

Seeking Standards: Mathematics and Science Curricula for Early 20th Century Texas High Schools

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Abstract:

Beginning in the middle of the nineteenth century, a complex set of social, economic, and educational conditions shaped the development and widespread progress of the American high school for service to a broader range of the population. This paper traces the development of the affiliation process whereby high school programs were accredited by The University of Texas, an process which was later replaced by an "official" state process.

Beginning in the middle of the nineteenth century, a complex set of social, economic, and educational conditions shaped the development and widespread progress of the American high school for service to a broader range of the population. Certainly, the nineteenth century high schools served a larger portion of the population than once thought. Traditionally, the accepted wisdom asserted that only a few youth attended high school. However, the number of high schools had grown from the first high school in Boston, *The English Classical School for Boys* in 1821 to 7,983 schools by the year 1900 (Eby & Arrowood, 1941, 727-742). Moreover, a diversified student population prompted both educators and citizens to develop curricula to prepare students for the labor market as well as for university attendance.

In 1850, the basic principles of American education were still contested. Not until the 1890's did Americans accept that public schools should be freely available to all children at both elementary and secondary (Evans, 1955, 93). Additionally, they came to accept that the notions that professionally prepared teachers should staff schools. The states also created publicly supported universities. Inasmuch as states funded public schools, they also began to set standards for these schools. Within this context, public high schools and many state universities began close relationships about graduation and admission standards.

Important dimensions of the emerging high school included efforts to ease students' entry into universities as well as into the job market. Students arriving at 19th century universities typically graduated from high schools with widely varying standards and courses of study. In order to increase the number of students attending the universities, educational and political leaders recognized the necessity to adjust high school standards. For this reason, several state universities, including Michigan, Wisconsin, Iowa, and Texas created statewide standards for high schools in that state and launched systems by which high schools affiliated with state universities.

This study focuses on the early history of the affiliation or accreditation of high schools in the state of Texas. When the University of Texas was established in 1883, only six public high schools existed in the state. In fact, the first public high school in Brenham had opened its doors only eight years earlier (Benner Banner, Brenham, Texas, 1875). The University of Texas began with 221

enrolled students who were admitted by examination or by individual faculty approval but faculty members considered that most of them were ill prepared for University work (University of Texas Bulletin #106, 5-7). Soon, the university's professors realized that the "university of the first class" foreseen by the Texas constitution would be impossible to build in the absence of students' obtaining a sound academic foundation in the state's high schools. Thus, beginning with the 1885 school year, the university initiated a system by which high schools became affiliated (or accredited) with it. University enrollment began a steady increase each year.

Implementation of the University's plan for affiliation of high schools in 1885-1886 included school visitations by professors. Only four of the high schools reviewed that year received affiliation. During the next ten years, the university failed to pursue diligently the affiliation process and, consequently, the scheme floundered. A major reason for this relative inattention was that no university administrator was in charge of the application and review. During the year 1895-1896, university officials again turned their attention to the state's high schools. The faculty formed a University committee on Affiliated schools. This committee suggested curricular subjects in which schools might be affiliated. The results of this relationship quickly yielded positive developments in high schools and increases in the enrollment and the quality of work at the University (University of Texas Bulletin #106, 1908, 5-7). The university committee developed a formal structure to the affiliation process. School administrators who desired affiliation of their high school with the university acquired suggestions about minimal curricula, faculty qualifications, buildings, classrooms, and textbooks and other important materials. The faculty committee oversaw the applications from high schools and visitations to the high schools that sought affiliation. From this time, the affiliation program rapidly gained strength. Results of this university-high school relationship included the development of stronger high schools in the state and in the increased enrollment in and preparation for students at the university.

This report covers the affiliation of Texas high Schools by the University of Texas during the 1897-1907 period. This decade represents a transition from the university's early and largely informal beginnings to a

more elaborate, systematic, and formal process of affiliation of high schools with the university.

The primary source of documents for this study was the UT Affiliated Schools Records, largely unexamined for a century, and now accessed in the Eugene C. Baker Texas History Center, the Center of American History. Additional sources included catalogs and bulletins published by The University of Texas. An initial list of affiliated high schools was compiled from annual University of Texas Bulletins. Then, relevant files that contained original correspondence and documents were studied. Based on information from these documents, other sources, including individual records from the Visitor of Schools, were identified, located, and analyzed.

Documents were first read to gain understanding of surface content. Notes were made and several types of graphic organizers were developed according to the information available in the affiliation applications. Next, the context of the document was further established by asking what the document may have said but did not. These analyses provided early insight into changes in the affiliation process over years. The next step was to investigate the records by seeking to reconstruct the intellectual worlds behind the words. Also, individual schools and communities often had different purposes for the local high school curriculum than did university affiliation requirements. Finally, the affiliated school records were interpreted according to the way they functioned within specific situations (Davidson & Lytle, 1992, 25-35). The affiliated school records reveal the processes of affiliating or establishing a connection with the affiliation process with the University of Texas. Typically, high schools considered this relationship a recognition that was a source of civic pride. This study in the first is a projected series that seeks to portray the affects by which early Texas high schools used the affiliation program to strengthen their curricular offerings.

The Renewed Affiliated School Process

With the renewed emphasis on the affiliation process, faculty at the University of Texas understood the importance of its relationship to the state's secondary schools. For example, a 1908 bulletin of the University stated that the interest of the University was correlative with the interest of the high schools of the State (University of Texas Bulletin # 117, 6-7). The growth of the University in number and quality of students depended upon the increase in number and efficiency (quality of instruction and student work) of high schools. Thus, the University provided high schools with suitable course of study and insisted that the schools provide appropriate adequate laboratory equipment, buildings, certified teachers and high quality instruction. Graduates of affiliated high schools would then be better prepared to engage in university work.

The renewed emphasis prompted significant changes in the affiliation process. Notably the university created the position of High School Visitor and employed J. L. Henderson, an experienced Texas school

administrator, to fill the position (University of Texas Bulletin #106, 1908, 5-7). Additionally, the revised affiliation process specified five curricular subjects for affiliation: English, History, Mathematics, Latin and Greek. During the subsequent decade, 1897-1907, the University Affiliation program adapted the Carnegie Unit (1905) and divided the affiliated schools into three groupings (1906). Group I included high schools that prepared students in English, History, Algebra, Plane Geometry, one or more foreign languages, and enough electives to total fourteen units of work. Group II included high schools that provided satisfactory work (i.e. affiliation) in eleven units that included instruction in English, History, Algebra, and Plane Geometry. Group III comprised of high schools that were affiliated in English, History, Plane Geometry and Algebra within a minimum of eight units of work. The qualitative level of teaching in all three groups for the common courses was presumed to be of equal quality. Graduates of the affiliated high schools in Group I, II, and III could enter the university on the basis of credit for which their courses were affiliated; graduates were required to pass examinations on enough units of work to total the fourteen units set for admission (University of Texas Bulletin # 288, 1913, 15-18).

Formal reorganization of the process included the use of several new documents, a review of student examinations by University faculty, recommendations for laboratory equipment, listing of science experiments, and suggested courses of study for one-teacher high schools, two-three teacher schools and four-five teacher high schools. Newly developed documents facilitated the affiliation process. For example, new application forms (referred to as "application blanks") required the provisions of more information from schools, e.g. the listing of qualifications of all teachers and the number of students enrolled at the school.

The affiliation process was reasonably straightforward. First, a high school administrator, usually the Superintendent of Schools, requested affiliation applications for specific curricular subjects from the High School Visitor. Second, local officials submitted completed affiliation applications to the High School Visitor who referred them to the University Committee on Affiliation. If committee members judged that the high school was weak in certain areas they made recommendations for improvement and suggested that the school seek affiliation the following year after the improvements were instituted. Student specimen papers (laboratory books and exam papers) accompanied the application. The Visitor then forwarded these materials for review by faculty members of the university in departments related to the high school subjects. If all judgments deemed the school minimally satisfactory, the Visitor planned a visit to the school. This event often was a red-letter day for the high school and the community. A successful visit likely would result in a vote of approval by the affiliation committee (University of Texas Bulletin #27, 1908, 8-9). Sometimes, the review of specimen papers and the actual visit to the school occurred concurrently (Henderson, 1940, 151-157).

Preliminary analyses of the affiliated school records have yielded a large-scale database. It follows the design of the original forms employed in the affiliation process. These records, although they contain vast amounts of information on many Texas high schools were not complete for every year. When direct evidence does not exist or is incomplete for schools, other sources, (e.g., University catalogues) provided information. By 1897, seventy-two high schools were affiliated with the University, but very little evidence exists to attest the quality of courses offered by those schools. During that year, university officials changed the affiliation procedure such that individual subjects in each school, rather than schools were affiliated. Dr. George T. Winston, the University president approved the reinstatement of the University's School of Education in 1897 and the selection of Houston Superintendent W.S. Sutton to become Professor of Pedagogy and, later Dean. The University formally established the Faculty Committee on Affiliated Schools and members of the Committee included Professor Sutton, chairman, and Professors from the departments of History, English, Mathematics, Latin, Geology, and Germanic languages (University of Texas Catalogue, 1897). The committee worked closely with John W. Hopkins, the university's inspector of schools. Hopkins served only a short time in this post and was replaced by J.L. Henderson (Henderson, 1940, 132-134).

In 1897, seventy two high schools were affiliated with the University of Texas, but, by 1899, the number had increased to ninety-one (University of Texas Catalogue, 1899). In 1901, the total number had increased only by one; two years later, the number grew to 99 (University of Texas Catalogue, 1901). In 1905, a total of one hundred and ten high schools were affiliated (University of Texas Catalogue, 1905) and, in 1907, one hundred twenty-nine schools claimed official affiliation with the university (University of Texas Catalogue, 1907). Not all high schools, to be sure, retained their affiliation during this ten-year time. Requirements were such that high schools had to submit their courses of study every year in order to preserve affiliation (University of Texas Bulletin # 106, 1908).

As noted above, some high schools were not affiliated in all subjects. Each began the process with affiliation in a few subjects, notably English, Mathematics, History, and Latin. On the other hand, high schools found continued affiliation in Latin to be difficult largely because of the unavailability of adequately prepared Latin teachers. In the school year 1901, with a total of ninety-two schools officially affiliated, some thirty of these schools were not affiliated in Latin. Comanche High School represents one such example. After inspector Hopkins visited Comanche High School in 1905, he recommended that affiliation in Latin "be dropped" because it was not adequately taught. German or Spanish eventually replaced Latin in most Texas high schools (Affiliated School Records, Box #4P293).

Affiliation in science courses began during the school year 1901-1902 with two courses, physics and

chemistry. The following year botany, physiography, and physiology became affiliated subjects of study. The university affiliation committee at first discouraged high schools offering these new science courses. They clearly favor the traditional academic subjects (e.g. English, Latin). Furthermore UT professors contend that few Texas high schools were prepared to teach the science courses because most of them did not have adequate equipment, separate laboratory rooms, or qualified teachers (Affiliated Schools Records Box #4R48). For example, Professor Sutton wrote (September 16, 1898) to the Superintendent of Honey Grove High School (located in north east Texas just south of the Red River); he stated "You have three years work in your high school, and I believe that this is too short a time in which to attempt so many of the natural sciences. You have Physics, Physiology, Zoology, Botany, Geology, and Chemistry. It is my opinion that it would be well to eliminate some of these studies, devoting the time thus saved to other sciences and to work in English (Affiliated School Records Box #4P482)." Additionally, in March 1904, Professor Sutton wrote to the Superintendent of Schools in Crockett, "very few small towns have secured affiliation in the natural sciences (Affiliated School Records Box #4P295)." During these early years, the teaching of the sciences in Texas high schools clearly was a controversial issue in the university Committee on Affiliated Schools. Moreover, even though some high schools offered these science courses, most of them were not able to obtain the accreditation. Visitors routinely observed that the quality of the offerings simply was too low. However, by the 1908-1909 school year, the committee approved affiliation in all the sciences, including zoology (University of Texas Catalogue, 1908). Mathematics on the other hand enjoyed respect early in the Texas affiliation.

In 1897, the recommended high school course of study in mathematics included algebra and plane geometry. These courses remained the only two affiliated mathematics courses until 1907. During the following year, 1908, however, the Committee began to affiliate solid geometry and trigonometry courses.

Mathematics along with English, history, and Latin provided the core of course work minimally expected for affiliation in all high schools. Every graduate affiliated of Group III high schools could enter the University of Texas with eight units of affiliated course credits. Therefore, they only had to take examinations to make up the additional six units in order to qualify for university entrance. Group III schools during this period included Amarillo High School, Yoakum High School, San Saba High School, and University Military Academy, Dallas, schools in some of Texas' larger cities as well as schools in small towns. Group I schools offered Solid Geometry and Trigonometry. Schools in this group included Austin High School, Ball High School in Galveston, Mineola High School and Waxahachie High School. Students graduating from Group I schools, as noted before, were exempt from any entrance examinations at the University of Texas.

Special dimensions of the quality of high schools courses may be understood through awareness of instructional features in the courses. Specifically, schools reported the textbooks used, the number and length of recitations each week, and the portions of the textbooks covered by the courses.

Science courses, for the most part, were offered at single grade levels with each course being completed in that year. Not all affiliated high schools offered all science courses. The most commonly reported science textbook used during this decade was Henry Carhart and Horatio Chute's *High School Physics* (University of Texas Bulletin #106, 1908, 80). (Publication dates for these books are given for the printing/edition published nearest to the beginning of the decade covered by this research. These dates must be understood as approximate only inasmuch as school officials who reported their use did not provide complete bibliographic information.) Routinely, forty-five minute recitations for science courses were scheduled three days each week. The laboratory recitations occurred twice each week for ninety minutes each. In Physiology and Hygiene courses, no textbook was commonly used. Among the textbooks reported in use, however were Buel P. Cotlon's *Physiology: Experimental and Descriptive*, Herbert Conn and Robert Buddington's *Physiology*, Frank Overton's *Applied Physiology*, Joseph Hutchinson's *Physiology and Hygiene* and Walter Eddy's *General Physiology and Anatomy*. For these courses, forty-five minute recitations occurred five times weekly (University of Texas Bulletin # 106, 1908, 74).

In Physiography, known today as Geography, the most commonly used textbooks were W.M. Davis's *Elementary Physical Geography* and Ralph Tarr's *New Physical Geography* (University of Texas Bulletin #106, 1908, 70) and daily forty-five minute recitations were commonplace. For Botany, the most commonly used textbook was Joseph Y. Bergen's *Foundations in Botany* (southern edition)(University of Texas Bulletin #106, 1908, 111). During this period, the university Affiliated Program considered science courses to be electives. The University affiliation committee emphasized the importance of laboratory work in all the science courses. It argued that the investigation of sciences through books was delusionary. It provided directions to schools concerning recommended equipment in laboratories and considered that every school provide a science laboratory, not necessarily an expensive outlay, but one in which science might be studied first hand by the students. The committee held that the offering of too many sciences, although never specified, might result in failure in all studies. Consequently, the committee believed that Texas high schools students would benefit more from in depth instruction in fewer rather than more science courses (University of Texas Bulletin #47, 1905, 10-103).

The Committee on Affiliation held that the teacher of mathematics at the high school level should insist on two principle aims, namely, the development of comprehension of the principles underlying the rules of computation and a high degree of accuracy in carrying out

these computations. Class recitations and oral drills constituted the basic methods of instruction in the affiliated schools' mathematics classes. Initially the affiliated courses in mathematics were only algebra and plane geometry. The first affiliations for solid geometry and trigonometry were granted in the 1907-1908 school year. In all of the mathematics courses, G. A. Wentworth's popular textbooks were the most commonly used of all others. Specifically, these books included Wentworth's *New School Algebra*, Wentworth's *Plane Geometry*, Wentworth's *Solid Geometry*, and Wentworth's *Trigonometry*. The algebra and plane geometry courses were each one year courses, spread over the first three years of high school. This plan enabled students to take trigonometry, if offered, the fourth year. Forty-five minute recitations in all mathematics courses were held five times each week. Teachers of mathematics in schools that sought affiliation were expected to require neat and accurate work of their students. The affiliation committee also insisted that students maintain cumulative notebooks, especially for geometry (University of Texas Bulletin #106, 44-45). Without a doubt, the University Committee on Affiliation believed in a system of instruction for high schools that included an emphasis on recitation, neatness and accuracy. This system supported the belief that a classical academic education was best for all students regardless of their future. Furthermore, the committee on affiliated schools wanted to maintain an accurate system to measure changing demographics of the states high school populations. Thus, modifications in new application blanks reflected this need.

The application blanks for affiliation required school authorities to list the number of students in each course, the number of grades in the high school, the number of grades below high school, the number of teachers employed at the high school and a statement as to whether or not the school followed a departmental plan. This application changed in 1906 (Henderson, 1940, 140-142). The new applications required more details and covered new courses that could be affiliated. Group I high schools offered four years of secondary studies. Groups II and III ordinarily required three years for students to complete high school instruction. The number of students in individual courses is difficult to ascertain because this information often was not provided. However, based on the total number of students attending a high school, inferences are possible. Enrollment in Texas high schools during this period averaged between 80 and 120 students each year. Dallas High School, which had 471 students in the 1906-1907 school year was an exception (Affiliated School Records, Box #4P296). First and Second Years of high school had more students than later years. More girls than boys attended Texas high schools during this decade. Seven grades existed below high school grades. The number of teachers employed at high schools ranged from two to three, sometimes four in the very large schools. The Committee on Affiliation preferred a minimum of two teachers but recommended more. The final statement on the application inquired about the schools' organization,

use of a departmental plan or the graded plan. This information obviously was important to the Committee; it preferred a departmental plan. In instances in which a school did not have enough teachers or that followed a graded plan, affiliation was not possible until the school could correct the specific problem. On the other hand, the Committee was aware of the difficulty of adding teachers to a school's faculty, particularly in the smaller high schools. Although conscious of these issues, the University committee did not alter its standards. Its members believed that the improvement of secondary education in Texas was essential to the preparation of students for university work. In his 1905 report to President William Prather, High School Visitor Henderson emphatically argued that high schools should maintain a course of study for those who may enter higher studies in the university (Affiliated School Records Box #4P232).

R.G. Hall, principal of Cleburne High School, in an address to the Texas State Teachers Association in 1905, offered a tribute to the leadership of the University of Texas in raising educational standards. He stated, "In the nation and in the state, inspiration must come from above. We, the teachers of Texas have a right to expect and demand competent and sympathetic leadership from the colleges and universities of the state." Hall's likely captured the sentiment of most leading Texans that the university and the state's school systems should work together for the sake of the people (Hall, 1902). During the first decade of the nineteenth century, school systems began to consolidate. The University Committee on Affiliated School consequently organized and implemented changes that assured common standards for Texas high schools. This uniform set of standards met the university's entrance requirements as well as it improved the nature of curricula and instruction in Texas secondary schools. Educational standards, controversial in contemporary Texas, were contested early in the 20th century. However, those early standards unquestionably provided the impetus for the growth of high schools in the state. Moreover, the work of the University Affiliated Schools Committee provided a foundation for subsequent accreditation programs instituted by Texas Department of Public Instruction. The state's Thirty-second Legislature authorized this change in accreditation in 1911. In 1915, the Thirty-fourth legislature strengthened the authority of the Department relative to the classification (accreditation) of schools; increased the funds to administer the work of classification; and provided funds for two high school supervisors to classify, inspect and accredit high schools (Department of Education Bulletin #58, 1916, 7-8). During the time that the University of Texas administered the affiliation program in Texas, the state's communities took immense pride in their affiliated high schools. Indeed affiliation was prize sought after by the high schools of Texas. Henderson (Henderson, 1940, 166-170) wrote that once a school achieved accreditation, the school's community considered loss of affiliation to be a calamity. At times, when withdrawal of affiliation was threatened, not only superintendents of schools but also members of

school boards journeyed to Austin to learn how the loss of accreditation might be avoided. Citizens and educators in each school community compared itself to neighboring schools; "Keeping up with the Joneses" was a very real motivation for qualitative educational improvement. For example, Superintendent F. W. Chatfield of Abilene wrote to University Professor W. Simonds, who earlier had visited the Abilene High School, to ask how Abilene High School compared to other schools in the area. In the margins of this letter, are hand written notes apparently composed by Simonds that Abilene High School did not compare favorably to other schools in a state of equal position (Affiliated School Records Box #4P289). The affiliation records have numerous examples of school board and community members seeking information on affiliation. Affiliation with The University of Texas was an important accomplishment and leaders in communities recognized the distinction as a label of their high school as "first class".

The university's involvement in the establishment of high school curricula standards and its inspection and affiliation plan resulted in stronger high schools in Texas. Simply, the affiliation process provided standards for improvement where none existed before. Everyone involved in the affiliation process, teachers, principals, superintendents, and school board members, the visitor of schools and the University rightly could be proud of the major improvements made by the secondary schools of Texas during the period 1897 to 1907 (Wise, 1999, 27-42). The University's Affiliation program provided the impetus and the direction for this improvement.

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Continued from Menck, page 40.

educationists to occupy themselves with history. But is history really an essential part and if so, why?

Another open question remains. The degree of education of a human being is usually measured according to the amount and the nature of the knowledge, which this human being has acquired in the course of its life. For this reason for example a curriculum vitae always delineates the educational background in detail. There can be no objection to such knowledge collected in an individual biography. In Platon's dialogues its acquisition is taken for granted, as well, but he wouldn't have gone so far as to call that knowledge *paideia* [education in the full sense of the word]; and in the tradition of German pedagogy, we wouldn't go so far as to speak of *Bildung*. Platon's dialogues as well as the neo-humanistic education theory in Germany are orientated towards other aims. I have learned from Plato that we have to ask for the *spirit* of knowledge, for the sense it makes in a given society, and for the principles that guide the application of knowledge. I agree with Platon that there is no conclusive answer to be given, and that the answer can rather be found in the preoccupation – asking questions in a way, though, that is as intense and profound as Platon demonstrates it in his dialogues. Is that sufficient in our days, or is it even a luxury that, as in Socrates' society, only the upper classes can afford

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