP," six hours in "RHET," and two hours in a "100 Level" department exam. The student would then appear in the three "Hours Proficiency Credit" row in the "CBAPP" column, in the six "Hours Proficiency Credit" row in the "RHET" column, the two "Hours Proficiency Credit" row in the "100 Level Departmental Proficiency" column and finally in the "Total" column at the 11 "Hours of Proficiency Credit" row (3+6+2). The same is true for the column labeled "DEPT (Total)" in that the rows of the three levels are non-additive and a student can appear in more than one category of "Departmental Proficiency."

[b]Other proficiency examinations administered by MARD, include biology (four courses) five foreign languages.

The mean number of semesters to graduation for the entire sample was 7.96. The range was from six to 10; however, taken by itself, this number is misleading since slightly less than one half of the sample (170) attended summer school. The mean number of summer school sessions attended was 0.72. The range was from zero to four. If each summer school session is counted as one half of a semester, the mean of the composite number of semesters is 8.31. The range is from six semesters (by three students) to 12 semesters (by one student). Continuing reference to the composite of number of semesters plus one-half number of summers, 190 students graduated in eight semesters or less, 159 students took more than eight semesters. Another way of looking at the same data is as follows: Thirteen students (3%) graduated in less than four years without attending any summer sessions. An additional 36 students (10%) graduated in less than four years but attended at least one summer session. One hundred and fifty-eight students (48%) graduated in the normal four-year period without attending summer sessions, and 129 students (35%) graduated in four years and did attend summer sessions. Fourteen students (4%) attended college more than four years but did not attend any summer school sessions. Finally, 23 students (6%) graduated in greater than four years and did attend summer school.

The required number of credit hours for graduation at the UIUC is 120, excluding Physical Education activity classes. In Table 2, the mean number of credits and the mean number of non-proficiency credits for the entire sample are listed. Also found in Table 2 are the mean number of non-proficiency credit hours for each course level (100, 200, 300, and 400), and the range for each. Thirty-seven students took at least one 400-level course. Sixty-six students received some credit for high school courses they had taken. The mean and range of high school credit are also found in Table 2.

At this point, a composite student record can be produced by using the means of the 349 students in the sample. This composite is found in Table 3. The grade point averages (GPA) at UIUC are computed on a five point scale, with "A's" counting 5, "B's" counting 4, etc. The average GPA for the sample is found in Table 4. Also found in Table 4 are the average GPAs within each of the four course levels, and the ranges of the GPAs.

TABLE 2

Mean Number of Credit Hours and Range of Credit Hours

Type of Credit	Mean	Range
Total credits[a]	126.09	120-178
Total Non-proficiency credits	122.46	96-174
100 Level	71.81	17-103
200 Level	25.50	3-68
300 Level	24.66	3-70
400 Level	0.49	0-12
Credits transferred from high school	0.08	0-5

[a]*Includes* high school credits transferred.

TABLE 3

Composite Student Record

Type of Credit	Credit Hours	
Total Non-proficiency credits		122.46
100 Level	71.81	
200 Level	25.50	
300 Level	24.66	
400 Level	0.49	
Total Proficiency credits		2.84
CBAPP	0.70	
OIR-RHET	1.00	
Other OIR	0.59	
DEPT (TOTAL)	0.54	
100 Level	0.39	
200 Level	0.11	
300 Level	0.03	
Total Credits[a]		125.30

[a]*Excludes* high school credits transferred.

TABLE 4

Mean Grade Point Averages and Ranges

Course Levels	Mean	Range
Overall	3.93	2.88-5.00
100 Level	3.84	2.80-5.00
200 Level	4.13	2.59-5.00
300 Level	3.98	2.00-5.00
400 Level	4.45[a]	2.00-5.00[a]

[a]Based on the 37 students who took 400-level courses.

Method and Results

The relationship between proficiency credit and other student variables was assessed in two ways. First, the actual amount of proficiency credit was correlated with the values of the other variables across all students. Secondly, the sample was divided into three groups as a function of hours of proficiency credit earned. Group I was comprised of 205 students who had received no proficiency credit throughout their college career. Group II contained 128 students who received some proficiency credit but less than 14 hours. Finally, Group III contained 16 students who had received 14 or more hours. The mean number of proficiency credits was 5.25 for Group II and 19.94 for Group III. The means of the three groups on other variables, such as GPA, both overall and by level, number of semesters to graduation, and high school percentile rank (HSPR), were then compared using a one-way analysis of variance. The results of these analyses are presented in Table 5 and discussed in the following subsections.

High School Performance. HSPR correlated positively and significantly with hours of proficiency credit, (see Table 5). As would be expected from design, differences among the means of the three groups were also significant for HSPR. Thus, the gaining of proficiency credit was positively related to previous success in high school. The relationship between hours of proficiency credit and high school credits transferred was not significant.

Credit Hours. There were significant differences among the means as well as significant correlations for total credits, total non-proficiency credits, and non-proficiency credits at the 100 and at the 300 level of course work. The pattern seems clear. While students with proficiency credit

TABLE 5

Correlations With Hours of Proficiency Credit, Means of Groups Categorized by Hours of Proficiency, and Results of a One-way Analysis of Variance

Variable	Correlation (N = 349)	Means			F
		Group I (N = 205)	Group II (N = 128)	Group III (N = 16)	
HSPR	.23*	83.53	89.10	95.00	11.91*
High School Credits Transferred	.12	0.66	0.92	1.56	2.43
Total Credits	.29*	124.44	127.81	133.56	12.61*
Total Credits[a]	-.31*	123.79	121.64	112.06	14.97*
100-Level Credits[a]	-.37*	74.29	69.77	56.37	25.47*
200-Level Credits[a]	-.07	25.95	24.77	25.56	0.48
300-Level Credits[a]	.19*	23.11	26.56	29.38	5.10*
400-Level Credits[a]	.06	0.47	0.54	0.75	0.26
Number of Semesters	-.29*	8.03	7.94	7.19	14.53*
Number of Summers	-.02	0.81	0.61	0.75	2.01
Composite[b]	-.26*	8.45	8.24	7.56	12.58*
Overall GPA	.25*	3.81	4.08	4.21	13.34*
100-Level GPA	.33*	3.69	4.03	4.30	27.84*
200-Level GPA	.14*	4.06	4.23	4.29	5.58*
300-Level GPA	.13*	3.90	4.09	4.14	5.18*

[a]Non-proficiency credits only.

[b]Number of semesters plus 1/2 number of summers.

*$p < .01$

graduate with less non-proficiency credits, they graduate with more total credits. Compared to Group I, students in Group II had a mean difference of 5.25 proficiency hours but graduated with an average of 3.57 additional total credits. Similarly, students in Group III displayed a mean difference of 19.94 hours of proficiency, and graduated with an average 9.12 more total hours than Group I. Thus, on the average, every two courses proficiencied tends to result in the student taking one less course in his total program. Students who received proficiency credit took considerably less 100-level course work. Although there was no significant relationship at the 200 level, there was a significant positive relationship between proficiency credit and 300 level credit. Students with proficiency credit actually tended to take more hours at the 300 level than those with no proficiency credit. It appears that much of the additional course work mentioned in the previous paragraph was taken at the 300 level.

Time For Graduation. Proficiency credit is significantly related to time between matriculation and graduation. While those students in Group I averaged nearly 8 1/2 semesters, students in Group III averaged just under 7 1/2 semesters. Group II was intermediate, but much closer to Group I. There were no significant differences among the groups in the extent of summer school attendance.

Grade Point Average. The relationship between proficiency credit and GPA were significant within all three levels of course work and for the cumulative GPA; the more proficiency credit received the higher the GPA. It should be noted that proficiency credit does enter into the computation of the GPA. Since only 37 students were enrolled in 400-level courses, they were not included. For each Level, Group I had the lowest GPA, Group II was intermediate, and Group III was highest. However, a stronger relationship can be noted for

the 100-level courses than for the other two levels. The means of the three groups are much closer together for the two higher levels. Much of this difference appears attributable to the relatively low GPA of Group I for 100-level courses. Basically, Group I started lower than Groups II and III, improved more, but did not catch up.

Discussion and Conclusions

The purpose of this study was to look at proficiency testing in terms of student educational benefits. The results suggest the presence of benefits in several areas, although correction in interpretation is in order because of the fact that the representativeness of the sample was not determined.

First, proficiency credit does appear to shorten the time from matriculation to graduation. The most important indication of this comes from Group III, who, as a group, shortened their program by almost an entire semester. While this group was relatively small ($N = 16$), it is probably most indicative of the immediate future in higher education, with significant numbers of students receiving large amounts of proficiency credit.

Of course, a shorter time required to obtain a degree does not necessarily imply a higher or equal quality degree. However, the finding that students who gained proficiency credits also graduated with more total hours probably indicates that students do not "use" proficiency credit only to graduate quickly or lighten course loads. While some of the additional courses may be due to graduation requirements, there is no obvious reason why proficienciéd courses should not count equally toward the requirements of a degree. Thus, the conclusion has to be that students take additional courses because they want to, not because they have to.

Furthermore, students with proficiency credit take more upper division course work and much less lower division course work. This is probably the most encouraging result to come out of this study. It is assumed that upper division courses are generally of higher quality, and probably are often of greater conceptual difficulty, than lower division courses. Furthermore, upper division courses often assume knowledge taught in lower division, introductory type classes. Thus, we take the fact that proficiency credit apparently results in students getting into higher level courses sooner, and taking more of them, to be a very positive benefit of proficiency testing.

A valid concern to express at this point is the quality of performance in upper division courses of those students who avoided taking some of the usual lower division courses through proficiency examinations. Are they put at a disadvantage relative to their colleagues who did take the courses? If we use grades as an index, the answer seems to be that proficiency credit at lower levels did not seem to hurt students since their GPAs were essentially the same across the three course levels. However, students without proficiency credit definitely competed more favorably at the 200 and 300 level, even though they did not reach the level of the proficiency groups.

There are at least two possible explanations for the relative increase in Group I. First, the data from course grade distributions for the years 1971 and 1972 suggests that there is less variance in grades as courses get higher in level (instructors give fewer "D's" and "E's").[3] Consequently, the

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[3] See the Kohen Research Memoranda. The data in these memoranda are for the Fall Semester 1971, Spring Semester 1972, and Fall Semester 1972, respectively. If we can assume some stability in grading practices over time, it is reasonable to suppose that the same trends in grading practices were operating during the enrollment of the students used in this study.

decreased differences among groups is at least partially attributable to an artifact of the differential grading patterns found at different course levels. Second, taking 100-level courses may have helped bring students up to the level of the proficiency groups. The reader can probably think of other possible reasons. Further research is needed to untangle this interesting result. We do not believe, however, that the grade data of this study throws proficiency testing into question.

We would like to conclude this report with some tentative thoughts on the cost of proficiency testing. We believe that determining the financial savings which a proficiency testing program can provide a university is more complex than merely multiplying the number of proficiency credits granted by the average cost of an instructional unit. Such a method is bound to yield over-estimates because students who gain proficiency credit tend to take additional courses. Thus, a university does not eliminate a full instructional unit for each hour of proficiency credit which it grants.

Furthermore, students who gain proficiency credit tend to take higher level courses, and higher level courses cost more, on the average, than lower level courses, since they are typically taught by higher ranking instructors, have lower enrollments, and are more likely to include expensive laboratory sections. Thus, while we feel this study indicates that proficiency testing can be justified in terms of student benefits, the justification in terms of cost-efficiency needs to be carefully investigated.

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