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The Credibility of the Credit Hour: The History, Use, and Shortcomings of the Credit System

JAMES M. HEFFERNAN

EMERGENCE OF THE CREDIT SYSTEM

The emergence of the credit system in American higher education can be traced to two developments in the late nineteenth century. The first was the break from the classical curriculum and the introduction of the elective system; the second was a move toward standardization of high school curricula, and their improved articulation with college programs. In both, the expansion of public education played a significant role.

In the classical and ecclesiastical tradition which characterized higher education up to the 1850s and 1860s, students were trained in basically the same subjects and sequences. Progress toward a degree was embodied in a fairly rigid, prescribed curriculum. The first major break with this system was President Charles Eliot's implementation of the elective system at Harvard in 1869. His introduction of a variety of courses gave the curriculum greater breadth and flexibility, and provided opportunity for individual choice. But such a change also marked the need for a quantification of the educational process, so that students' progress along various paths toward a degree could be assessed. The first units of measurement were the courses themselves, defined in terms

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of hours of classroom contact; by 1877, the University of Michigan catalog indicated "24 or 26 full courses are required for the bachelor's degree (full course equals 5 exercises per week per semester, whether in lab, recitation or lecture)."¹ Thus, the measurement of achievement across varied course offerings was based on a common time unit; the accumulation of the proper courses and time units was assumed to constitute a complete bachelor's level education.

Related to the growth of the elective system was the spread of mass secondary education. Public opinion called for a wider variety of college courses—general, practical, professional—more appropriate to the diverse interests of high school graduates. In Michigan, this pressure was voiced by the superintendent of the Flint school system (1897): "The University of Michigan is too far removed from the people; the rigidities of their programs are not a proper policy for a tax-supported institution. . . . In the future the conforming act will be on the part of some gentlemen in Ann Arbor, and not by the entire state of Michigan."² Such demands, as well as the desires of institutions themselves to be more attractive to a broader public, led to the proliferation of courses, and an increased need for quantitative measures of the educational process. With greater numbers entering higher education, student mobility also increased; transferable, quantitative units of educational accomplishment became critically important. By the turn of the century, Eliot's system of flexible electives had been adapted to a well-defined structure of degrees, examinations, and course-time units, expressed in semester credit hour terms.

Secondary education expanded so greatly in the latter decades of the nineteenth century that educators were pressed to develop national standards for high school programs. Such standards would lead to a "common currency," and also facilitate the transition from high school to college. The landmark attempts in this area were made in the 1890s by the Committee of Ten on Secondary School Studies and the Committee on College Requirements. The elaborately designed system in their 1899 report laid the base for standardizing high school curricula across the country; it prescribed programs with certain unit distributions prerequisite to college entry. It based this unit on a contact hour-course dimension. Again, time in class, and a prescribed configura-

¹ Taken from Dietrich Gerhard, "Emergence of the Credit System in American Higher Education," *AAUP Bulletin*, 41 (Winter, 1955), 654.

² *School Review*, V (1897), p. 107, in Gerhard, *op. cit.*, p. 652.

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tion of courses, were deemed the quantitative representations of learning.

The College Entrance Examination Board and the North Central Association quickly adopted this structure for admissions and accreditation standards. The final refinement and firm entrenchment of the credit system came in 1901, however, by way of the Carnegie Fund for the Advancement of Teaching. In order to be eligible for the Fund's pension program for professors, colleges had to employ admissions criteria acceptable to the Carnegie Board's guidelines. (In turn, high schools had to adjust their curricula if their students were to attend fund-approved colleges.) A range of required precollege subjects was defined by the Carnegie Board; achievement was measured in terms of credit for time spent in the classroom. The so-called Carnegie Unit required five hourly periods per week per term; courses were evaluated in fractions of units, depending upon contact hours required in a subject area.

The use of the Carnegie Unit by high schools, entrance examination boards, and accrediting agencies, plus their own well-developed system of electives and course units, committed the nation's colleges to quantitative assessment techniques. The operation of credit systems on a term-week-hour basis was soon made explicit; the University of Michigan catalog of 1901 contained the statement that "the B.A. degree is conferred upon students securing 120 credit hours . . . One credit hour is given for satisfactory completion of work requiring one hour's exercise a week per semester in recitation, lab work or lecture."³

It is not surprising, then, to find the credit hour being applied shortly thereafter to areas other than student learning. Increases in enrollments, staffs, and facilities required some means for dealing with the "business" of educational institutions. The credit system was a logical choice, for once the units of educational accomplishment were established, they could be linked to revenues produced and dollars expended in the running of a college. Administrative operations, both managerial and economic, were soon expressed in credit hour terms: tuition by credit hours elected, salaries by credit hours taught, facilities by credit hours produced, programs of study by credit hours required. By the early twentieth century, our present notions of gauging both educational and administrative functions in terms of the credit system were widespread. In 1932, the National Committee on Standard

³ Gerhard, *op. cit.*, p. 657.

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Reports for Institutions of Higher Education published a study of cost analyses employed by American colleges and universities. The criteria used in all analyses for instructional programs were derived in some way from the credit hour:

The credit hour system resulted as a natural convergence in the needs of teachers and students. It provides a means for measuring the service given in teacher output, and also for measuring the units of educational status taken on by the student. And it makes for an exceptionally neat package to assume that the costs to teachers of their services and the value to students of their learning both alike increase in direct proportion to the number of hours spent in the classroom.⁴

USE OF THE CREDIT SYSTEM IN CONTEMPORARY HIGHER EDUCATION

Credit system units are maintained in higher education because they are widely used and easily understood, and are considered to be meaningfully related to other measurements. Credits serve as the coin of the realm not only because "they're all we've got," but also because they are commonly regarded as central to the activities of each participant in the educational enterprise—highlighted as follows:

Students—The credit system provides an up-to-date record of progress toward a degree, and a "map" of a student's entire educational experience. Post-graduation plans may be laid even before college entry, for the paths to vocations, professions, and further education are clearly delineated in the course and credits structure. It also provides short-range goals and expectations for performance helpful to students less sure of their long-range plans. Finally, the credit system permits educational flexibility: changes in majors, programs, and institutions are fostered through the transferability of credit units.

Faculty—The work of faculty members is difficult to express in terms of the "40 hour week"; the credit system provides a more cogent measure of instructional workload. A professor's credit load of courses approximates time spent in direct instructional contact; e.g., a nine credit hour "load" may involve three courses, or nine clock hours in class per week. Work load can be further defined through the student credit hour measure; class sizes, and concomitant variations in preparation and grading time, can be represented through the product of num-

⁴James Schellenberg. "The Class Hour Economy," *Harvard Educational Review*, 35 (Spring, 1965), 163.

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bers of students times course credit values. Considering the prime function of the college professor to be instruction, an accounting of course credit hour or student credit hour productivity thus provides an indicator of his contribution to his department's instructional output.

Institution—From its inception, the credit system provided institutions with a standard measure for admissions criteria, and aided in a “leveling up” of admissions requirements. It also fostered uniformity in national accreditation standards, affording institutions clear guidelines for self-improvement. Within the institution, the relation of credit units to dollars, man-hours, building space, etc., has permitted a linking of educational functions to financial and administrative affairs. Costs per credit hour, definitions of full-time students and faculty, or credits produced per facility, in combination with unit-cost techniques, give the college administrator needed information for analyses of institutional operations.

State—With the widespread commitment to mass higher education following World War II, and a resultant burgeoning of public institutions in particular, state governments began to recognize the need to rationalize and coordinate their soaring expenditures on higher education. Again, the credit hour was chosen as the means for bringing some order to management problems engendered by rapid growth. States such as Ohio, Kentucky, Texas, California, Florida, and Virginia developed funding formulas for public institutions which based financial support largely upon numbers of student credit hours produced.⁵ Many other states without specific formulas nevertheless consider carefully student credit hour production in determining appropriations to their public colleges and universities.

CURRENT DEFINITIONS AND ASSOCIATED TERMS

Since its early use as a measure of educational achievement, the credit hour has had built upon it a variety of formulations which relate it to other functions within the university. The definition of the credit hour itself has remained virtually unchanged for almost a century: “A credit hour (credit value; “point,” semester or quarter credit hour) is the instructional unit for expressing quantitatively the time required

⁵ James L. Miller, Jr. *State Budgeting for Higher Education* (Ann Arbor, Michigan: Institute of Public Administration, 1964) *passim*.

for satisfactory mastery of a course of one class hour per week per term (semester or quarter)."⁶ Or "Credits are also a measure expressing the extent of content in a course, as well as quantitative requirements for a degree."⁷

The "second-order" terms and formulas based on this single definition are legion. The proliferation of additional refinements and associated terms belies the increasing dependence upon the credit system at all levels of university operation. Two of the most widely used are:

Semester Credit Hour (SCH; Student Credit Hour—terms are frequently used interchangeably) is derived by multiplying the number of students in each class by the credit value of the class, and summing all these products for all classes taught. Used as a measure of instructional "productivity"; per faculty, per unit, per facility, etc.⁸

Full-Time-Equivalent Faculty (FTE Faculty) is the number of full-time faculty, plus the total load of part-time faculty divided by a normal full-time load. "Full-time load" is the number of credit hours, clock hours, or other load bases considered by the institution to constitute "full-time" responsibilities: teaching classes, evaluating students, reporting grades and credits.⁹

Others include Full Time Equivalent Student, Full Time Equated Student, Fiscal Year Equated Student, Weighted Average Class Size, Instructional Salary Cost/sch, sch/Student Level, sch Teaching Load/FTE, sch Teaching Load/Type of Instruction, sch Earned/sch Registered, sch/Physical space units, etc.

SHORTCOMINGS OF THE CREDIT SYSTEM

From its beginning, the credit system has come under attack; its attractive features as a simple, interchangeable quantitative unit of educational accomplishment are also the source of its flaws. The earliest criticisms were based chiefly on educational grounds. It was felt that a unit of time, rather than a unit of competence, did not

⁶ L. G. Lewis. "The Credit System in Colleges and Universities," in *New Dimensions in Higher Education*, (Washington, D.C.: Department of Health, Education and Welfare, Office of Education, 1961) p. 2.

⁷ James I. Doi. "Analysis of Class Size, Teaching Load and Instructional Salary Cost," in *College Self Study*, R. G. Axt and H. T. Sprague (Boulder, Colorado: WICHE Institute on College Self Study, 1958) p. 188.

⁸ James I. Doi and John D. Russell. "Series on Finance," *College and University Business*, 21 (July, 1956), 43.

⁹ Bureau of the Budget, State of Michigan. "Preliminary Manual, Higher Education Operations Budget Process: Budget Forms, Instructions and Definitions" (mimeo, July 7, 1970), p. 14—Glossary.

properly represent the learning process, that time and knowledge attainment were not necessarily related. Later criticisms were brought forth by institutional administrators; the credit hour as a unit for management analyses was characterized as a "rubber yardstick" neither consistent nor sufficiently meaningful for institutional policy-making.

Educationally, the credit system was seen to effect superficial rewards for students, making them more conscious of course completion than subject-matter understanding. It is ironic that those who consolidated the credit system—Charles Eliot et al.—had intended it as a basis for individual growth and flexibility; their ideal of personal attention has been supplanted by the reality of processing students as units of credit through fixed matrices of requirements.

In terms of intellectual ideals, the credit system has been portrayed as improperly mechanical and stifling of originality. Perhaps the most succinct indictment of the educational validity of the system was voiced by Thorstein Veblen in 1918. He saw the "credits equal learning" equation encouraging "genteel students whose need of an honorable discharge is greater than their love of knowledge"; . . . "scholastic interests centering on unearned credits"; and the "sterilization of academic intellect." He decried "the pervasive way in which the system of academic grading and credit resistlessly bends more and more of current instruction to its mechanical tests and progressively sterilizes all personal initiative and ambition that comes within its sweep."¹⁰ This opinion was echoed—perhaps more temperately—by the North Central Association in 1936: "Credits, courses, semesters, units, and degrees are symbols of status and not of process. They tend to mechanize our thinking about education."¹¹

The stifling aspects of standardization plague the modern university even more. A 1961 report by the Office of Education describes well this condition:

In most colleges and universities we have acted on the assumption that there is not effective learning unless a professor offers a course 'packaged' in quarter or semester units of a given number of hours per week and the student is exposed to direct instruction in the required number of hours. Content must be padded or trimmed down to fit neatly into the credit unit prescribed for a course, and generally speaking, innovations which would disturb the complex schedule of classes are discouraged.¹²

¹⁰ Gerhard. *op. cit.*, p. 666.

¹¹ G. F. Zook, and M. E. Haggerty. *Evaluations of Higher Institutions* (Chicago: University of Chicago Press, for North Central Association, 1936) p. 97.

¹² Lewis, *op. cit.*, p. 7.

While academicians berate the standardization brought on by the credit system, others see the credit unit as "not standard enough." For the administrator, the system provides too loose a measure. Variations in the definitions and elaborations of the credit unit among various departments cause difficulties in comparability of institutional data and analyses. The complexity of today's universities has caused the credit unit to become less meaningful even as a measure of "time spent"—its prime definition. That the credit/time line has lost its dependability can be seen in the application of the credit hour/contact time criterion to non-classroom (i.e., laboratory) activities. For instance, the original justification for more lab hours than class hours per credit was that no outside preparation, or very little, was required for lab sessions. However, lab hours are now so crammed with experiments that students often spend more time outside the lab preparing for experiments, and writing lengthy reports. This additional time is not reflected in credit units for such courses.¹³

Other credit/time non-uniformities occur across departments. Areas of study new to students, such as geology and psychology, take more time for familiarization with their materials and techniques than subjects previously encountered, such as history and chemistry, but student credit-load limits prohibit granting credit for this additional time. Then, too, graduation and distribution requirements effect a variability in the credit/time equation. General education requirements limit the number of credits available for a major; to cover the amount of work deemed necessary in a major, departments are forced to apportion more work to a few courses, and require more time than credit hour values would indicate. Thus, credit hours no longer convey a good expression of contact hours, or student and faculty effort; in effect, the additional hours go unreported since the one hour equals one credit assumption is still generally maintained.

Imbalances in the credit/time equation also occur in the opposite direction; i.e., more credit being granted for fewer contact hours. This is evident in lower division courses, where four credits are given to courses meeting only three hours per week, and in higher level graduate courses, where seminars award credits which bear little or no relation to time actually spent in the classroom. In these cases, contact hours in class are not the basis for assigning credit values; rather, time spent

¹³ M. F. Lorimer. "How Much Is a Credit Hour?" *Journal of Higher Education*, 33 (June, 1962), 302-6.

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out of class in individual study, a highly variable element itself, is the elusive standard for credit valuations.

The effects of these distortions are pervasive. Excessive "uncredited" contact hours cut into students' available time and can result in superficial treatment of coursework. They also eat into faculty time, and, consequently, departmental budgets; costs per SCH may increase but not reflect "true" activity costs. Courses with "inflated" credit values serve to blur standards, or create inequities among departments and student levels. In extreme cases, degrees may be "cheapened"; at best, such valuations produce widespread and confusing inconsistencies in the course-credit relationship when accumulated over a school's or department's total course offerings.

Further shortcomings of the credit system arise in the assessments of individual and unit faculty workloads or productivity in instructional services. It is widely felt that Student Credit Hour production per Full-Time-Equivalent Faculty (SCH/FTE) is the best measure for determining instructional productivity across departments, levels, and ranks. But when the two factors in this term are analyzed, it is evident that SCH/FTE figures do not consistently reflect faculty time and effort. Underlying each of the factors are assumptions subject to substantial qualification:

Credit Hour.

ASSUMPTION: The credit value of a course is a valid measure of the time a faculty member spends in class.

QUALIFICATION: Studies done as early as the 1930s have discovered that there is no significant relationship between the credits carried by a course and the amount of time required of an instructor in teaching it. Ratios of total hours contact time to SCH produced ranged from 1:2.9 to 1:5.5 in one study,¹⁴ from 1:2.2 to 1:7.7 in another.¹⁵ A 1970 study at the University of Michigan revealed a correlation of only 0.43 between class contact hours and course credit.¹⁶

ASSUMPTION: There is a dependable relationship between time in class and total hours devoted to teaching.

¹⁴ A. S. Knowles, and W. C. White. "Educational Research and Statistics: A New Approach to Evaluating Faculty Loads," *School And Society*, 49 (May 27, 1938), 683.

¹⁵ Hugh W. Stickler. "Working Material and Bibliography on Faculty Load," in *Faculty Work Load*, ed., Kevin Bunnell (Washington, D.C.: American Council on Education, 1960), p. 81.

¹⁶ Charlton H. Jones. "An Empirical Development of a Linear Model for Faculty Course Instruction" (Ph. D. dissertation. University of Michigan, 1970), p. 53.

QUALIFICATION: The major flaw here arises from the great variability of time spent in out-of-class activities. Factors such as subject area, class size, level of students, instructional methods, nature of material, and experience of professor confound the equation. When additional sources of variance associated with preparing for classes—reading and grading papers or exams, holding student conferences, coordinating teaching fellows, etc., are considered—the exceptions to the assumption exceed the conformities.

ASSUMPTION: The hours devoted to teaching are a reliable indicator of instructional effectiveness.

QUALIFICATION: As indicated earlier, there is no way to demonstrate a relationship between faculty time and student learning, no evidence to show that twice as much learning occurs in a four hour course than in a two hour course. There is simply too much diversity among subject fields, teaching methods and approaches, levels and interest of students, etc., to support a learning/time equation.

Full-Time-Equivalent Faculty.

ASSUMPTION: FTE faculty carry full responsibility for the teaching of a class; faculty efforts account for all SCH production reported per department or unit.

QUALIFICATION: Although they frequently carry full responsibility for instruction in a course, teaching fellows are not always included in the FTE data of a department—despite the fact that they do “produce” substantial Student Credit Hours. (For that matter, students also contribute to the instructional effort.) Also, secretarial and clerical assistance factors are usually left out of instructional productivity calculations—despite the fact that they aid immeasurably in the teaching function, and are not distributed evenly among faculty, departments, or units.

ASSUMPTION: All activities related to the teaching function are expressed in the instructional services data of SCH productivity; “instructional service” (and, hence, credit production) occurs only in the “classroom.”

QUALIFICATION: In the more complex institutions, faculty salaries are often charged to the instruction category, even though faculty members are expected to devote a substantial part of their time to other activities, especially research. Accounting for additional time spent in non-classroom activities which are definitely related to teaching competence is typically not possible per the FTE definition. This dis-

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crepancy is compounded by the assumption that all "instruction" takes place in the classroom; e.g.:

Higher education is a peculiar combination of functions of production and distribution. While professors are distributors of educational service locally, they are also frequently producers for the national or world-wide knowledge industry of their discipline. The fact that their scholarly 'productivity' bears more tangible fruits than their service to students in the classroom adds further complications to measuring their services rendered as educators.¹⁷

When such errors and exceptions are accumulated throughout an entire institution, severe dislocations can result. Data based on the credit hour framework are too crude, too prone to discrepancies. Yet, as evident above, a substantial number of the terms used to describe university activities are related in some way to this simplified framework. Resultant flaws in long-range planning and cost analyses for a single institution are serious enough, but when such flaws are compounded in interinstitutional comparison, conclusions can be grossly misleading.

REMEDIES AND MODIFICATIONS

Because of the pitfalls inherent in the credit system, both educational and administrative, certain adjustments have been made in the various sectors of the university which utilize the credit unit. They range from patchwork adaptations within the system to full-scale departures to alternative systems.

Changes in the educational realm center on changes in requirements, learning techniques, and curriculum structure:

- a. Elimination of credit hour requirements for graduation: a shift to measures of competence, or criteria of learning, rather than accumulation of hours. For example, comprehensive examinations in lieu of class attendance (nationally, Advanced Placement Tests; locally, credit-by-exam); graduation requirements expressed in terms of courses or units, as at St. John's, Shimer, Sarah Lawrence, Dartmouth.
- b. Flexibility in learning techniques, class-hour requirements, e.g., independent study. Several studies suggest that students are able to learn as well or better with much less class time than we have

¹⁷ Schellenberg. *op. cit.*, p. 161.

been accustomed to require of them. The sanctity of three weekly class meetings per course has already been questioned. Many experiments such as those with independent study or unconventional learning settings have proved successful, e.g., programs at Reed, Oberlin, Antioch, Santa Cruz, among others.

- c. Reorganization of curriculum into larger blocks of subject matter. Thus, greater unity has been brought into some college curricula; duplication and unnecessary routine can be eliminated. Economy of effort for students and faculty is fostered by organizing curricula into blocks or units more meaningful than the course distribution structure. The new University of Wisconsin campus at Green Bay, Hiram College, San Francisco State College, and Hampshire College utilize this approach.

Changes in the administrative realm are numerous; two approaches which respond to the most critical problems—faculty workload and intrainstitutional data comparability—are the following:

- a. The “point” system for measuring faculty workload in departments, rather than reporting workload solely through SCH production; this system provides a point structure for relating other activities—committee work, advising, supervision of activities—to faculty time and effort.
- b. The use of faculty contact time rather than credit hour units as a workload index. This approach connotes an emphasis on program planning, and agreement upon the outputs to be produced by a department or institution, so that interference in internal management can be avoided. This is one of the major advantages of a PPBS structure (Program Planning and Budgeting System). It leaves to management control over the way resources are allocated and combined to produce previously agreed upon *output* units.

Hopefully, these and the many other departures from dependence on the credit system will continue to grow. As higher education becomes more diverse in its scope and functions, the inadequacies of older procedures become increasingly detrimental. Needs for information have far outstripped the capabilities of techniques employed. By developing units more relevant to the kinds of activities being measured, more meaningful assessments of student learning, of faculty effort, of program outputs, and institutional productivity will be possible.