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**Working Paper**

## The Design of Schools as Output-Driven Organizations

Working Paper, No. 88

**Provided in Cooperation with:**

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*Suggested Citation:* Coleman, James S. (1993) : The Design of Schools as Output-Driven Organizations, Working Paper, No. 88, The University of Chicago, Center for the Study of the Economy and the State, Chicago, IL

This Version is available at:

<https://hdl.handle.net/10419/262490>

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May 1993

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# **THE DESIGN OF SCHOOLS AS OUTPUT-DRIVEN ORGANIZATIONS**

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April 23, 1993

Prepared for presentation at the Rational Choice Models Seminar held May 25, 1993 at the University of Chicago.

## The Design of Schools as Output-Driven Organizations

In this paper, I want to discuss the design of organizations. The aim of the paper is first to analyze the functioning of a particular type of constructed organization, elementary and secondary schools in the United States -- and then to take some steps toward design of schools as organizations. To begin, I will focus briefly on the theory and practice of formal organizations generally.

### Innovations in Organizations

Max Weber was one of the first to attempt to develop theory for non-primordial, constructed organization. He described such organization as a "rational authority system," and specified its characteristics, with the pure type being the bureaucratic form.

This form, with variations, has been widespread as the paradigmatic form in which the rationalization of society proceeded. However, in recent years, organizational practice has initiated new forms, some of which have little in common with the theory and practice of bureaucratic authority as described by Weber.

One of the first of these was the development of the multidivisional firm, initiated by General Motors in the 1930s, and described by Chandler (1962). This structure gave both more autonomy and accountability to divisions of the firm, by introducing relative autonomy of divisions, along with internal pricing of goods and

services produced and consumed by divisions, making each division in effect a profit center.

Another innovation, one which goes beyond the multidivisional firm, is franchising. Although franchising, which has recently become widespread, takes various forms, they have in common a contractual relation between the central franchising organization and the franchisee (usually a retailer) with a portion of the income going to franchiser and a portion to franchisee.

Some organizations have developed a modus operandi which involves funding of spinoffs by employees who develop a possibly profitable product idea, with the spinoff a joint venture between the parent firm and the person or persons who developed the idea. One of the earliest firms to engage in the activity was 3M of Minneapolis, seeing itself in effect as a central bank and research and development center to finance ideas generated by employees, particularly those engaged in research and development.

Other organizational innovations can be found in the computer hardware and software industries, as well as in genetic engineering firms. The latter involve creative arrangements between university faculty members and biotechnical firms, either independent startups or spinoffs from larger firms.

There is one innovation that has arisen in a quite mature industry, the automobile industry. This innovation, which began with Japanese firms and is being imitated in some American firms, can be described as a reallocation of rights. It has been described by Aoki ( ), Sabel ( ), and others.

The rights that are involved are those having to do with rejecting parts and stopping the production line. In the classical manufacturing organization, the supervisor or foreman in an assembly line may have the right to reject input parts that are out of specification, or may only have the right to request from a higher supervisor in the plant that the parts be rejected. The decision may depend on whether it is possible to work around the defect without shutting down the assembly line. If it is a defect that can be repaired, a tag is put on the car, and at the end of the line, all cars with tags on them are shunted to a repair facility. Whatever the decision, the right to make that decision is never in the hands of the assembly line worker. It is in the hands of either the line foreman, or a superior of the line foreman.

In the Japanese auto assembly line, the rights are allocated somewhat differently. First, many of the rights and responsibilities that would ordinarily be held by the line foreman are held instead by a collectivity consisting of the members of the line (called a Quality Circle (QC)). The foreman is in most cases altogether missing, the position being absent from the firm's organization. This specific right, the right to reject out-of-specification inputs, is held by the individual worker on the line who must use these parts in accomplishing the task. The right includes the right to shut down the line. Execution of the right, that is, rejecting out-of-specification parts, is made more likely by the fact that the next worker who handles that component of the automobile has the right to reject the component for any out-of-specification parts. Thus the right to reject input parts is accompanied by the responsibility for the output being in specification. The worker thus has an incentive not to accept input parts that

are out of specification as well as to insure that labor input does not result in an out-of-specification output.

The general character of the incentives that are introduced by this structure of rights is fairly obvious. It is an incentive on the part of the worker to carefully inspect input parts and to be careful about possible errors introduced during processing. The set of rights that are involved in a production process like that involved in building automobiles is a string of rights which mirrors the production process itself. The workers who receive worker A's output have the right to reject worker A's production, and thus to affect A's pay, which is partly based on bonuses (and depending on other aspects of the organization of work, possibly also to affect the pay of other in the same workergroup as A). The holder of the ultimate right is outside the organization altogether, that is, the shipper, the dealer, and finally, the customer, each of whom can reject the finished product.

An additional right that accompanies these rights of workers is the right to extra pay (paid as a bonus) depending on quality and quantity of output by the workgroup. As much as a third of a worker's pay may be in the form of a bonus.

The allocation of rights that I have just described produces what I have elsewhere (Coleman, 1990, chapter 16) called "backward policing," that is, a policing of the quality of the product that reverberates backwards step by step through the production process of the organization. The feedback process from the production of a defect to the discovery of the defect and then back to the producer of the defect is an extremely short loop. This contrasts with the long loop of the feedback process

that is characteristic of the classical hierarchical structure of rights that could be described as downward policing. Figure 1 shows diagrammatically the two structures.

[Figure 1]

There is one important aspect of the allocation of rights that I have just described. The Quality Circle, constituting the members of an assembly or sub-assembly line, has rights as a group which give it collective authority over its members, replacing the authority of the line foreman or supervisor. This, together with the fact that members' bonuses are dependent on the group's quality-quantity productivity, means that norms develop in the group that are consistent with and reinforce the organization's goals. For this to occur, it is important that the group not be too large, and the Quality Circles typically have 8-12 members.<sup>1</sup>

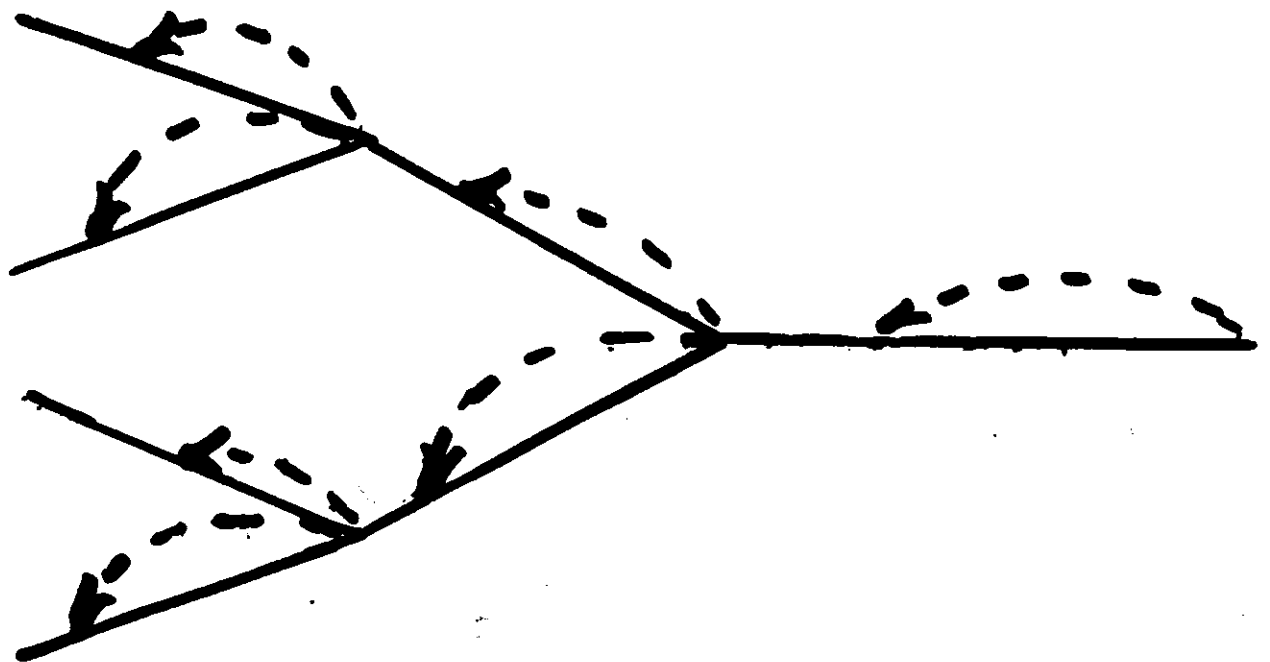
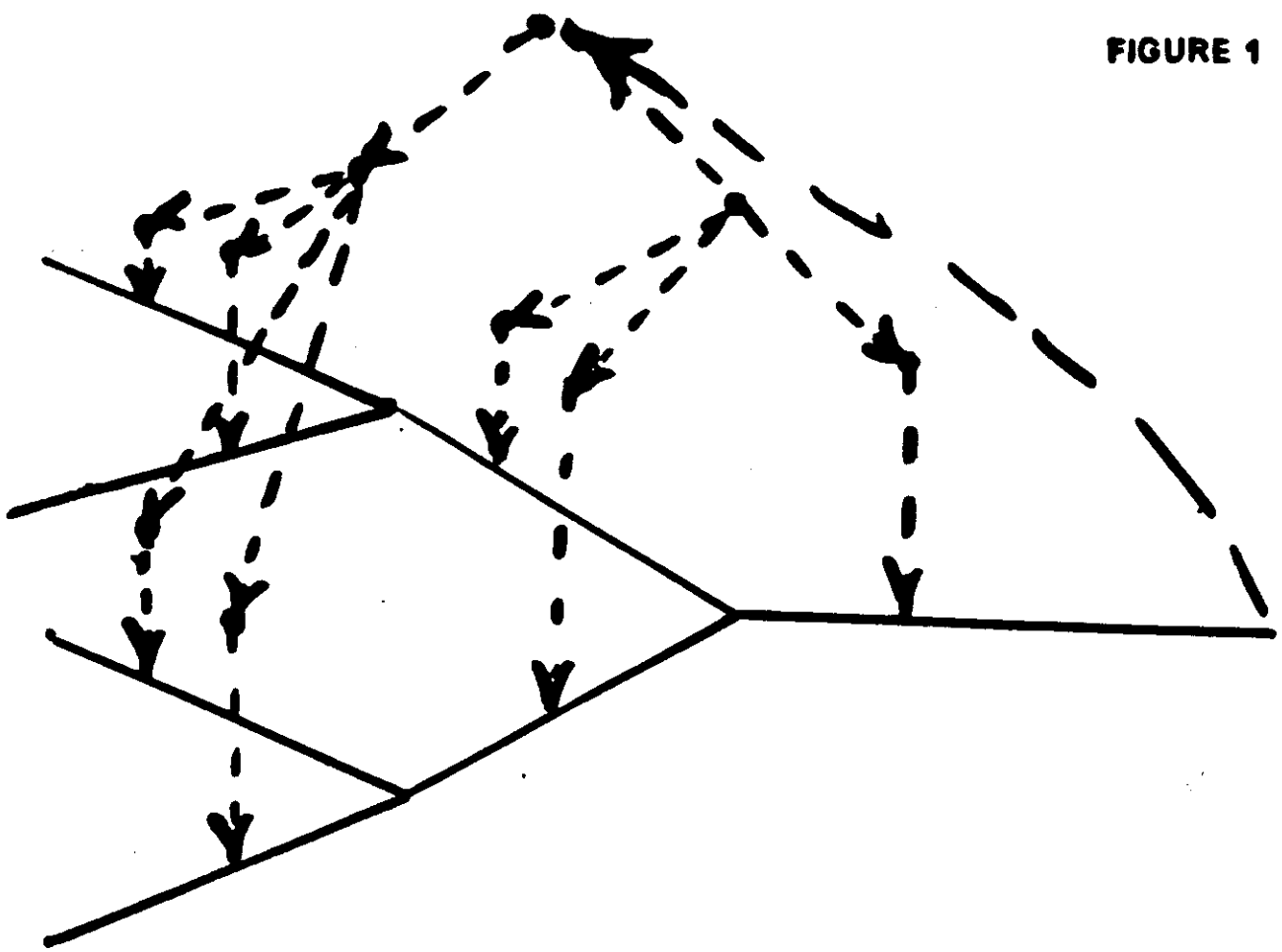
All the innovations that I have described can be seen as attempts to overcome the incentive problems that arise in a centrally-directed, hierarchically-structured organization. By making benefits (income, autonomy, responsibility) contingent on the quality and quantity of what is produced, the organization creates a direct link between effort and reward. In the multidivisional firm, the link is at the divisional level, in franchising it is at the franchise owner level, in spinoff joint ventures, it is at the entrepreneur level. In backward policing, it is at the workgroup (QC) level.

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<sup>1</sup>One worker's cooperative, planting trees under contract to the U.S. Forest Service, organized work in teams of 12 members who monitored one another's work (Mackie, 1991). They concluded that for purposes of workgroup monitoring and maintenance of productivity-oriented norms, twelve members was an optimum size for the workgroup.



FIGURE 1



At least in this last case, and very likely in the others as well, the organizational innovation does more than overcome the incentive problem of hierarchical organizations (as, for example, payment according to piecework pay rates would do). The innovation creates a social group in whose interest it is to encourage high effort and careful work on the part of the members. Social norms come into being to reinforce organizational goals. These norms go beyond overcoming incentive problems of hierarchical organization. They provide extra incentives of their own, because each member's work benefits all. And this comes about because rights which in the hierarchical organization are held centrally and delegated vertically are instead given to subgroups -- divisions, franchisees, quality circles.

Incentive problems arise in any centrally-managed and directed system. The collapse of state socialism in Eastern Europe and the Soviet Union was principally due to failure to solve these incentive problems. The continuation of state socialism in China results from China's capacity to solve, at least for the present, the incentive problems through introduction of a market.

The different allocations of rights which exist in these organizational innovations involve in effect a reconstitution of the firm. The Weberian bureaucracy can be described as "authority-driven"; these innovations create, to differing degrees, organizations that are "output-driven." The degree to which the organization as a whole can be said to be output driven depends on the degree to which the external criterion on which the rewards to a part of the organization are contingent is

transmitted to sub-parts within. This occurs by explicit design in backward policing, and may or may not occur in the other forms.

### School Design

From the organizational innovations that I have discussed, I want to take two elements that can be useful for the redesign of schools. The first of these elements is the replacement of authority-driven organization by output-driven organization. I will make use of this in its most extensive form, in which the output-driven principle is applied not merely for the organization as a whole but internally for sub-parts of the organization - as shown in the chart.

The second element I want to take from these innovations is the explicit creation of social capital in the organizational design. This is most evident in the quality circles seen in Japanese automobile manufacturing firms, although it is present to varying degrees in the other innovations I described. It is brought about primarily by the allocation of rights and obligations not merely to individual positions in the organization, but to subparts of the organization -- which themselves are not hierarchically organized from without (though they may create such a structure from within). These subparts must be small enough and with dense enough interaction that they can be norm-generating bodies. The norms, of course, are not imposed by the central authority. Rather, if the rights are allocated appropriately, norms will arise that support and reinforce the goals of the organization. If the rights are allocated inappropriately, the norms that arise will act against the organizational goals.

## Diagnostics of American education

With these organizational innovations in mind, I want now to turn to the question of how schools might be modified to improve their functioning. I will first give a brief diagnosis of American education.

First it is important to recognize that there are a number of dimensions along which children develop during their formative years -- and thus a number of dimensions to the goals which schools have. There is, however, a justification for laying out a design for schools which focusses on one goal alone. When an educational system (including the full social environment of the child's family, school, community, popular culture) is seriously deficient with respect to an important goal, then it is reasonable to carry out designs which attend to that goal alone. Inertia and countervailing forces will serve as counterweights when any such design is implemented.

Educational systems in the United States are seriously deficient in academic achievement. Relative to students in other countries of the developed world, American students score at or near the bottom on standardized tests (Husén, 19\_\_,

). Measures of performance both before and after the test score decline of the 1970s show the extraordinary deficiencies with which American children leave the system of elementary and secondary education. The deficiencies are throughout the distribution of performance. At the lower levels, the ineffectiveness of inner city schools is well known, and the weak performance of the children who attend them is extensively documented. What is not recognized, however, is that the weak performance is found throughout the distribution. As one investigator writes, "the gap

between American high school seniors in middle class suburbs and their counterparts in many northern European countries and Japan is larger than the two to three grade level equivalent gap between whites and blacks in the U.S." (Bishop, p 1, 2, using data from NAEP 1988b, IAEEA, 1987).

These low levels of performance of American students at the high end of the achievement distribution are ordinarily forgotten. But the well-known SAT test score decline of the 1970s and 1980s shows the greatest loss at the top end of the distribution, (Herrnstein and ). In Minneapolis, Minnesota (a state which scores near the top of American states on standardized tests), performance in mathematics in 20 5th grade classrooms was compared with that in 20 classrooms in Taipei, Taiwan and 20 in Sendai, Japan. The average for the highest-performing classroom in Minneapolis was below that for the lowest-performing classroom in Sendai, and below that for 19 of the 20 in Taipei. The performance of Americans in foreign languages is miserable compared to that in almost any other developed country. In mathematics, over half of the new assistant professor appointments in American college and university mathematics departments are persons born and educated at least through high school in some country other than the United States. Our scientific and technological achievements depend heavily on a "brain drain" from other countries to the United States. If another country became a more attractive destination for these immigrants, so that we had to depend on our own system of bringing the young into adulthood, we could not maintain current technological levels, much less innovate technologically.

This low level of performance in American schools is reinforced by another aspect of most schools: in middle schools and high schools, across the socio-economic spectrum and among all racial and ethnic groups, the informal norms that develop among students are not norms that extol achievement, but are norms that scorn effort, and reward scholastic achievement only when it appears to be done without effort.

This need not be true, of course, and in fact there are some high schools in which it is not true. There are even more schools in other countries where it is not true. It is a mark of incorrect organizational design that such norms exist in schools.

The sources of the low effort put into high achievement are several, but one is important: the lack of well-publicized external criteria of performance from which meaningful consequences flow. In the absence of such criteria, there can come to be an implicit compact to reduce the strain imposed by high standards (including extensive homework), and parents unable to enforce extensive homework. The implicit compact can result in quite low levels of performance. An example can be seen in an incident reported by Arthur Powell in a high school he visited:

"Students were given time [in class] to read The Scarlet Letter, The Red Badge of Courage, Huckleberry Finn, and The Great Gatsby because they would not read the books if they were assigned as homework. Parents had complained that such homework was excessive. Pressure from them might even bring the teaching of the books to a halt ... (as one teacher put it) "If you can't get them to read at home, you

do the next best thing. It has to be done .... I'm trying to be optimistic and say we're building up their expectations in school." (Powell, Farrar, and Cohen, 1985, p. 81).

Theodore Sizer reports the implicit compact more directly in describing one teacher's class:

"He signaled to the students what the minima, the few questions for a test, were; all tenth and eleventh-graders could master these with absurdly little difficulty. The youngsters picked up the signal and kept their part of the bargain by being friendly and orderly. They did not push Brady, and he did not push them .... Brady's room was quiet, and his students liked him. No wonder he had the esteem of the principal who valued orderliness and good rapport between students and staff. Brady and his class had agreement all right, agreement that reduced the efforts of both student and teacher to an irreducible and pathetic minimum." (Sizer, 1984, p. 156)

How can a teacher gain the friendly and orderly classroom climate that Brady has and at the same time the kind of effort and involvement that generates high achievement? The teacher seems caught in a bind: Either impose high standards and sacrifice the good climate and risk a rebellion or reduce the standards and sacrifice achievement. One of the few ways out, in the absence of strong parental demands that hold a rebellion in check, is for the teacher to be freed from the task of setting the standards. Then the teacher and the class can be engaged in a common task, that of beating the externally-established standards. The standards may be those of an external test, or those imposed by a contest with students in another school, or perhaps in a different way. But so long as the standards are out of the teacher's

control, the teacher and students have a common interest which generates both the effort needed for achievement and a positive climate.

There is an interesting "natural experiment" involving the absence of any external demands whatsoever toward school learning. An Englishman, A. S. Neill, established a boarding school, Summerhill, in which no external demands are made upon the children; no classes, no assignments, no school. According to accounts of Summerhill by Neill and by others, Summerhill is a very pleasant place, one in which the children manage their own affairs individually and collectively, but as Neill himself put it, one in which "the children of Summerhill are not much interested in book learning."

There is one exception to the lack of external demands at Summerhill. When the children reach their upper teens, they see that in order to manage in the outside world, they will need a school leaving certificate, one which requires passing a set of externally-imposed examinations. Thus in their last year at Summerhill, they spend a considerable amount of time studying, in order to pass these examinations. This last-year studying is the exception that proves the rule: When an external criterion is imposed, efforts toward learning begin.

It is interesting to point out also that a much cruder and more partial natural experiment can be found in the comparison between American and Japanese schools. In Japanese schools, where there are strong externally-imposed standards, the achievement is much higher than that in American schools, but there is lower satisfaction with the schools, and the children and parents are less satisfied with the



child's performance, than is true for American schools. This is sometimes seen as paradoxical: American children learning much less; but they and their parents more content with their educational performance. But as in Brady's classroom described bySizer, American children are content, because they are satisfying the demands made on them, demands which are depressed by the majority's unwillingness to meet stronger demands.

Young people have a time-and-attention budget, just as adults do. In that budget, the time spent on homework has declined to about 3½ hours per week, half of what it was in the 1960s before the SAT test score decline. Time spent in sports, in part-time jobs, in TV viewing, in consumption of popular culture with friends all compete with homework for the teen-ager's time. While the time on homework has declined, the time spent in part-time jobs (about 10 hours on average for high school seniors) and in television watching has increased. Television, at 20 hours per week, is twice to three times that in other OECD countries. It is clear that since the 1960s, other activities, such as watching television and earning money at part-time jobs, have come to occupy a more important place in the average teen-ager's life, and schoolwork has come to occupy a less important place. Parents, meanwhile, appear unable to prevent this.

Schools as authority-driven and school as output-driven:

The organizational innovations that were described earlier constitute a change from an authority-driven organization to one that is output-driven. Schools as they exist are not pure forms of either of these. Most schools, as any teacher knows, are

hierarchical authority systems, with the building principal the immediate authority. Principals in turn are under the school district superintendent as the central authority, often with little discretionary authority over resources, over hiring of teachers, and other decisions. The structure of schools follows that of the bureaucratic authority-driven organization quite well.

At the same time, there are various examples, some the result of intentional design but others not, which show the power of output demands in education. One of these is the importance of college entrance requirements for high school courses taken. College entrance requirements in the United States have traditionally been a requirement for 32 "Carnegie units" of high school courses, including specific requirements, such as two years of a foreign language. These entrance requirements have dictated the "college prep" curriculum in high schools. In the 1960s and 70s, with the onslaught of the youth revolt and the civil rights movement, colleges liberalized their entrance requirements. Most elite colleges dropped the foreign-language entrance requirement. A consequence of this was that foreign language course-taking in high school dropped precipitously. Only in the late 1980s, as colleges reinstated entrance requirements, has course-taking in foreign languages revived. Note an additional point: This is an external demand, which imposes requirements not upon output but upon actions. By "passing courses," the student meets the demand, and the teacher is free to determine the criteria for passing. Even though the Carnegie-unit demand has this crucial flaw, the example of foreign languages illustrates how relaxation of a demand has its effects.

There are other examples. An interesting one is handwriting. High schools, as the recipients of the products of middle schools, set the external requirements for middle schools, and middle schools set the external requirements for elementary schools. When, in postwar America, high school teachers no longer required good handwriting, middle school teachers did not either; and when this occurred, elementary school teachers stopped teaching children to have good handwriting.

As these examples indicate, educational systems are in part output-driven, despite their hierarchical authority structure. In fact, containing these two conflicting modes of organization, schools create an untenable situation for teachers. They are under the constraint to meet certain output demands, yet are subject to authority which eliminates their autonomy in meeting these demands. However, as I will suggest, the character of the output demands is defective, which means that the system reverts to an authority-driven system, and the teachers set flexible internal standards -- as in Mr. Brady's class -- to make the situation tolerable.

The absence of external standards for actual performance has several negative consequences. It puts teachers in the position of establishing the requirements, by deciding what levels of performance will be necessary in order to receive a given grade. By placing this task upon the teacher, the school puts the teacher in two roles with conflicting interests: as the person who sets the standards, and as the person who tries to get students to meet the standards. This creates an ambivalent relation between teacher and students, quite different from that between coach and performers. The coach can devote undivided efforts to improving the performance of

the team members; the teacher's efforts must be on two fronts: to improving students' performance, and to struggling with students over the level of performance required for a given grade. This can poison the student-teacher relation, voiding the effort on the first front. It is also an important element in generating the norms among students to restrict output. Students would have no reason to develop such anti-achievement norms if the standards used to measure performance were not under the teacher's control.

Another negative consequence of the absence of external standards is that it creates an incentive for a student to take easy courses. A student's grade point average (GPA) creates a rank in class, which is well-known by students and widely used for college admission. But a GPA can be augmented by taking easy courses, with less effort and greater certainty than by performing well in difficult courses. Various devices have been introduced to signal to colleges that grades are based on hard or easy courses, but none of this would be necessary if the rank in class were based not on teacher-established standards in specific courses, but on externally-established standards in specific areas of performance.

A third defect of internally-established standards is that they introduce noise into the information the receiving institution (further education or employer) gets from the school about the student's performance. Employers seldom use the information at all, and colleges augment rank in class by scores on the SAT or ACT test, and sometimes by a ranking of the high school itself. None of this would be necessary if standards were externally set rather than set internally.

A major reason for schools' use of internal standards of achievement rather than externally-established ones is the great disparities between performance of students from different backgrounds and with different preparation. The use of internal standards is clearly a defective way of addressing this problem; I shall show later another method of doing so that has none of these defects.

### Definitions

In approaching the design of schools as organizations, a number of concepts will be useful. While I have already used some of these concepts, it is useful to list them and give brief definitions.

1. **Output-driven:** An organizational form in which the rewards and punishments for performance in productive activity come from the recipient of the product.  
Applied to intermediate products within the organization, this means that the recipient of the intermediate product has the right to monitor the quality of that product, and thus to determine the rewards and punishments for the part of the organization from which it receives intermediate products -- and in turn the obligation to satisfy the requirements that its own products must meet -- as monitored by the recipients of its products.
2. **Authority-driven:** An organizational form in which the rewards and punishments for performance in productive activity come from the central authority in a hierarchical structure, through an immediate supervisor.
3. **External standards:** Standards that are set outside the organization, ordinarily by the recipient of the product of the organization.

4. **Internal standards:** Standards for performance of organization members set within the organization.
5. **Stages of schooling:** elementary school (grades 1-4; ages 6-9), middle school (grades 5-8; ages 10-13) high school (grades 9-12; ages 14-17).
6. **Value added or performance gain:** These two terms will be used interchangeably. They mean the difference in the performance level at the end of one stage of schooling and the performance level at the end of the prior stage. The terms are also used to refer to yearly differences in performance levels.
7. **Rights allocation:** The allocation of rights in the organization by the central authority to positions in or subdivisions of the organization.
8. **Incentive:** Any source of motivation to apply effort toward a goal. Here the term is applied to teachers, students, and parents.
9. **Informal norms:** This term is used to apply to norms that arise within an organization, held by all or some of its members. The norms may be facilitated through structures established by design, or they be unanticipated and unintended by the organization's designer. Informal norms held by the teachers in a school and informal norms held by students in the school are discussed separately.
10. **Social capital:** This term refers to the informal social relations, primordial institutions (families, religious groups), and other informal institutions that exist in the environments of the children in a school,) insofar as they can serve to

augment the education of the children. It is also used to refer to social relations and norms that arise spontaneously within a constructed organization, when these augment the organization's goals.

11. **School:** A set of 4-16 non-specialist teachers with primary responsibility for a set of children at elementary, middle, or high school levels. In addition to the teachers, the school includes a building and a building custodian.
12. **Specialist:** This term refers to a teacher, who, under contract with non-specialist teachers in schools, teaches or coaches students from more than one school in non-core special areas. These include music, drama, other performing arts, advanced topics in mathematics, sciences, sports, technical skills, and other areas.

### Working backwards

In the design of an output-driven system, it is necessary to begin at the end and work backwards. The necessity arises from the fact that it is the standards at the final output which, properly employed, provide the motive force that reverberates back through each of the earlier stages to energize and focus actions. What is necessary, then, is a reward for performance at the end of the process of elementary and secondary education. It cannot, however, be a reward which comes only to teachers, or only to students, or only to parents. It is clear that there are three parties whose actions are directly relevant to achievement: the child, the parent, and the teacher. High achievement requires that each of these three parties be motivated to bring it about.

There are several requirements that must be met by the evaluation system on the basis of which teachers, students, and parents are rewarded.

1. The standards must be externally-designed, by those parties that will be the institutions receiving the "graduates" of the school.

Comment: For the high school, there is such a test for college admission, the SAT test and the ACT test. There are no such tests for high school graduates who will enter other institutions. However, for sports played in high school that are also collegiate sports there are good evaluation systems. These result from the extensive interscholastic competition which allows high school students to exhibit their competence. In areas where interscholastic debate is widespread, the same is true to a lesser extent for debaters. In those states which have statewide interscholastic competition in music, drama, and other areas, there is the basis for such an evaluation system in these areas as well. Advanced Placement tests provide a starting point for such evaluation in particular academic areas.

There are international "olympics" at high school level in some specialized technical areas, in which students from some countries (not the United States) participate. There is also an academic olympics at least in fields of mathematics, in which some countries (Hungary and Poland, for example) participate. Thus in many specialized areas, there already exists the basis for externally-designed performance tests.

There exists little basis for externally-designed standards for the end of middle school and the end of elementary school. Following the logic of output-driven



organization, and more specifically backward policing, the design should come from, or at least be extensively informed by, teachers at the next level: high school teachers for the tests at end of middle school, and middle school teachers for the tests at end of elementary school. These tests, however, can hardly be designed without knowledge of what the criteria at end of high school will be.

2. The system must evaluate not "basic abilities," but achievement.

Comment: The SAT and ACT tests, currently used in the United States for college admission, fail this criterion. From the outset, the SAT test was designed to be "curriculum-free," and students were told that it is not possible to study for the SAT. It is, in fact, possible to increase one's performance on the SAT test; there are commercial organizations which provide courses which do just that. But the fiction was strongly maintained by the SAT test-makers at Educational Testing Service, (which constructs the SAT) until it lost a court case in which one such organization proved its claim to be able to improve performance substantially.

One original aim of the SAT was to give students from weaker high schools the same chance to score a good grade as students from stronger high schools. The effect, however (in contrast to English O- and A- levels, French Baccalaureate, the German Matura) was to deprive the SAT of any motivating power toward achievement. Note that the SAT and ACT tests, in transmitting the notion that what is tested is immutable, are less egalitarian than a test which is explicitly tied to curriculum, because it creates the belief that the score measures one's self, fixed and immutable, relative to others.

3. The system must evaluate the performance level, but also the performance gains over the period between test administrations (a year or a 4-year school).

Comment: If an evaluation provides rewards only for level of achievement, there are at least two negative consequences. First, it leads only to interpersonal comparison (rather than to comparison with the students' own prior performance), which tends to differentially motivate persons who are at different points in the distribution of achievement. Only those at the high end of the distribution are highly motivated. Second, it can be seen as unfair to teachers, parents, and students. If we accept that different children have different abilities, then to measure all against a single standard of performance is not to have a level playing field: different abilities give, in effect, differentially efficient equipment to students, parents, and teachers, to reach the same goal.

But if an evaluation provides rewards only for gains in achievement, then there are at least two negative consequences. One is that this creates a moral hazard: gains in achievement can be brought about not only by high final levels of achievement, but also by low initial levels of achievement. Thus this creates a motivation to have low initial scores as well as a motivation to have high final scores. Second, a system of evaluation with rewards only for gains in achievement lacks the authenticity that one having rewards for level of achievement automatically carries. Thus it would lack the legitimacy necessary for a stable evaluation system.

Note that not only do the evaluations used in the United States, SAT and ACT, fail this criterion, but also the Baccalaureate, Matura, and A- levels fail it as well.

Each measures level of performance, and thus serves its motivating function only for high performers; there is no measure of gain in performance.

4. The evaluation must provide rewards that motivate teachers, parents, and students.

Comment: Certain evaluation systems, such as that in the Japanese and Hungarian systems, and to a lesser extent, those in various European countries, meet this criterion, despite failing others. The Hungarian system does this through contests, local, regional, national, and international. Teachers gain prestige and the opportunity to move to a more prestigious school by having high-performing students, just as coaches do in the United States. Students and parents are motivated to win the prize. The defect, of course, is that the effectiveness of this reward differs greatly at different points in the distribution of performance. It is most effective for high achievers, and for teachers and parents of high achievers.

Teachers can be motivated by pay, by career opportunities, and by autonomy in their jobs. Students and parents can be motivated by various benefits to be discussed, and also by recognition for doing well; but recognition for doing well academically is not automatic.

Yet recognition depends on conditions under the control of educational policy. For example, schools now have informal rankings in parents' and teachers' minds in terms of the level of performance of students. This is reinforced by the reporting of standardized test scores in local newspapers. But if the year-to-year gains in performance (for example, gains in percentile position or standard score) were

reported, there would be a shift in the rankings, as a consequence of publication of the gain scores.

### Possible designs

There are in the designs that I will lay out, six elements that are central, each of which is not present in the design of current schools for American children.

1. Externally-imposed standards as the basis for all evaluations of student performance.

[Figure 2-1]

2. Evaluations based on two measures: level of performance, and performance gain or value added.

[Figure 2-2]

3. Yearly rewards to teachers, students, and parents for level of performance and performance gain.

[Figure 2-3]

4. Using the final output criteria (the externally-imposed standards) as the starting point for designing evaluations at each stage of the education of a child, creating a system with short feedback loops.

[Figure 2-4]

5. Allocation of rights and responsibilities not only to individuals, but also to groups of teachers, groups of students, and groups of parents, to encourage the development of social capital, that is, informal norms that support educational goals.

1



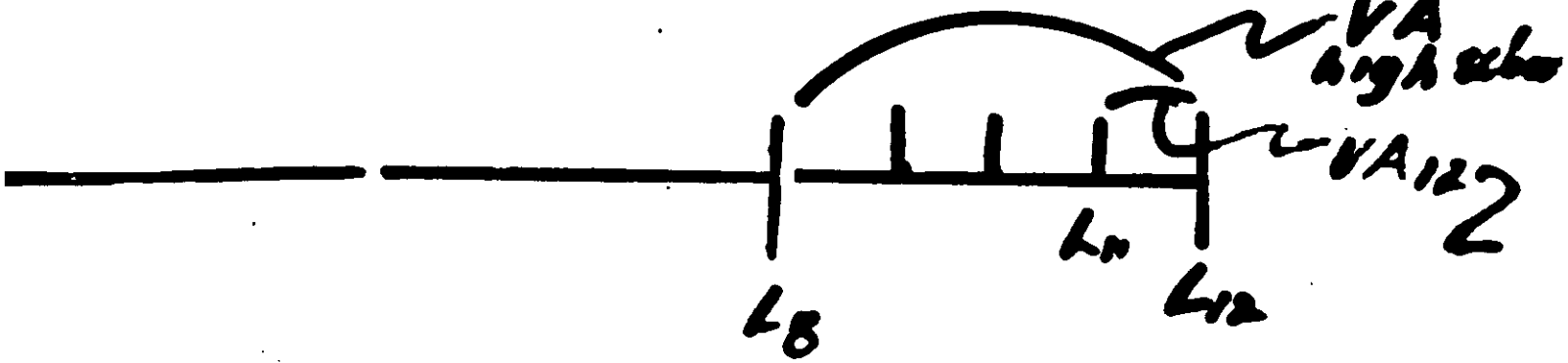
VA  
high school

VA12

$L_8$

$L_n$

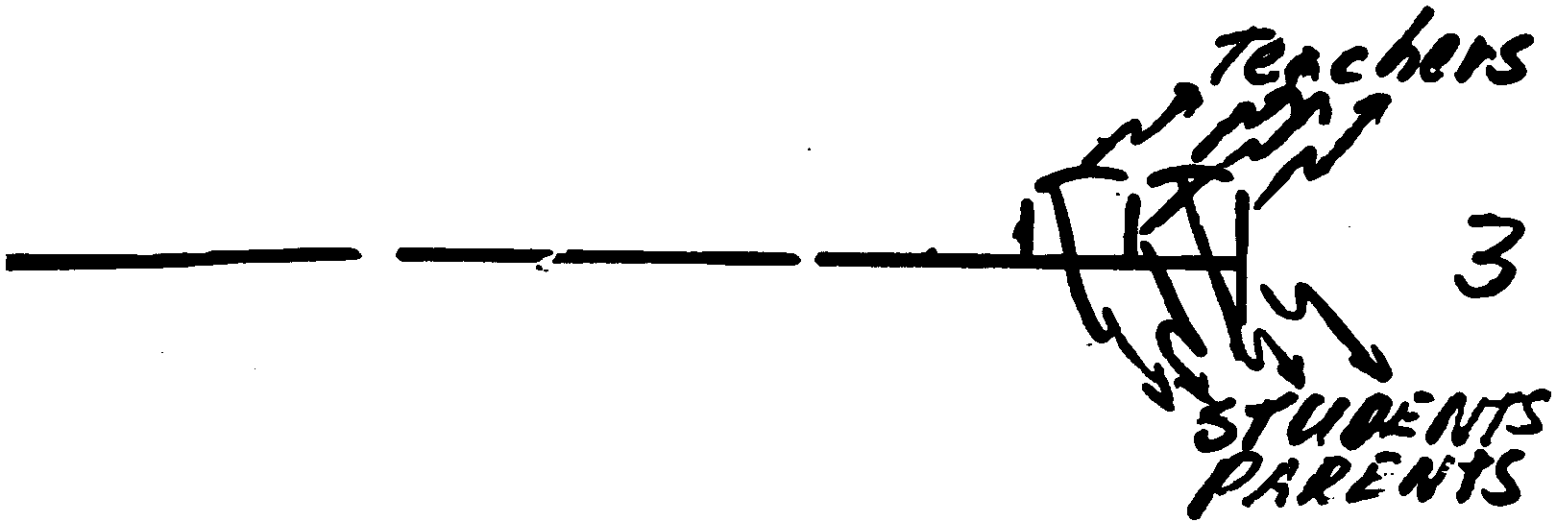
$L_{12}$



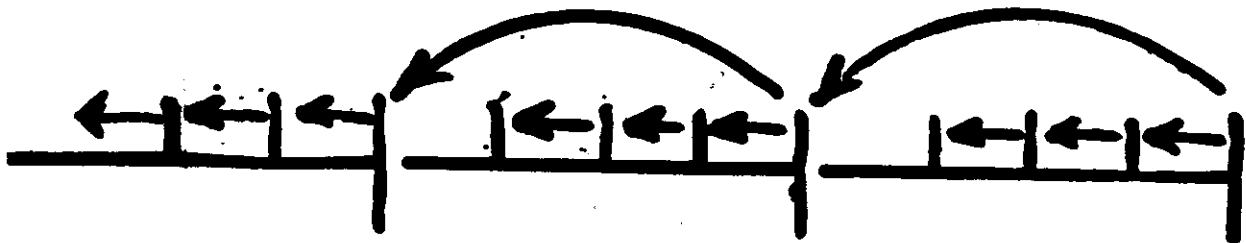
Teachers

3

STUDENTS  
PARENTS



4



[Figure 2-5]

6. The use of a core of academic achievement plus an area of specialized performance (which may be academic, but need not be) as the performance criteria.

[Figure 2-6]

With these as analytical points, it is useful to describe possible organizational designs.

#### Design 1

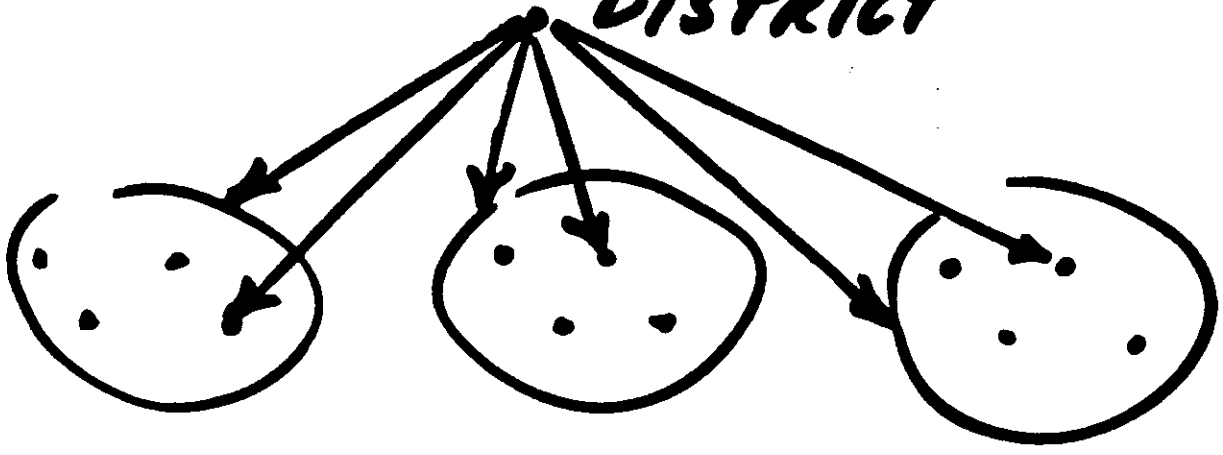
1. At the end of high school, each student takes an externally-designed examination in academic subjects. A great deal of experience exists for this examination. The International Baccalaureate exists, and in most European countries, there are examples of academic achievement tests for a high school diploma.

Each student would take a second test, in topics ranging from advanced mathematics to performing arts to technical skills to athletics. The student upon leaving high school would have a portfolio consisting of scores on each subject in the academic test, plus performance evidence in the specialized field, plus attendance and discipline. This portfolio is the graduate's credential for employers or higher education.

[Figure 3-1]

2. A student receives a grade in each academic subject at the end of each year of each school, based on an externally-designed examination. Two grades are given, one being the level of performance on the test, and the other being the value added,

**SCHOOL DISTRICT**



5

**ACADEMIC CORE**

**SPECIALIZED**

6

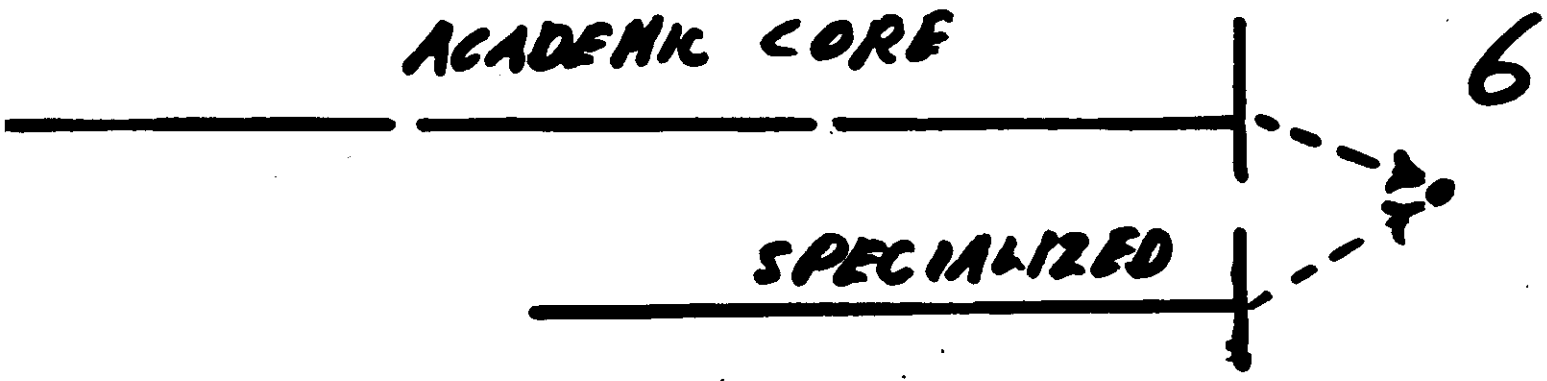
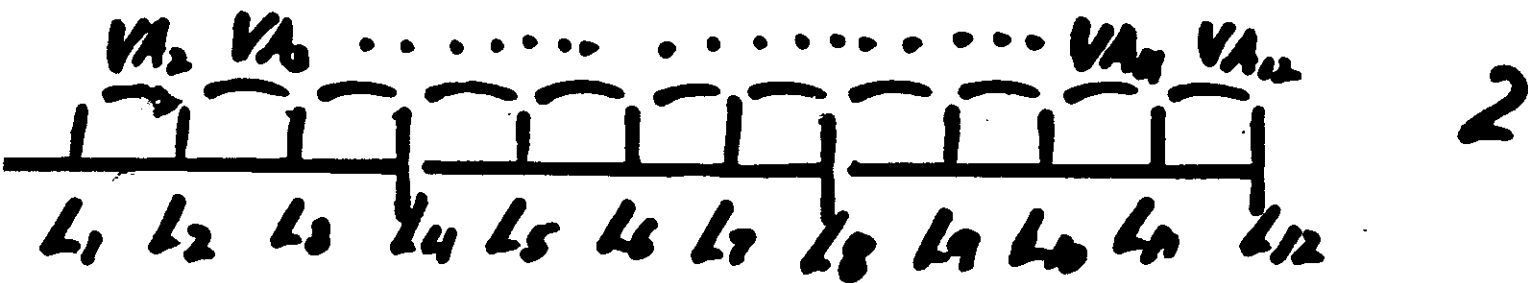
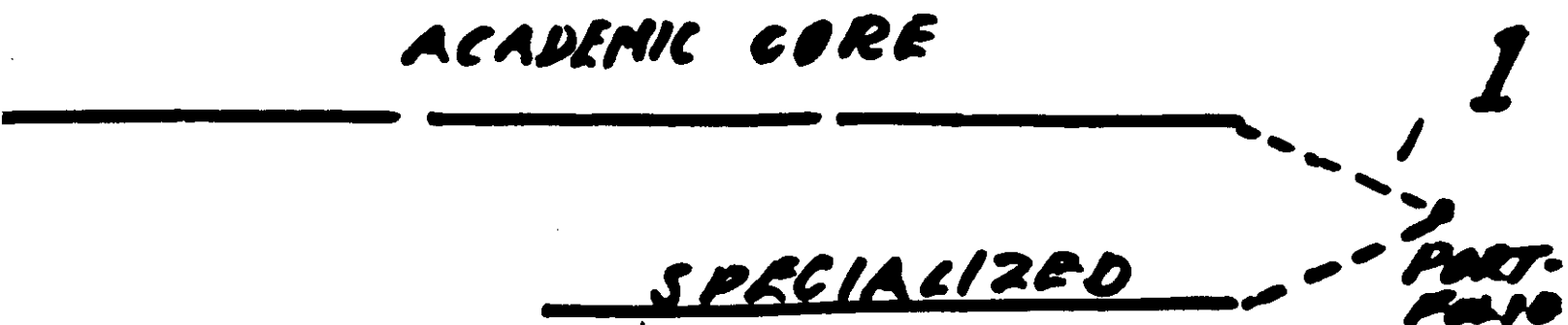
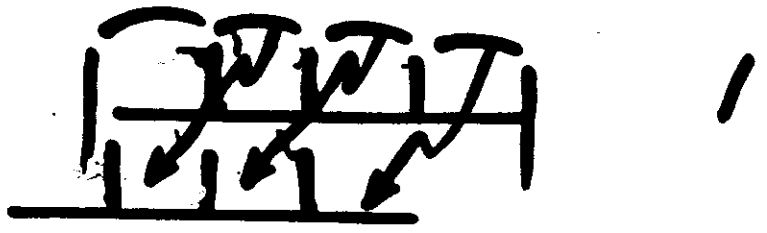


Figure 3

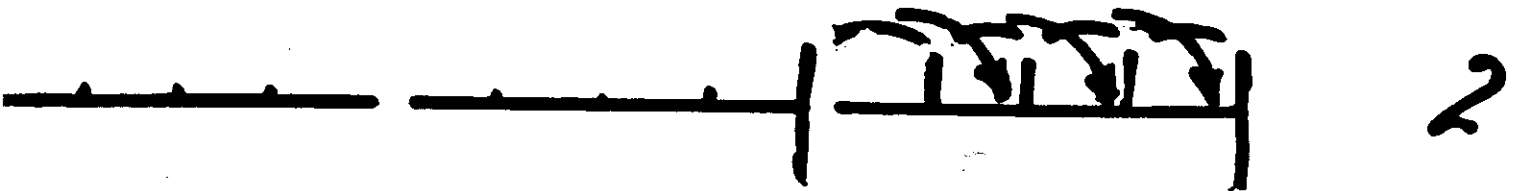




TEACHERS



STUDENTS PARENTS



or performance gain, that is the difference between the test score at the end of the previous year and the test score at the end of the current year.

[Figure 3-2]

3. Value added at each of three levels of school (elementary, middle, and secondary) is determined by the difference in performance between the end of the preceding level and the end of this level in academic subjects. Value added is determined separately for each child, but is a combined measurement across subject matters in the academic test given at end of each school.

4. The test at the end of each level is externally designed and externally administered. Teachers have control over preparation of their students, but not over content of the examination their students will take, nor the conditions under which they take it. The areas of achievement covered by the examinations are made public to facilitate preparation for the examinations, as is true for the European end-of-secondary-school examinations.

5. The group of teachers at each of the three school levels are rewarded each year with bonuses for the value added for each of the children who "graduate" from their responsibility, having been under that responsibility for four years.

[Figure 4-1]

6. The group of teachers at each of the three school levels are rewarded each year with autonomy in teaching, including choice of the number of students they will have responsibility for, with the reward based on the average level of achievement of

children for whom they have been responsible graduating over the past two years.

This level of achievement determines the rank of the school for admissions purposes.

7. A child and parents are rewarded for value added at a given level, with free tuition for postsecondary education, or for postsecondary vocational-technical training. The amount of free tuition depends on the amount of value added.

8. A child's level of performance at the end of a 4-year stage of schooling determines the schools at the next stage to which he or she can apply. The school, i.e., the group of teachers, determines the number of students they will accept (a decision which will affect their potential bonus, which depends upon total -- not average -- value added). Teachers cannot choose which students they will have. Students' priority in admission, when a school is oversubscribed, is determined by their level of achievement on the examination just taken. The group of teachers which constitutes a high school must contract with specialist teachers for the specialized area of each student in their care. Specialist teachers will teach, or coach, students from more than one school.

9. The cohort of students at a given age level in a school is rewarded each year as a group for the total value added for the group for that year. The reward, given each year on the basis of that year's value added, consists of a certificate valuable for purchasing school resources, (for example, computers, audio-visual or other technology aids or field trips) to be used by that cohort during its tenure in the school, and then left with the school when the cohort graduates. The decision about how to spend the certificate is made jointly by students, parents, and teachers.

[Figure 4-2]

10. The group of teachers responsible for a given level of students (four years) should be between 4 and 16. This is the group who are rewarded together (see 5 and 6) for joint performance. There is no principal. Decisions are made collectively by the group of teachers who constitute the school.

There may be more than one school in a building. Schools in the same building may use community resources (health, welfare, and other agencies) housed in the same building.

11. The academic-subject examinations should involve demonstration of achievement in each area tested. This may require a portion of the test to be in performance, and not only paper-and-pencil. Although more expensive, this implies taking each student seriously, and creates an incentive toward more extensive preparation. It is already part of the examination at end of secondary school in some countries.

12. Could a child be required to repeat a period of time in a given level of school? If the child's level of performance was below that which would permit admission in any school at the next level (which could occur only if there were too few places for the number of students, an event that would probably not occur), then the child would be required to repeat a year in the current school. However, if a child's test score did not make possible admission to a school acceptable to the child and parents, the child could choose to repeat a year, with the aim of improving performance.

13. Any set of teachers each of whom satisfied state qualification requirements could set up as a school, so long as they would have a certain minimum number of students. Their initial position in the rank of schools is at the bottom.

14. The school would be required to take responsibility for the student during a certain period of each weekday, and the student is required to attend the school. The school may offer to some or all students the option of spending a greater portion of each day at school, and the student and parent may choose whether to accept such offers. [This provision differs little from the existing extra-curricular activities (sports, drama, etc.) that are carried out after school, except that it also includes the possibility of curricular activities.]

#### Design 2

This design is like that of Design 1 except for the provisions noted below. The design differs from Design 1 principally in the possibility for some children in the middle and high school to spend part of their school time as assistant teachers in lower schools.

1. At the middle school and the high school, students with highest value added in a given year will have the choice of spending half of school time in the next year as an assistant teacher in elementary school (for middle school students and elementary or middle school (for high school students). The student is qualified to be assistant teacher in any school in which the average entry test score is below that student's entry test score. The choice is made anew for each year in middle school and in high

school. Students' options are in the order of value added, and may be revoked during the year of their tenure by their master teacher.

2. The student who chooses to spend half time as assistant teacher will receive tuition expenses for half a year at postsecondary education or vocational training; or if this is a fee-paying school, will pay only half tuition for that year. In addition, assistant teachers participate in the bonus received by the school they are teaching in, at a reduced level compared to the regular teachers' bonus.

### Design 3

This design is based on an incentive structure which depends on interscholastic competition. Here, rather than achievement level being judged by performance on a standardized test, it is judged by success in interscholastic competition.

Except for the provisions noted below, this design is like Design 1.

1. External tests are replaced by frequent interscholastic competition involving both team and individual performance. Models for these already exist in some areas, such as interscholastic mathematics team competition, debate, and statewide contests involving both academic subjects and the performing arts. The competitions would be in the form of tournaments (round-robin or otherwise).
2. On a certain core of subjects, each student would participate; for other subjects and more advanced performance in the core subjects, students would select which areas to compete in.

3. The tournament competitions described in 1 would lead to individual and team ranking. The individual ranking covers all students in the core subject areas, and only subsets of students in the non-core subject areas.

4. The "value-added" or "gains" of a student in Design 1 are in Design 3 determined by the differences in rank (combined rank over all subjects contested) over the year or at the entrance to and exit from a given school. The "level" of performance a student at time of completion of a given school (elementary, middle, high) is in Design 3 determined by the student's rank at the time of exit from that school. With this modification, all of the Design 1 principles which depend on measurement of value added or level of performance apply to Design 3. (There may be a necessity to measure the actual levels of performance in terms of content rather than rank. This can be determined by measuring the content learned by a small sample of persons at different ranks.)

### Conclusion

I can anticipate that not everyone will embrace eagerly the school designs I have laid out, not Design 1 nor Design 2 nor Design 3. In part this is because I have not been able, in this presentation, to do more than sketch the bare outlines of what I have in mind. But the disagreements will certainly not vanish by greater design detail. I recognize this.

What I do hope to have achieved, however, is not to have convinced you of a particular school design, but to have convinced you that careful application of well-established sociological principles can be the basis for design of a school -- or of

another type of organization. I hope also to have convinced you that the task of engaging in such design is an important task for sociologists. I hope that I may have challenged some of you who do disagree with my designs to draw upon sociological knowledge in developing competing designs.

Both social research and social theory are important inputs to this task, but the design, and its realization, constitute the crucible which tests social theory. It is a crucible that sociologists should not avoid, and one which, if we do not avoid it, constitutes a major contribution of sociology to the future of society.