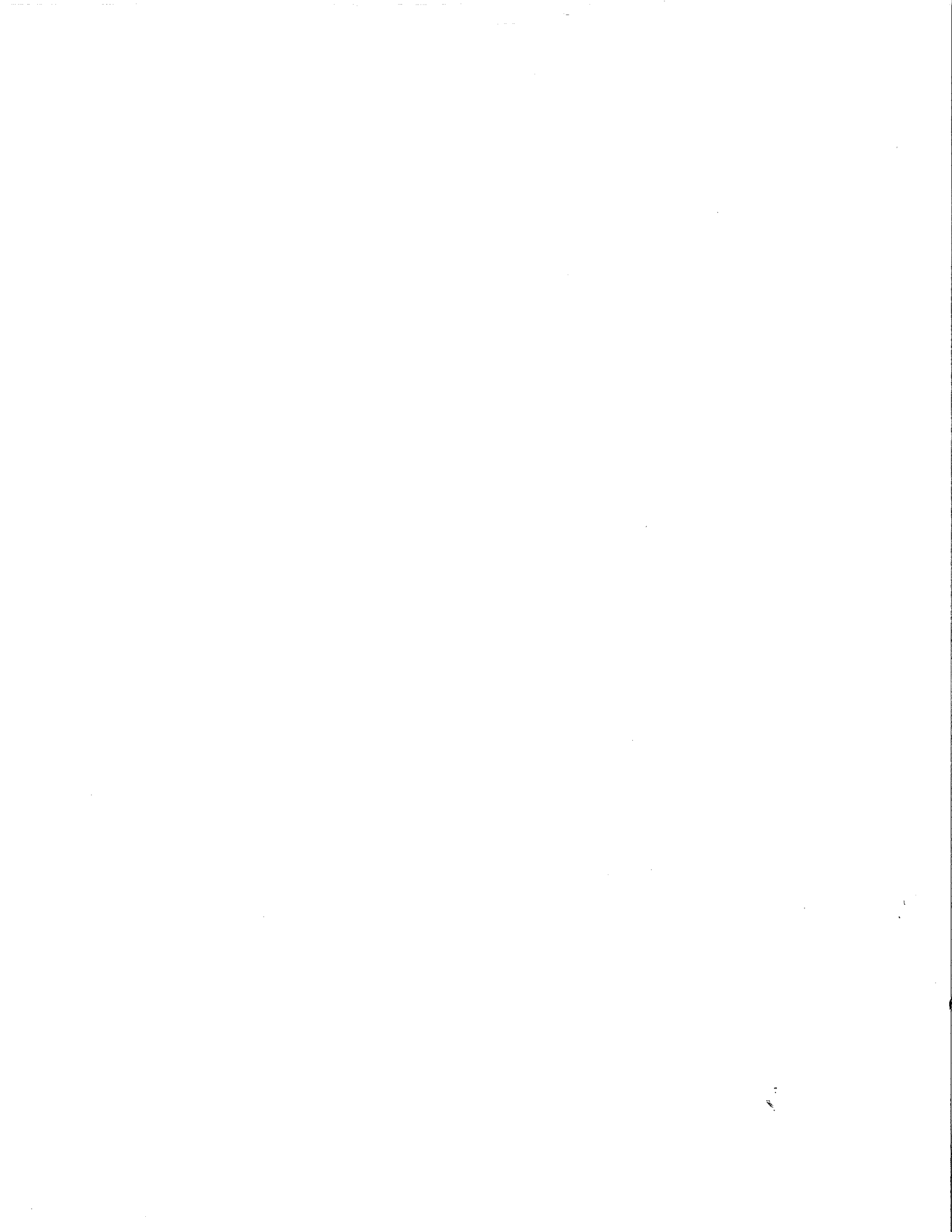


THE SOLUTION FOR TEACHER SHORTAGES

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Everyone is rightly concerned about the quality of public education and its cost to the community. But most discussions of these problems seem to us, as economists, to be wide of the mark, for they fail to fix attention on the teaching profession's unique salary structure. The structure of teacher salaries, we think, is a key both to understanding the nature and cause of teacher shortages, and to solving some of the major problems of cost and quality in public education.

We believe that there is a way for communities to improve a vital part of the public school program -- the quality of instruction at the secondary level -- without imposing unacceptable tax burdens. The way to do this is to recognize that there is not a single "teacher shortage" but rather specific shortages in particular teaching fields, and to

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concentrate on reducing these specific shortages. This means that school districts must adopt a new kind of salary structure that will allow them to pay more to those whose teaching skills are relatively scarce.

Today most school districts have "unified salary schedules," which provide for only two kinds of pay differentials. They provide one set of salary "steps" for years of teaching experience and another set of steps for total amount of college credits. But outside the teaching profession, there are wide salary differentials for various types of training. For example, in 1959 average incomes were \$14,000 in the medical sciences, \$11,000 in physics, and \$8,000 in meteorology. Doctors with different specialties -- surgeons, anesthetists, allergists -- each earn different incomes although college training and length of experience may be the same. It is characteristic of these professions and of professions generally not to have unified salary schedules. Is teaching different from other professions so that it requires an "unprofessional" salary structure? We think not, and we believe communities should no longer accept uncritically that kind of salary schedule.

The Role of Salaries in Our Economy

Salary differentials serve an extremely important function in our kind of free society. If people are to have the freedom to choose their occupation and place of employment, there must be signals that will show where manpower is relatively scarce and that will lead to voluntary shifts of personnel to alleviate the shortages. In a free economy, differences in salaries are these signals. If mathematicians are comparatively scarce in relation to the demands for their services, employers offer higher salaries to attract them. These relatively high salaries tell us that there is a shortage of mathematicians, and, what is more important, they induce voluntary shifts to remedy the shortage -- causing some young people to enter mathematics instead of other fields, persuading people with part of the necessary training to acquire the rest of it, inducing persons already trained in mathematics to re-enter the field, and so on.

Thus the function of salaries, and other prices, in a capitalist society is to produce a sensible allocation of resources among uses, with each individual making his choice voluntarily. If we do not allow salaries and prices to carry out their function, there will be persistent shortages of some resources and surpluses of others; and the basic scarcities making for salary differentials will continue.

Why We Would Expect Shortages Under the Unified Schedule

In the teaching profession the "unified" or "single" salary schedule has become almost universally accepted, and it typically applies to all teachers within a district. This means that the same salary prospects confront all teachers alike -- teachers of kindergarten, 5th grade, high school mathematics, high school physical education, etc. -- although these assignments may call for very different kinds of training and teaching skills. If the district includes a junior college, instructors in all subjects at that level too face this same pay schedule.

Outside the teaching profession, however, salary offers are by no means identical as between mathematics majors and physical education majors, or as between persons prepared to teach kindergarten and those properly equipped to teach high school physics. Persons with different types of training face identical salary prospects if they enter teaching, but they face widely differing prospects in the rest of the economy. In 1959-1960, for example, the average annual salaries of experienced people in a sample of occupations other than elementary and secondary teaching, were as follows:

Research and Development Personnel, Ph.D.	\$14,760
Mathematicians	13,990
Engineers	13,730
Chemists	12,950
Physicists (all experience levels)	11,000
Newspaper Reporters	10,000
Biologists (all experience levels)	9,000
Professors of Pharmacy	8,690
Geographers	8,000
Home Economists	8,000
Professors of Nursing	7,730
Physical Therapists	7,000
Draftsmen, Senior	6,140
Clerks, Accounting	4,780

Clearly the opportunities open to persons with training in mathematics or the physical sciences are markedly more attractive than the opportunities open to persons with some other kinds of training. A student about to major or minor in mathematics would compare teaching salaries with the \$12,000 to \$14,000 he could expect to earn as a physical scientist outside teaching. A student considering a less exacting course of study might compare the teaching salaries with the \$5,000 to \$8,000 he could earn as, say, an accounting clerk or a geographer. The competition for the services of teachers and potential teachers is much more varied and complex than this, but these examples serve to bring out the essential point.

Of course, these salaries do not mean that mathematicians are more worthy or important than geographers. They simply mean that in the prevailing circumstances mathematicians are scarcer in relation to demand. Similarly, the fact that maple syrup is more expensive than water does not imply that it is more worthy or important; it merely means that maple syrup is scarcer than water in relation to demand.

Given these salary patterns inside and outside the teaching profession, we would expect the schools to have more difficulty recruiting good teachers trained in mathematics and the physical sciences than in recruiting good teachers for other assignments. For a special reason, as well as their non-teaching opportunities, we would expect a relative shortage of able English teachers to develop: to teach composition well, the teacher must require many themes and criticize them thoughtfully -- an exceptionally arduous task. Because of this, it is often harder to retain capable well-trained teachers for these classes than for other assignments. These are

some of the shortages, then, that we would expect unified salary schedules to produce.

But is there anything new about the situation? After all, the unified salary schedule has been widely adopted for twenty years or so, and school districts have managed to get along. Why should we be concerned now about these salary patterns? The answer is that the situation, which may have been tolerable in earlier years, has become, and is becoming, a great deal worse. Salaries in the "scarce fields" have risen tremendously in relation to teachers' salaries. For example, in 1939 chemical engineers received, on the average, an annual salary of \$2,640 -- 16 per cent less than the average salary of high school teachers in large cities. Twenty years later the average salary in chemical engineering was \$11,000 -- 65 per cent more than that of the high school teachers.

The question may be asked, Why not raise salaries across the board enough to attract capable teachers with the scarce types of training? That is exactly what districts have attempted to do. To find that they have failed should come as no surprise, for letting the "tightest" market determine the amounts paid to everyone can raise the total salary bill prohibitively high. The result is that, under the unified salary schedule, a teaching career is attractive to some of the skilled people that schools need, but not to all of those that are vital to the instructional program. As a consequence, there are surpluses of some skills, shortages of others, and more severe shortages in some subject-matter areas than in others.

Some people, many in the teaching profession, insist that teachers are all alike, that they perform the same tasks and should therefore be rewarded in exactly the same way. If they were perfectly substitutable,

of course, one teaching skill could be no scarcer than another, because one could be used in place of the other. But it is hard to believe that the instructor of physical education is a really adequate substitute for the teacher of Algebra III, or that the kindergarten teacher can be used in place of the high school English instructor without loss of effectiveness. These assignments call for different training, different abilities and interests, sometimes even different physiques. Quite a few people in the educational profession also feel that teaching skills differ. Superintendents and principals prefer not to have members of their staff teach outside their majors and minors. And the National Education Association, while sometimes urging that teachers are alike, reports that "... The distribution of the new prospective candidates among the grade levels and teaching fields is gravely out of balance with the distribution of the demand for teachers."* Evidently the NEA does not really feel that these teaching skills can readily be substituted for each other.

*Teacher Supply and Demand in Public Schools, 1960, Research Report 1960-R7, Research Division, National Education Association, Washington, D.C., April, 1960, p. 10 (italics in original).

What We Find

When we look at the evidence, we find that shortages of particular teaching skills do indeed exist. This does not mean shortages of "bodies" but shortages of well-qualified teachers. Nearly always school administrators can put someone in front of a class, but for certain assignments they have trouble getting the kind of teacher they and the community want.

The teacher supply and demand data collected by the NEA provide clues to the nature of these shortages. Each year the NEA adds up the numbers of new graduates prepared to teach in particular fields. It also tabulates the numbers of new teachers employed for assignment in each field. By subject-matter areas in secondary schools, the ratios of the numbers produced in each year to the numbers of newly employed teachers in that year have been as follows:

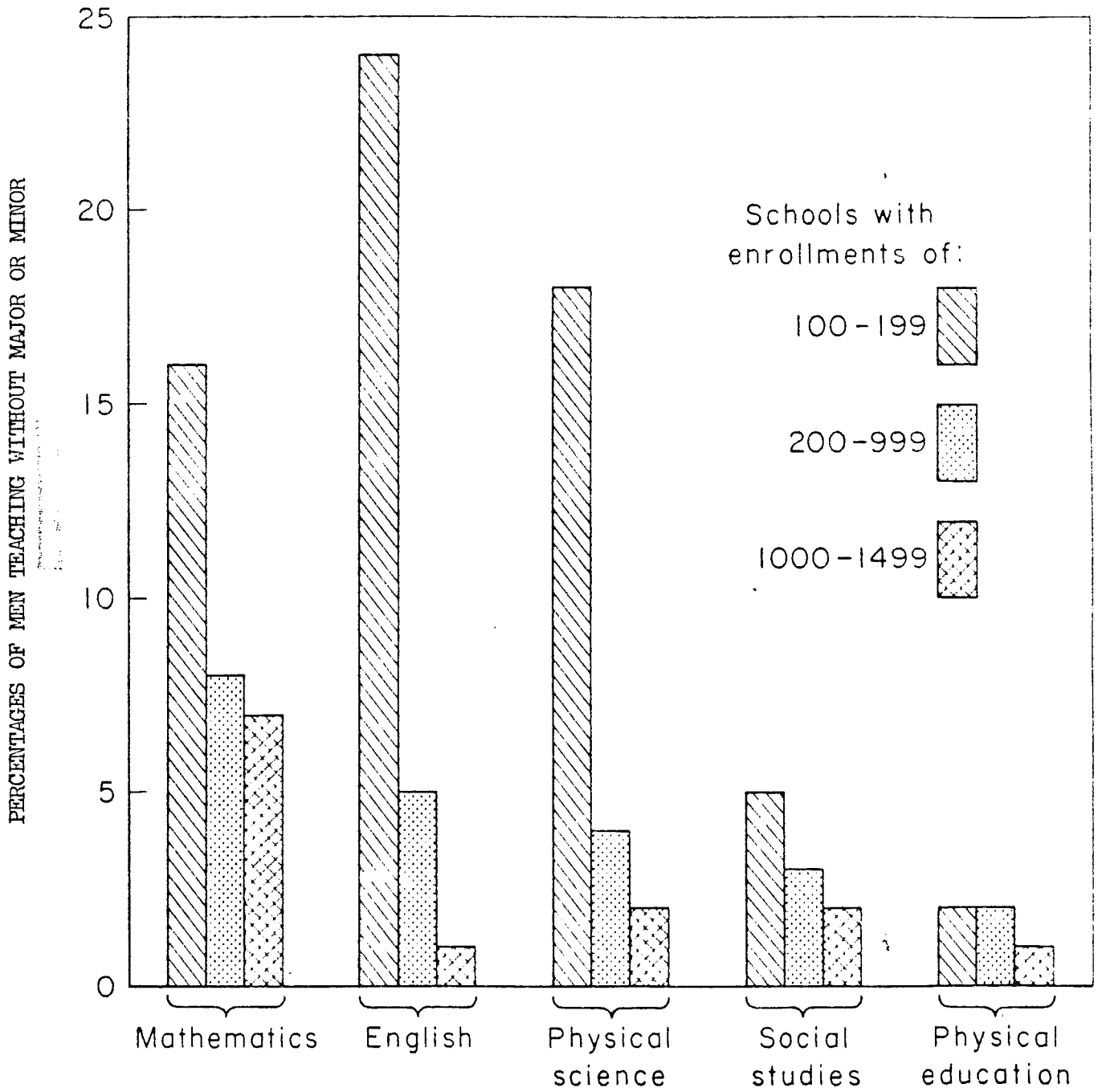
	1957	1958	1959	1960
Mathematics	0.5	0.6	0.7	0.7
English	0.7	0.8	0.8	0.7
Physics	0.5	0.5	0.9	0.8
Home Economics	1.2	1.4	1.3	1.4
Biology	1.7	1.6	1.8	1.4
Social Studies	1.4	1.8	1.6	1.5
Industrial Arts	1.4	1.6	1.6	1.7
Men's Physical Education	2.0	2.2	2.7	2.9

Without exception fewer new teachers were prepared for teaching in mathematics, English, and physics than were assigned to teach those subjects. These clues suggest that a large cumulative shortage is developing in such fields. In the other subjects listed, however, far more teachers were produced with the necessary training than were employed for these assignments.

To get additional evidence about the relative scarcities of particular teaching skills, we asked a sample of secondary schools across the country for information about their teaching staffs. The following figure portrays part of the results -- the percentages of men teaching in each of five fields without either a major or minor in the field. Clearly the schools have more difficulty in getting well-trained teachers for mathematics, English, and physical science classes than for physical education and social studies classes. The smaller schools have more trouble in general than the larger schools, for they must more frequently assign teachers to handle classes in several fields. But the smaller schools have much more trouble making appropriate assignments in the "scarce fields" than in the others.

Such data of course tell us nothing about the quality of the training of those teachers who are assigned to their major or minor fields -- for example, what colleges they attended and what kind of students they were. However, if schools cannot get enough teachers with at least a minor for certain assignments, the schools probably have even more difficulty getting persons trained in those subjects who are good teachers and did superior work at first-rate colleges and universities. Offering higher salaries for the scarce skills would give district officials a chance to pick and choose among applicants possessing the right subject-matter training -- to hire and retain more of the abler teachers with these scarce skills.

The data relate only to a few fields; they do not reveal all the relative shortages (or surpluses), and because they are averages they may not apply to a particular locality. But boards of education and school administrators will know which skills are comparatively hard to obtain in their own schools.



What Lies Ahead?

Relative shortages of teachers in particular fields are likely to grow worse (so long as current salary practices persist). Teachers with the scarce skills are just beginning to realize how attractive non-teaching opportunities have become. Younger people choosing their careers, because they are still mobile, will be affected more than teachers who have already put their roots down. Also, because of the type of technological and social changes that are occurring, the non-teaching demands for training in mathematics, English, and the physical sciences will probably continue to soar. School districts will have three basic choices: (1) to raise salaries across the board sufficiently high to attract the scarce skills they need, (2) to adopt 3-step salary schedules providing increments for scarce kinds of training but not for all teaching skills, or (3) to let the quality of instruction deteriorate where the scarce skills are needed but not provided.

Raising salaries across the board is extremely expensive. Consider a medium-sized community that employs 400 teachers -- 100 in high school, 100 in junior high school, and 200 in elementary school. Suppose the district is having difficulty in hiring enough good mathematics, English, and science teachers -- 30 positions in all -- and it appears that an increase of \$1,000 per year would enable the district to attract and retain enough of these scarce teachers. (This raise would be over and above whatever salary increases ordinarily occur because of inflation or productivity increases in the rest of the economy.) If the district raises salaries by \$1,000 across the board, it raises the total salary bill by \$400,000 per year. In such a community, this implies an increase in the tax rate of 25¢ or 30¢ per \$100 of assessed valuation. The voters are unlikely to accept such a costly charge on top of

other increasing expenses. Instead they will probably tolerate deterioration of the teaching staff in the scarce fields.

If the district introduces a third set of steps in its salary schedule, however, the cost of keeping a good teaching staff in all fields is reasonable. If the \$1,000 increment is offered only to teachers with the scarce types of training, the total salary bill will go up by only \$30,000, perhaps a 2¢ increase in the tax rate. At this price the community can offer high-quality education in all subjects.

To prevent deterioration in particular fields by offering higher salaries in them alone is no more than common sense. If your left front tire needs repair, you put resources into repairing it. You don't spread those resources thinly by putting them into overhauling the entire car. School officials don't put a thin coat of paint over the entire school when the auditorium needs freshening up. We get more from our resources by using them where they are needed most.

Overcoming the Practical Difficulties

As teachers and school administrators will immediately recognize, several practical difficulties would be encountered in departing from conventional salary schedules. The difficulty that educators usually emphasize most is the possible impact on teacher morale. It is asserted over and over that any new kind of salary step would shatter morale, apparently forever.

Despite all the dogmatic pronouncements, this difficulty is probably an illusory one. First, the claim that salary differentials would shatter morale is based upon repeated assertions, not on any systematic compilation

of evidence. Second, a recent study by Chandler and Mathis (Professors of Education at Northwestern University) indicates that school systems with merit pay schemes, which are departures from unified salary schedules, do not have noticeably lower morale than schools with unified schedules. Third, other institutions that employ similar personnel do not have unified salary schedules, yet morale in these institutions cannot be said to suffer from the lack. (The university teacher of Greek will regard it as highly regrettable, but hardly as degrading, that the professor of medicine receives twice as high a salary.) Fourth, the unified salary schedule itself provides for certain kinds of salary differentials, and all we are suggesting is another.

There would be some resistance and disappointment, of course, if such additional salary differentials were introduced. Some teachers would hate to see others get raises that they did not receive. As Mark Twain said, "Most of us can't stand prosperity -- someone else's, that is." Besides, with additional pay differentials there would be fewer or smaller across-the-board salary increases, and many teachers would therefore have to forego some of the increase they might otherwise have had. Those teachers -- the ones whose skills are not relatively scarce -- would naturally resist the introduction of the new schedule. (Removal of tariffs on cloth would be resisted by domestic textile manufacturers, too.) But resistance and disappointment do not mean permanently lowered morale, especially if care is taken in explaining the issues and implementing the new policy. Certainly the ground should be well prepared before making any change. The understanding of the teachers should be particularly sought. It is important for them to understand the allocative function of salary differentials and

realize that other professions have salary differences for types of training and subject-matter specialties. It is perhaps still more important for them to see that the alternative to these pay differences will soon be the deterioration of the school's teaching staff.

Another practical difficulty about having additional salary steps is that they would increase administrative burdens. Without any doubt, the unified schedule simplifies the problems of school administrators -- by eliminating certain choices that would otherwise have to be considered. With an additional set of steps, there would be more salary configurations to be considered and perhaps some hard choices to make. Administrators and boards of education would have to decide which skills are the most difficult for them to recruit. (They can usually name those skills immediately.) They would have to determine the kind and size of the new salary steps. But these decisions are by no means impossible -- and the format of the new schedule need not be complicated. School officials might simply add a footnote to the present schedule specifying the new steps, providing, say, a 15 per cent increment for a major in mathematics and a 10 per cent step for a major in subject X or for a minor in mathematics.

There might be difficulties, particularly in smaller schools, in handling dual assignments, since some teachers have to handle classes in more than one field. If the increments were paid for types of training, however, it would not be necessary to worry about the assignment. A superintendent would not pay extra for a mathematician and then have him teach mostly in physical education, just as a university would not pay extra for a professor of medicine and then assign him most of the time to teach economics.

There would be the problem of adjusting to future changes in the demands for various skills. But further adjustments of these salary steps could be made, not every year to be sure, but when really needed. And, in any event, it is hardly sensible to retain one obsolete salary structure just because a better one might ultimately become obsolete, too.

If we consider the introduction of additional salary differentials in the schools, we can indeed see some practical difficulties ahead. But the fact that there are some difficulties does not foreclose the issue. The question is not whether there are difficulties, but whether the payoffs outweigh the efforts required to achieve them. It is more difficult to provide education through the 12th grade than to stop at the 9th, yet we rightly choose to provide instruction through the full 12 grades. Similarly, it is more difficult to introduce additional salary differentials than to stick with the status quo, yet the change to the new policy may be called for. Boards of education, school administrators, and other citizens need to consider now the adoption of additional salary differentials, seriously weighing the potential gains against the difficulties. As we see it, a 3-step salary schedule will be essential in the coming years if individual districts and the nation as a whole are to provide adequate education at acceptable costs.