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ABSTRACT

Presented in this document are the proceedings of the conference to mark the dedication of the Henry Chauncey Conference Center at the Educational Testing Service in Princeton, New Jersey. Included in the document are the opening remarks by William W. Turnbull; Higher Education is a Chauncey Business by Roger W. Heyns; Higher Education in a Steady State: Some Productivity and Manpower Questions by Juanita M. Kreps and James B. Duke; Technology, Humanism, and Higher Education by Lloyd N. Morrisett: and Plato, Ticcit, and Sigi: Demonstrations of Educational Technology in the Service of Higher Education by Ernest J. Anastasio and Martin R. Katz. The dedication ceremony is also included. (PG)

PROCEEDINGS OF THE CONFERENCE
TO MARK THE DEDICATION OF
THE HENRY CHAUNCEY CONFERENCE CENTER

Increasing Productivity in Higher Education

MAY 1974

EDUCATIONAL TESTING SERVICE
PRINCETON, NEW JERSEY

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CONFERENCE

Opening Remarks

William W. Turnbull

THIS IS AN OCCASION that we have been looking forward to for a long time, and we are just delighted at the fact that so many old friends and members of the "family" could be here to join us for the occasion.

I thought I ought to take my text from a former ETS Trustee indeed, a former Chairman of the Board of Trustees of ETS James Perkins. He provides the following:

> There was a young lady of Kent,
> Who said that she knew what it meant
> When men asked her to dine,
> Gave her cocktails and wine.
> She knew what it meant, but she went.

Like the young lady of Kent, we all know that "when men ask us to dine, give us cocktails and wine," it

means inevitably that some serious-minded fellow is going to stand up at the end of the dinner and declare that he is some kind of MC and begin the transition from a social to an educational occasion. At least I think that is what Jim Perkins was saying.

It is my pleasure to open this conference which, awesomely enough, serves four separate purposes. First, it is part of our celebration of ETS' 25th anniversary. Second, it marks the dedication of the Henry Chauncey Conference Center. Third, of course, it pays tribute to the person who appears in the title role, Henry Chauncey. And, finally, it provides an opportunity for all of us who are concerned with the present and with the future of higher education to reflect on its state and on its prospects.

I suppose that in each period of history people have had reason to believe that their problems were uncommonly difficult, if not uniquely beyond solution. If so, we stand today in a grand tradition, because right now people are saying that education in general, and higher education in particular, has problems that clearly defy easy resolution and, some would say, any resolution. That conclusion is one that I think we must stoutly resist, and we are here to begin an examination of how higher education can be improved or, more likely, how it can improve itself.

Those of you who spend most of your time trying to find ways of improving higher education at an af-

fordable cost can attest to the fact that we are dealing with anything but a simple exercise.

As we began looking for the central topic that ought to occupy a conference of this kind, we were immediately concerned about, and almost mired in, the question of cost. Certainly finances pose the most visible and dramatic problem today. But we realized, the more we talked about it, that money is only half the problem and perhaps the smaller half, if that is not a contradiction in terms. The other half certainly is the quality of the education that the money can purchase. And we thought that perhaps the most appropriate topic for this conference world be productivity in education and how it can be increased and I suppose one must add, if indeed it can.

We are fortunate indeed to have on hand for this conference an all-star cast of distinguished speakers who are familiar with the history of ETS, who have known Henry Chauncey, and who are better able than most speakers I know to articulate the state of the art of higher education and to comment on the particular problems we face. We owe them our gratitude.

HIGHER EDUCATION IS A CHAUNCEY BUSINESS

ROGER W. HE NS

Introduction of Roger W. Heyns

William W. Turnbull

When Roger Heyns left the Chancellorship of the University of California at Berkeley in 1971, a reporter wrote, "There is a vitality to the campus. There is great strength. There is the gentle imprint of Roger Heyns."

These are key words, I think, for there is evidence of vitality, strength, and gentleness in most of the things Roger Heyns has done throughout his career. If vitality is the capacity to live and develop, certainly he has given that particular quality to the people and places he has served. The University of Michigan, where he received his doctorate and which he served as both teacher and administrator for many years, honored him twice: once in 1952 with its Outstanding Teacher Award and again in 1958 with its Faculty Distinguished Service Award.

In his six years at Berkeley, the most critical in the history of that great institution, he "held the walls up," in the words of one of his colleagues. He managed to do that, as he has done everything else in his career, with a gentleness tempered with common sense. I like the way one faculty member described this quality: "It takes one hell of a lot of prudence to know where to stop when you're being virtuous. He knew."

A psychologist by profession, Dr. Heyns spent his teaching career at the University of Michigan. After leaving California in 1971, he returned to Michigan

to accept a dual appointment as Professor of Psychology and Professor of Education. During his academic career, he has published books and articles on group development, the psychology of adjustment, and conformity and nonconformity.

One book he didn't write was presented to him by his staff at Berkeley on his fifty-third birthday. It was called *What I Know about Administration by Roger Heyns*. Inside, of course, were blank pages. "I'd like to change page 33 somewhat," he told them, "but otherwise let it stand."

It is evident from his career, however, that Dr. Heyns knows a good deal about administration. Dean of the College of Literature, Science and Arts at Michigan for four years, he was promoted to Vice President for Academic Affairs in 1962 and remained in that position until his appointment at Berkeley in 1965. Three years ago, he was chosen out of 150 candidates for his present job as President of the American Council on Education.

It gives me great pleasure to introduce Roger Heyns.

I CONTEMPLATE ALL discussion of increasing productivity in postsecondary education with a remarkably large, and often contradictory, set of propositions. I suspect we all do. It may be useful to state some of them.

The concept of productivity leads us immediately to the matter of outcomes of higher education. Increasing the productivity of what? Is it the student's amount and quality of knowledge, degree of enlightenment in social attitudes, of improvement in social skills, of development in aesthetic taste?

There are two goals here that I, as a professional educator and psychologist, have no trouble embracing. I believe we must improve the assessment of what it is that we purport to do, both with respect to range of attributes measured and the reliability and validity with which they are measured. We cannot, in the present competition for resources, continue to rely as

heavily as in the past on testimonial support--only the Salvation Army can continue to do that.

Further, I believe that we cannot make significant advances in pedagogy and in understanding the effects of various pedagogical conditions on human learning unless we improve the quality and number of measures used to assess educational outcomes. Improvement in resource management can take place only if we have better outcome measures.

Continuing this theme, I believe those of us who are committed to measurement must not give any comfort to those who regard the process of education as essentially mystical and the effects ineffable. Although that view may hold for some outcomes, I believe it wise to treat the measurement of educational processes and outcomes as an empirical question.

Nor do I think we should give emotional or intellectual support to those in education who prefer to evade questions of productivity or measurement of outcomes in the interest of more effective resource allocation, on the grounds that more precise data will be abused by the decision-makers. They argue that we will fare best if we keep the enterprise obscure and data about it hard to come by. I think this counsel is terribly shortsighted, and whatever peace we achieve would be temporary indeed. If a problem arises about abuse of data by the uninformed, then our problem is not unique to the educational world, and its solution

lies in educating the decision-makers about the proper use of imperfect data. We must certainly play the leading role in that educational process.

Having said all of this in behalf of increased concern with measurement so vital to answering questions about productivity, there are some other propositions that go in the other direction and need to be stated. Without providing any comfort to the antimeasurement people, we must indeed show a sensitivity to the tendency, now upon us and likely to increase, to equate the whole with those parts that we can currently measure, to describe the entire complex activity in terms of the indices most readily available and understood. Sensitivity to this peril must show itself in the claims we state, the promises we make, *and* the seriousness with which we take those educational processes we don't understand or whose efficacy we can attest to theoretically but not empirically.

Educational measurement people are particularly and, I think, inordinately preoccupied with issues of reliability and validity. This exaggerated concern has led them to set unrealistic standards for social indices. Economists have, in my opinion, no such reticence. For example, the Gross National Product and the Consumers Price Index are quite gross and imprecise, but they are enormously useful because they relate to highly plausible and important ideas. In any case, I suggest that we devote an increasing amount of time and effort to developing indices, perhaps quite rough,

of the performance of education. An index of educational quality would be a particularly good initial target.

Further, our willingness to accept the measurement task implicit in productivity, resource allocation, management efficiency, and orientation must not allow us to abandon our role as experts or to downgrade hunches and unquantifiable experiences—our own and those of other workers in the vineyard. My impression, again, is that educators are being forced to demonstrate the validity of their judgments with empirical proof, far beyond the pressures exerted on other professional groups. The reason may be that apparently little preparation is required to become an educational expert. To qualify one need only be a parent, a student, an alumnus, a congressman, or a donor.

Nonetheless, there is a great deal of collective wisdom in pedagogy. I suspect that our rudimentary theory and our intuitions have more validity than our current measurement methodology and our capacity to conduct experiments have permitted us to determine. In any case, the world of business and the world of government have been able to proceed, by and large admirably, with less experimental testing of their theories and their practices than we are under pressure to undertake. Ironically, both institutions—business and government—have been the major sources of pressure on education for premature quantification,

whereas they themselves strongly resist similar pressures. From what I have already said, clearly I am using these comparisons, not as reasons to reduce the measurement effort on the ground of unfairness, but rather to observe that the wisdom of people who have devoted their lives to the educational process ought not to be discounted. Nor should we discount ourselves as we seek to make our educational institutions better. Of course we must guard against rigidity, dogmatism, and self-interest, but this risk, as I see it, is relatively small, given our capacity as an educational community for self-criticism. Whether great or small, it is a lesser risk than deciding that only those propositions are true that are demonstrable under our present conditions of measurement methodology and research design.

I am also concerned lest, because we think better measurements can be made, by implication we help eliminate education from the domains of activity where it belongs. Education to meet society's needs for trained people for the vocations and professions, for a certain level of cultural literacy: these goals make congenial the rhetoric and activity of assessment, measurement, and improved productivity. This is not true if one thinks of education also as a pleasurable activity or as an activity that contributes to the quality of one's personal life. Education can properly be considered as a worthy rival of the mountain and the seashore, the orchestra concert and the play. Too much devotion to productivity implies that we deny

these roles or think them less important than we do, indeed, believe them to be.

Too much concern with productivity has also the effect, perhaps unintended, of downgrading the need for qualitative improvement. To avoid this contamination, we must make strenuous and visible efforts to develop qualitative measures of the educational process. I earnestly believe that the engineers now graduating are indeed better trained than they were 20 or 30 years ago but how do we know?

This consideration of quality leads me to the melancholy reflection that there is a certain phoniness on the part of some of those interested in increased productivity. It is so easy to describe a system of education that reduces per unit costs: teachers with low qualifications, poorly paid, in an interaction with large numbers of students that permits no individual attention, allows no serious effort to assess performance, and regards as important only the passage of time. Yet we know that a system thus produced will not attract the sons and daughters of those who insist upon its introduction. Implicit in our present situation is a widespread belief that what we now do is qualitatively satisfactory but not cheap enough. *Both* the quality and the quantity questions must be open, and we must keep them open if concern with productivity is to be beneficial. We must ask questions that combine consideration of cost and quality: What would it cost to do better? Can we do a better job at the same

price? These are legitimate questions and they reflect this dual concern. This emphasis is especially important when one contemplates the period ahead. The young will constitute a smaller and smaller percentage of the population; without increasing the proportion of funds available for education, we can indeed, provided we know how, increase its quality.

My practical advice, then, is this: We, the people represented by this particular community in which we meet, cannot limit ourselves to accepting the measurement task and expect that the rest of the educational community will carry these other messages. Educators have always got into trouble when they allowed anyone to oversimplify a problem. We, ourselves, have added to that tendency by saying only one thing at a time. Actually, we must say many things simultaneously. In our pronouncements and in our programs, we must reflect our interest in quality as well as quantity. We must state that some outcomes can be measured, but they are not the only outcomes of education nor are they necessarily the important ones.

We are all blessed in that we are involved in a task of enormous importance. All of us are stewards of enterprises vitally important to the educational effort of the nation.

My hope is that we can take pleasure in that participation and view its future with optimism and self-confidence (chancy though it unmistakably is.

HIGHER EDUCATION IN A STEADY STATE: SOME PRODUCTIVITY AND MANPOWER QUESTIONS

JUANITA M. KREPS

Introduction of Juanita M. Kreps

William W. Turnbull

If I were planning to conduct a symposium on almost any of our country's more urgent problems, I would undoubtedly call upon Professor Juanita Kreps to be a featured speaker. Vice President and James B. Duke Professor of Economics at Duke University, she could talk to us in depth about the financing of higher education, about consumer issues, the state of our economy, the problems of the aging, the manpower situation, or the status of women in our society. It is evident, too, from her books and articles that she writes as skillfully as she speaks on these subjects.

Although she is a scholar with a leading economic text to her credit, Professor Kreps is not one for ivory towers. She has been a member of the White House Conference on Aging and the Council of the American Association of University Professors, Chairman of the Commission on Academic Affairs of the ACE and the Committee on Fellowships to American Women, as well as Consultant to the United States Senate Special Committee on Aging. When I last checked, she was Chairman of the Task Force on Financing Higher Education, Vice Chairman of the North Carolina Manpower Council, on the Board of Trustees of four organizations (including ITS), and a director of four others including that ultimate mystery, the New York Stock Exchange.

Dr. Kreps' primary commitment, of course, is to Duke University, where she is a top-level administrator and distinguished faculty member. At Duke, where she

received her master's and doctoral degrees, she has served as Director of Undergraduate Studies in Economics, Dean of the Woman's College, and Assistant Provost. Last year, she was appointed Vice President.

She is, according to her colleagues, a consummate teacher. "Witty," "quick," "intuitive" are words one often hears about her. Mostly, however, one hears about her unusual ability to communicate.

I am pleased to present Professor Juanita Kreps.

Between wheat and meat, raisins and rice, soybeans and fowl, oil and gas, propane and ethylene, lumber and newsprint, cotton and synthetics, trains and planes, and the many other items showing up in the daily headlines but not on the market shelves . . . abundance appears limited to new stocks, reshufflings, and surprises.[1]

SUDDEN SHORTAGES HAVE SHATTERED our childlike faith that continued high rates of growth are forthcoming, almost inevitably—a faith born of long, uninterrupted prosperity and seeming abundance. Despite the clear signals that natural resources are indeed limited and that the technology which has spurred growth has done so by drawing down the supplies of energy while not yet affording alternative sources, our interpretation of the scarcity has been curiously ambivalent. Remember the sentiments of six months past. There is no gasoline shortage, the angry customer

argued, while waiting at the end of a long line at the pumps. Nor would we be short of food if we had not foolishly sold our wheat to Russia. Housing would be adequate if the banks would lend money at reasonable rates. Health services are available, but we can't afford them. And so on. In none of these cases is there a recognition that supply is actually short relative to demand (which is all we mean by "shortage"), and for the immediate future, at least, the rising price is a reflection of that imbalance.

In the wake of these shortages, the question of future economic growth in the United States becomes more than an academic exercise. True, we are unlikely to invoke policies deliberately to move us to zero economic growth in the near future; even short periods of recession such as we are now having are lamented. A number of compelling arguments for continued growth can be cited, not only on behalf of that large portion of the earth where present subsistence levels of living call for a continuation of improved technology and increased output, but also as a means of improving the lot of the bottom fifth of our own income recipients.

These valid arguments in favor of continued high growth notwithstanding, there are unmistakable signs that resource constraints will force some change in the rate and pattern of growth. It is easy to assume this problem away by proposing that we could grow without consuming resources too rapidly or destroy-

ing the environment by shifting from goods production, with all its waste and pollution, to services—which presumably use only "clean" human resources. But Lester Thurow reminds us that

> While it's quite true that services don't pollute directly, they generate a lot of indirect pollution. . . . Take education. Who is the largest consumer of electricity in the Boston area? . . . MIT. Who is the second largest? . . . The Affiliated Hospitals of Harvard. It's not at all obvious that we can have lots of health care and lots of education and still not have pollution or use of resources. It may be that when we add the direct and indirect aspects of these activities, they are, in fact, great polluters. . . . Until hard information is developed on who pollutes, and who doesn't, who uses resources and who doesn't, no growth should mean no growth for everyone.[2]

In short, there seems no easy way to take the purifying medicine of zero growth without suffering side effects. So the ecologists are forced to face the trade-offs of increased output versus decreased pollution. What the nation and the ecologists have to face is the additional set of constraints imposed by natural resources and the supply of capital which specify the rate at which we *can* grow, once we determine the desired pace. Within these boundaries we shall then have to reconsider the problem of income and work allocation. For when the rate of growth changes, the total output shifts and the former division of that output among different groups of people is no longer necessarily appropriate or even acceptable.

These growth questions have important implications for higher education, now and in the future. The zero growth which has already hit academia has brought with it a set of problems that may well signify things to come in the rest of the economy. Any goal we seek and particularly the important goal of raising productivity in higher education—must be considered within the context of a steady state in which educational resources are already underutilized. Insofar as the proposed productivity improvements reduce the requirements for educational manpower (and unless offsets are found), the demand-supply imbalance will worsen. Any realistic appraisal of economies in higher education today needs to take account of this imbalance and its probable impact on institutional capacity to reap substantial savings even when productivity improvements are achieved.

Accordingly, these comments first review briefly some questions relating particularly to productivity in education and other services, and then consider the manpower issues that emerge when such improvements are made in a period of declining demand. Finally, questions are raised regarding the concept and measurement of productivity in higher education. In particular, the question is posed as to whether an index of educational productivity should not reflect the quality of education, as indicated, perhaps, by the rising lifetime earnings of the educated.

I. Educational Productivity: Some Special Problems

Higher productivity in higher education is a laudable goal, espoused alike by administrators who face budget deficits and by parents who have to pay rising tuitions. Why is it, our critics ask, that colleges and universities cannot show the same improvement in output that industry achieves? Do we not have access to the same technology? And should we not be expected to respond to the same market preferences? In the recent past, market pressure to serve a growing number of students should have led educational institutions to develop economies of scale which would have held down unit costs; at present market forces should direct us to cut back on volume but retain those institutions that can compete. Elimination of the inefficient institution or firm is a necessary threat, it is argued, if we are to serve the consumer interest.

Similarities between a business firm and a university can be overdrawn, of course. Yet there is a set of market forces in both cases, and we cannot assume away the significance of shifts in demand for our services or increases in the supply of educational resources. Product differentiation, too, is a critical factor in the college market: witness the emphasis on the value of institutional diversity, particularly in an era of declining demand when some institutions are threatened. These immediate market influences must be kept clearly in mind if we are to survive today's depression in higher education. A longer run set of

adjustments will also be necessary if we are to embrace an educational technology that reduces costs and makes it possible to educate succeeding generations of students at reduced prices or with improved quality, or both.

At the microeconomic, or business firm level, rising productivity during the twentieth century has meant a reduction in input per unit of output, the input consisting of all factors (but especially labor) and the output usually being goods rather than services. As our economy has moved from an agricultural to an industrial, then a post-industrial stage, the proportion of all workers engaged in goods production has declined while the proportion in services has grown. Since mechanization of the production process is usually slower in services than in goods production, productivity gains (measured in output per man-hour) in education, health, and other services have not matched the increases in manufacturing. Labor-intensive services continue to be expensive as long as they are labor-intensive that is, until ways are found to perform the same service with less manpower or to improve the quality of the service while using the same labor resource. In educational endeavors, for example, savings through reduced capital expenditures tend to be minimal.

Because of the higher proportion of labor cost and the greater difficulty of automating health and educational services, technologically induced efficiencies

have been smaller and, as a result, costs have risen more sharply in these areas than in goods production. The question of whether such a slow pace of technology can continue in a period of rising labor costs is now squarely before us. Again, the business firm's experience is cited: When labor costs are rising, there are strong incentives to substitute labor-saving capital. Such a substitution (assuming the savings are passed on to the consumer) would offer some relief to students and their parents, and to taxpayers.

II. Manpower Implications of Rising Productivity

But a reduction in the number of professors hired would be a likely corollary of such increased efficiency. And in an era in which the demand for professorial talent is already declining because of a reduced college-age population, a further shrinkage in jobs would require extremely difficult adjustments.

The present imbalance between the numbers of professors seeking jobs and the numbers of jobs available calls for explanation on two counts: One, how did it happen that our graduate schools produced the "surplus" of Ph.D.'s just at the time when demand for their services was shrinking? And, two, why does the manpower imbalance not come to be reflected in the form of lower salaries for professors? Presumably, there is something in the academic labor market that is causing it to behave unpredictably or, at any rate, differently from other labor markets.

Let us try to remember how we got here. Throughout most of the 1950s and 1960s, the demand for teachers seemed to be insatiable—first for primary and secondary, then for college instructors. To accommodate the hundreds of thousands of students, colleges and universities expanded physical facilities as fast as they could build them. But faculties, too, had to be built from the ground up, and as a result we encouraged more and more students to go into graduate school. The market responded in classic fashion to an increase in demand, providing incentives in the form of fellowship aid, teaching assistantships, and rising faculty salaries. Tenure was offered freely, not just as a protection to academic freedom, but also as a means of retaining faculty.

Productivity, as measured by increasing numbers of students per teacher, also increased. Huge lecture halls and televised performances appeared on every large campus, and senior professors often worked with graduates who in turn taught undergraduates. Without such efficiencies of scale, universities could not have accommodated the numbers of students who elected to enter, since even a rising salary scale cannot increase the supply of professors overnight.

But what rising demand and good job offers cannot produce immediately, they can and will produce in a few years. So it is that in 1974 we have an abundance of young Ph.D.'s eager for faculty appointments. In the meantime, that demographic bulge that was for-

merly of college age has moved into the labor force and the demand for professors has slackened. Moreover, the assistant professor who gained tenure in 1960 at, say, age 35, is now only 50 and a long way from retirement. Thus the labor market did not fail to respond; rather, it responded all too well, given the necessary time for increasing the supply of talent. And although it is too soon to have adequate documentation there is evidence that the current lack of jobs in academia (and the lack of fellowship support) is now discouraging students from entering graduate schools, and these cutbacks will shorten the supply of professors four or five years hence.

As for the second question of why professors' salaries do not fall, given the large numbers of job applicants, the fact is that salaries have been declining in real terms. ETS salaries may have kept pace with the cost of living, but practically no other educational institutions have done so; indeed the 5.5 percent limit specified in the wage-price guidelines made it impossible for salaries to go up as fast as living costs in 1972 and 1973. Prices in the first quarter of 1974 have risen at an annual rate of about 10 percent, which is substantially in excess of the highest rate of salary adjustment yet announced by a university for 1974-75. A continuation of this discrepancy may eventually signal some decline in numbers of professors although the process will be slow, achieved mainly through retirements and a reduction in the numbers seeking entry to the profession.

Productivity increases that would result in further erosion of demand for professorial time and talent would hardly be greeted with enthusiasm. Worker reluctance to endorse a technology that displaces labor is not new, of course: Since the days of the Luddites, job conservation has seemed more important than efficiency to the threatened wage earner. It would be far easier to introduce new techniques if demand for higher education were growing at the pace of the early 1960s. In short, the goal of efficiency and cost reduction appears to be at odds with the need to preserve jobs in a declining market.

III. Alternatives: New Sources of Demand, New Definitions of Productivity

In the face of declining enrollments, many universities have responded by seeking other sources of potential demand. This year's menu of academic alternatives lists the groups not now served by the postsecondary educational complex roughly all persons not aged 18-22. During the next decade when the numbers of young people in college decline, nontraditional students will surely assume a growing proportion of the total demand for educational services. By encouraging greater flexibility in the timing of education, work, and leisure through the lifespan, we can offer a greater variety of educational options. Institutions that adapt to these winds of change may suffer very little attrition in student enrollment; indeed, it is possible that the aggregate demand for educational manpower could

be maintained even though the youth component of that demand declines significantly. The shift in age composition of students is likely to occur only slowly, however, and many institutions will not survive the transition.

In the meantime, the most important single variable influencing the proportion of college youth (and to a lesser degree, the proportion of those in other ages as well) who enroll in postsecondary studies is the extent of public financing available to the student. If the entire cost of instruction were borne by the public and the cost of foregone earnings by the student, the numbers of part- and full-time students in all age groups would increase. The long run economic gains from such a public investment are difficult to predict with precision, but it is hard to imagine that the expenditure would not be cost-effective.

The rationale for making an educational expenditure from public funds has not been built on a cost-benefit basis, however. Nor has there been any other clear and consistent definition of productivity in higher education. Although not explicitly stated, productivity is most often assumed to vary with the faculty student ratio; institutional efficiency presumably rises as the number of students per instructor increases. Continuation of productivity gains thus means that eventually all students will be instructed by a single teacher, as Robert Lampman has pointed out. Clearly, such a goal lacks appeal for faculty even if it could be assumed

that that one teacher's wage rose to match his productivity.

It is important to consider the concept of productivity in higher education in the light of the necessary allocative decisions. When such decisions are to be made, the criteria have to allow for comparisons of the gains from given expenditures in each of a series of areas, such as higher education, health care, environmental improvements, and income maintenance for the poor. The need to make such comparisons has led to numerous attempts to measure returns to investments in various fields, particularly education, and to examinations of the rates applicable to expenditures for different levels of education. Although the methodology for measurement is far from perfect and the data not always available, this technique has nevertheless helped to clarify the allocative issues.

In cost-benefit analyses, the cost aspects are somewhat easier to specify than are the benefits. It is not easy, but it is possible to estimate the additional costs of an A.B. (beyond high school), the costs of an M.D. (beyond the baccalaureate), and so on. Since costs can be calculated, it is understandable that state legislatures concentrate on expenditures to the exclusion of benefits. Costs are measurable, and they must come out of this year's revenues. Benefits are less easy to estimate, and they accrue only in the long run.

But to allow dollar (or even real) costs of providing

an M.D. degree, for example, to be the sole basis on which productivity in medical education is measured is to ignore the benefits imputable to that degree, when such benefits may be growing far faster than costs. Thus, educators are in the untenable position of trying to defend a degree that costs more each succeeding year under the implied assumption that the degree remains the same through time—that is, that there is no change in the returns to that degree.

We know, of course, that the returns from an additional year of schooling vary from one type of education to another, and that the return from any one level of education or degree has increased through time. In calculating returns, we have relied on lifetime earnings as a measure, the difference between earnings of baccalaureates and those of high school graduates (by sex and race) being attributable to the additional education. This method clearly understates the worth of the college degree by neglecting its value in consumption. A better illustration, perhaps, is a professional degree such as the M.D., which is related almost exclusively to earnings. Even with the understatement, returns to investments in higher education bear handsome rates of return, and these rates have been rising much more rapidly than the costs of the education.

A medical doctor's education costs in time and money have soared during the last few decades. Why? Certainly not because the technology has failed to advance. Probably not because of waste and inefficiencies

in the medical schools. Educational costs are higher because what is being produced is an ever-changing product. With an exploding knowledge base, each succeeding class of students has to absorb additional information, learn new techniques, answer new and different questions. We could of course take the position that the generation and transmission of such new knowledge is too costly. But that decision surely should turn on the costs relative to the gains provided in the form of reduced morbidity and mortality which, when translated into reduced losses due to illness and premature death, are likely to dwarf the educational costs. Only after estimating the ratio of costs to returns in the medical schools and comparing that ratio with similar estimates for alternative expenditures can we make maximum use of our resources.

Only after such calculations, moreover, are we able to measure productivity in the services. As long as we continue to treat our output—the certified student—as the same, regardless of any changes in his quality as measured by his projected contribution valued in dollar terms, educational productivity will appear to be declining because we seem to be producing the same goods at higher and higher costs. If we specify instead that educational productivity measures costs relative to returns, both our research and our program agenda then become clear. Then it is obvious that we need to direct attention to more satisfactory techniques for measuring returns to education. More significantly, we are freed from the relentless drive toward increas-

ing the numbers of students we teach, and charged instead with the responsibility of improving educational quality. Improved quality may yield even greater returns than increased quantity of educational output. And this is the first point in our history that educators have had time to pause and consider quality, so great has been our necessary concern with numbers of students.

Educational excellence has been out of fashion for a bit. Its nonegalitarian sound arouses an image of elitism. Increased productivity, on the other hand, is something we applaud as being worthwhile, work-related, somehow American. What we have not yet made explicit is productivity's reliance on the quality of education a reliance all the more critical in an age when knowledge grows at a dizzying pace and when the capacity to be productive requires the absorption of more and more knowledge. The productivity question in education is not one of how to reduce the time and money spent per student, but rather how to increase the output of the student during the worklife that follows.

Time, too, is expensive, for time can of course be translated into dollar terms. Impatience with the time necessary for improved educational quality is illustrated by a comment made in the course of a story about a young man with the unlikely name of Pyestock, who went from one school to another trying to find a field he could learn in a hurry. He tried living with stu-

dents on the Left Bank in Paris, but since he had never bothered to learn French, he found himself on the outside. He retreated to England to study, but the deliberate British and their respect for tradition annoyed him. He wanted to get on with his education. He kept complaining. The author commented that Pyestock was something of a Master of Arts at midday, demanding to be a certified plumber by three in the afternoon. Then this observation:

> Now you can be dubbed a knight in half a second, become a hero or a corpse or a coward in three or four: but to become a plumber takes time.[3]

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TECHNOLOGY, HUMANISM, AND HIGHER EDUCATION

LLOYD N. MORRISETT

Introduction of Lloyd N. Morrisett

William W. Turnbull 54/55

IF YOUR CHILDREN ARE too young to be running around with Charlie Brown but are a little older than two and a half, the chances are good that our next speaker has played an important role in their lives, and perhaps in yours, too. He is Lloyd Morrisett, the father of *Sesame Street*. Since 1966, when he and Joan Cooney first hit upon the idea of a really good television program for preschool children, Mr. Morrisett, as Chairman of the Board of the Children's Television Workshop, has been instrumental in making television a major force in education. With hard work, exciting ideas, and the skill to sell them, he has raised millions of dollars and won the enthusiastic support of foundations, corporations, and government. And he continues to generate new ideas and enthusiasm. This year, having made a success of *Sesame Street* and *The Electric Company*, the staff of the Children's Television Workshop, at Mr. Morrisett's urging, are turning their formidable talents to adult television with the production of a health series for teen-agers and young parents.

Mr. Morrisett's interest in public television is part of a broad concern for education that is the driving force behind his work as President of The John and Mary R. Markle Foundation. Under his leadership, the thrust of the Foundation has turned toward improving the educational uses of the mass media and communications technology. In the five years of his presidency, the Foundation has supported projects such as a program of communications studies at Duke, Action for

Children's Television in Boston, and research on the potential of cable television.

Lloyd Morrisett's many activities outside the Foundation reflect his broad and complementary interests. His strong convictions about sound research techniques have led to membership on the Board of Trustees of The New York City Rand Institute and the Riverside Research Institute. An experimental psychologist with a teaching background at UCLA and a decade of executive experience at the Carnegie Corporation, he is committed to the advancement of education and science. He is a member of the New York State Commission on Quality, Cost and Financing of Elementary and Secondary Education as well as the Advisory Board on Regents Degrees of the State University of New York. Since 1970, he has given his time to working for the Committee on Public Understanding of Science.

He is also, I'm proud to say, an old friend.

May I present Mr. Lloyd Morrisett.

DISCUSSIONS ABOUT THE PLACE and promise of technology in higher education can lead to extraordinarily divergent, contrasting views. As long as discussion centers in applications of technology to the business affairs of a college, admissions and registration, or scientific research, emotions are usually placid and views restrained. When, however, discussion turns to applications of technology to the instructional process, the outcome tends to be different. For some, applications of technology to instruction are viewed as an important remedy for many of the ills that threaten higher education's progress. For others, these same applications are a major threat signifying a substantial loss in quality. How is it that the same technology can be an angel for some and a devil for others?

Before we examine the arguments about efficiency and productivity, it will be useful to recall what is meant by instructional technology. Actually we possess not one instructional technology but many. Recently cable

television has been under close scrutiny, but film, television, and radio are also important. For convenience, all these technologies can be thought of in terms of a process of recording, transmission, and display. Instructional technology begins with a source – a lecturer, a demonstration, or a performance – and either records it or transmits it. The recording can be in written form or either audio or video, on paper, tape, records, or film. The transmission of the original source of the recording can be via wire, over the air, or by mail, and involve radio, microwave, television, cable or other means. Finally, the display of the source can be via book, radio, phonograph, television, projector, or a host of other present and potential devices. Although much attention is given to the relative merits of one or another system of technology, it does not seem to me that the key issues concerning efficiency and productivity can be resolved by looking at technology in isolation. Technology must be put into the context of the educational process.

Instructional technology does not stand alone. An analysis of its potential must take the aims and objectives of higher education into account as well as current practice. The motivations of professors and the aspirations of students are involved, as well as the ways in which colleges and universities are organized. A principal argument for the use of technology in instruction is that it will increase the efficiency of the educational process. This increased efficiency can be obtained by reaching more students with the same

resources and thus amplifying an institution's ability to do its job or by reducing the amount of labor necessary to do a job that the institution is already doing. In the first case, for example, closed circuit television may allow a lecturer to be seen and heard by many more students at more convenient times both on and off the campus. In the second case, the acquisition of a videotaped course may allow the monitoring and teaching of that course by fewer people or less-well-prepared people. These increased efficiencies can, in principle, save money for hard pressed institutions of higher education or at least allow the institutions more freedom in the allocation of scarce resources.

Other advantages for the application of technology to instruction may also be cited. These may include the ability of technology to give improved feedback to teachers about their performance, the requirement that greater planning and preparation go into teaching when the teaching is to be recorded and reused, and the necessity for greater precision about educational objectives and instructional steps when a course is translated from a lecture-discussion to a computer-assisted mode. These additional advantages may be real, but they are seldom invoked in the main argument for the application of technology to instruction. Rather, they are incidental values that may be gained as technology is applied.

The widespread application of technology to instruction is also seen as a threat to higher education. First,

the increased use of technology means change—change in a process of education with proven value and with which there is great familiarity. Yet there exists no real knowledge or guarantee of what is to be gained by the change -and there is at least a vague feeling that small gains may be more than offset by large losses. Often behind this threat may be found the claim that technology is a dehumanizing agent in higher education and that its widespread use will increase the alienation already too prevalent among students and faculty members. With this primary threat, there are certain other threats that may be cited or at least implied. There is the threat of job loss to teachers because of the assumption of some of their tasks by television or film. There is also concern about the likely rise in importance and power of technicians rather than of scholars.

Cogent arguments and strong emotions can be involved in this discussion. In part this may be true because the proponents of one view or the other approach the debate with different perspectives. The administrator or trustee of higher education, overwhelmed with the financial problems of his institution, looks eagerly at technology as a means of increasing efficiency and cutting costs. At the same time, the faculty member concerned with preserving his job in a time of job scarcity and labor plenty views the onset of technology with dismay. A theme running through many of these concerns is the subject of this conference, productivity. On the one side, technology is

viewed as a means of enhancing the productivity of higher education; on the other side, it may be acknowledged as an enhancer of productivity, but with fears raised concerning unintended effects.

That both views have validity can easily be seen in the history of other applications of technology—in the mills of New England or the assembly lines of Detroit. The invention of weaving machines did allow the more efficient employment of people to manufacture cotton fabrics. The invention of assembly line techniques did allow the more efficient employment of people to manufacture automobiles. In both examples, however, there were human costs that took time to identify and subsequently took decades to sort out, with remedies ranging from new labor laws to the introduction of old-fashioned team organizations to replace some of the routinization of the assembly line. In light of these and other past examples of the introduction of technology, it is not unreasonable to fear that higher education will buy the productivity of instructional technology by selling part of its soul.

Lawrence A. Cremin defines education as "the deliberate, systematic and sustained effort to transmit or evoke knowledge, attitudes, values, skills and sensibilities."[1] All postsecondary institutions of education aspire to accomplish at least part of what he calls education, but they vary greatly in their effort and ability to do so. Casual examination of college catalogs shows wide differences in emphasis on knowl-

edge, attitudes, values, skills, and sensibilities. The research of the past 15 years on institutions of higher education bears out these differences, although it does not always confirm what the college catalogs say. For the most part, the residential liberal arts college takes the transmission of attitudes, values, and sensibilities as a more serious part of its effort than does or can the commuter college or the correspondence school. Two-year vocational colleges take the transmission of skills more seriously than the liberal arts institutions. Colleges with religious orientations and traditions place more emphasis on attitudes, values, and sensibilities than do their secular counterparts.

Over and above these differences, almost all institutions of higher education base their approach to learning on a verbal model. The medieval teacher talking to his students has become the modern professor lecturing to his class. The teacher presents a verbal codification and abstraction of experience to his students. Even though we might agree that experience is the best teacher—allowing learning and understanding an unequaled breadth, depth, and richness—it is impossible, impractical, and inefficient to try to have students fully experience history, economics, mathematics, chemistry, and the other subjects of higher education. Of necessity we codify experience in verbal form for its transmission to students, but in the process, some things are more fully captured than others. The verbal codification of experience deals more easily

with knowledge, taken as information, than with values, attitudes, and sensibilities. Words can transmit knowledge *about* values, attitudes, and sensibilities, but the values, attitudes, and sensibilities themselves are something apart from and different than knowledge about them. D. T. Zuzuki said, "The intellect is after all the spectator, and when it does some work, it is a hireling, for better or for worse."[2] Choosing a verbal model for the transmission of knowledge has meant some inherent loss in the capacity to transmit other human qualities. The ideal of the liberally educated man has never been simply that of the knowledge machine, but rather of a person who combines knowledge with values, attitudes, skills, and sensibilities and is able to employ his intellect in the service of his own and others' humanity.

The codification and abstraction of experience in words has been necessary. It has been a relatively efficient means for the transmission of knowledge, even at the cost of losing some capacity for the transmission of other human qualities, but this is not the whole story of higher education. The teacher can, by his manner and example, continue to transmit or evoke those qualities of education that would tend to be lost in mere words. The best teachers are remarkably able to do this, and this ability is precisely one of the things that set apart the master teacher—the person who is a bit of a poet, a performer, an actor, a mimic—from the person who is unable to add very much to the words he uses in teaching his subject.

The introduction of technology can make the teacher more efficient, but there is the real danger that the dehumanization already inherent in verbal instruction will be extended in the application of technology. The textbook transmits knowledge more efficiently than does the teacher, but textbooks are notoriously dry and dull and ineffective in transmitting skills, attitudes, and sensibilities. The lecture broadcast by radio or recorded on a cassette loses the visual image of the teacher and, along with it, some of the ability to transmit nonverbal aspects of experience. The television broadcast captures the visual image of the teacher but does not allow the interaction, verbal and nonverbal, between the good teacher and his students. The computer can interact with the student but cannot sense and respond to his emotions.

I think this line of argument is clear. The verbal tradition of higher education loses in its process some of the ability to educate in the areas of values, skills, sensibilities, attitudes, and emotion. The direct application of technology to the present content of education would be a simple translation of lecture to text, or lecture to broadcast, or lecture to telecast; and the simple translations are bound to lead to further losses in the ability to transmit qualities apart from knowledge. Looked at in this way, increased productivity in higher education through the application of instructional technology is purchased at the cost of a narrowing of the ability of education to proceed across its full range of objectives.

In objection to this point of view, it might be said that so much has already been lost in the educational process that little more would be lost and a great deal of efficiency gained through widespread application of educational technology. Perhaps this is true, but in the past decade we have seen signs of increasing unrest and protest over the decline in human qualities of higher education. Even if a great deal has already been lost, it might be that losing a little bit more will make the whole process intolerable to a great many more students and faculty members. It is easy to say that the unrest and protest against the dehumanization of higher education were not due to factors within the educational system but rather to the Vietnam War, the efforts of the radical left, or cultural conditions. True as these explanations may be, I think it would be unwise to ignore the accusation that higher education itself is at least partly at fault.

So far, this has been a one-sided argument. Relatively few people argue that print, radio, television, or film should be used simply to record the teacher and his lecture. These simple and direct applications of technology have been made, and in some places they have been made quite successfully. Sitting in front of a television set at a convenient time watching a good lecturer can be a more satisfactory experience than sitting in the back row of a large lecture hall listening to the same lecturer in person. The highly motivated student who needs to review a critical demonstration that he has missed may be more than glad to listen to

a recorded version of the demonstration available in the library. Factors of motivation, convenience, and necessity, all may work to make the student resigned to or, indeed, pleased to have the opportunity to learn through technology rather than through the direct experience of his instructor.

Technology can, however, be more than this. We recognize that technology has the capacity to record, allow editing, and permit mixing of different sources; it can be used to add very substantially to what the instructor does, or would do, in the classroom. These additions to the instructional process can perhaps combat the loss in ability to transmit skill, attitudes, values, and sensibilities. Where words alone convey only poorly the excitement, fear, and sudden rush of the stomach into the throat from a ride on a roller coaster, a superwide screen and associated sound effects can do it very well. Where the greatest poetic skill fails to conjure up the sights and sounds of a warm May day, the sound camera, even in inexperienced hands, can do it very well. Chemical and physical equations and verbal reports only poorly convey the experience of a nuclear explosion. The camera adds dimensions of experience that can only be surpassed by live involvement. In a recent issue of the Yale alumni magazine, Michael Lesy discussed his work in joining photographs with words. He said, "Pictures are just a level of data which to me is awesome—and which has a completeness which astounds me. But they are still incomplete. I mean, I can show you a

photograph of the World War II surrender on board the Missouri. But unless I can lay on you the diplomatic cables that were involved, you still won't understand it. The whole thing is arrangement — the whole thing is the choice of those details which, put together, will call up the smell, the sunlight, the sound, the thought, the predictions, the whole shebang . . ."[3]

The use of technology's capacity to augment verbal transmission of knowledge is costly in at least two ways. First, the addition of visual and auditory images or the responsiveness of the computer to language slows down the rate of transmission of knowledge. Studying illustrations in a textbook slows down the rate at which the text can be read. A dramatic presentation of a historical incident will ordinarily take much longer than the verbal description of the incident itself. Second, effectively augmenting the verbal transmission of knowledge is highly expensive both in terms of talent and money. A "Sesame Street" is extremely expensive to produce in comparison to the written or oral presentation of the knowledge contained in the program. The new physics, biology, and chemistry courses at the collegiate level employing films, television, demonstrations, illustrations, and recordings, as well as text materials, have been much more expensive to produce than traditional courses not utilizing these augmented forms of presentation.

Study after study has indicated that a televised lecture can be as effective as a lecturer in person in trans-

mitting information. We also know that a televised presentation can be enhanced to be more interesting than the same presentation without the addition of visual and auditory images. We do not know, however, the degree to which education is improved by this enhancement in the areas of the transmission of attitudes, skills, values, and sensibilities. Higher education has been so involved in the transmission of knowledge that it has not developed good ways of measuring whether or not educational qualities outside the area of knowledge are being learned.

Higher education is in a dilemma. The application of instructional technology can improve efficiency, but it may do so at the cost of some loss in the human qualities of education. To overcome these losses, the simple and direct recording of verbal instruction by technology has to be augmented—for example, through the use of additional visual and auditory images. This, however, can only be done at considerable financial cost, and it is done on the basis of faith rather than on the basis of any good evidence that the augmentation will be effective.

Since there is no easy way out of this dilemma at present, it may be expected that higher education will proceed slowly in the widespread application of instructional technology. If further experience shows that increased efficiency leads to greater depersonalization, the growth of instructional technology in higher education will be slowed. With more time, instruments

may be developed for the improved testing of learning in areas of education apart from knowledge, and then we can better ask whether augmented instructional technology is effective in transmitting those human qualities that otherwise tend to be lost. If that evidence turns out to be favorable, those who are concerned about the depersonalization and dehumanization of education may look toward technology as a remedy for some of the deficiencies that they see. If that evidence is unfavorable, it will be a further barrier to the spread of instructional technology.

Let us assume for the moment that further evidence will confirm technology's usefulness in enriching education and making it productive, not only in the sense of being more efficient but in the sense of being more human. There remain yet other barriers to the advancement of instructional technology. The technologies of instruction are created and supported by industrial organizations. The computer industry with various manufacturing, software, maintenance, and business arms is separate and different from higher education. While both the computer industry and higher education may foster scientific research, one manufactures machines and the other educates students. Similarly, the television industry—commercial or public and educational television—shares some objectives with higher education but differs in others.

In at least two instances—the university press and the computer center—the university has tried to make a

synthesis with institutions of technology that otherwise would lie outside its ken. In neither case has this synthesis been made without strain and without ambivalence. Neither the university press nor the average computer center in a university is very deeply involved in the instructional process. Rather, the university press tends to be a publisher of last resort for those specialized manuscripts that have scholarly value but cannot be published on a commercial basis. Most university presses exist in some isolation within their university communities where members of the press do not have faculty status and where it would be a rare professor who would look toward the university press as a primary source of his instructional material. The computer center was originally set up as a service center for people who were using the computer for scientific applications. Later, in some cases, the computer center began to develop programs of its own in instructional areas, but these were essentially separate programs in computer technology or computer science. Now on some campuses, Dartmouth for example, the computer center has become deeply involved in instruction on the campus. These efforts tend to be isolated and on campuses of relatively small size or where there is someone who is committed to this form of instruction.

Television, radio, and film have been less centrally involved in the university than have presses or computers. The synthesis is not easy. The orientation of the television producer, the filmmaker, or the pub-

lisher is quite different from that of most professors. Yet, if instructional technology is to be used most effectively, these different sets of individuals will have to be brought together in a productive fashion. The television producer must learn to work with the mathematics professor. The teacher of history must learn to work with the computer expert. In addition, it will be necessary for those concerned with research and evaluation to be intimately involved in the development of new instructional techniques. This suggests a team approach to instruction that will seem strange and perhaps antithetical to those committed to the model of lecturer and students.

If higher education is to adopt and adapt to instructional technology, new organizational forms within the university will be necessary. Because of the large investments called for, it may well be that these organizational forms will not be confined to a single institution but will involve associations of institutions. Promising starts have been made both within individual institutions and among some institutions. It is too early yet to be sure that these starts will be successful. The examples of the university press and the computer center are not wholly reassuring. If increased efficiency is the sole argument used to sell instructional technology to higher education, I anticipate slow progress. If it can be shown that increased efficiency can go hand in hand with increased productivity in transmitting those human qualities we would like to associate with higher education, progress will be

quickened. Then, perhaps, we can have faith that instructional technology will help do the job better, and new generations of students will be educated in breadth and depth as few have been since the demise of the apprenticeship system.

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74/75-

PLATO, TICCIT, AND SIGI: DEMONSTRATIONS OF EDUCATIONAL TECHNOLOGY IN THE SERVICE OF HIGHER EDUCATION

ERNEST J. ANASTASIO
and
MARTIN R. KATZ

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Introduction of Ernest J. Anastasio and Martin R. Katz

William W. Turnbull 78/79

OF ALL OUR TECHNOLOGICAL ACCOMPLISHMENTS, the computer stands out as a truly awesome creation. Like most awesome things, however, it has evoked fear and praise, particularly in the field of education. In the 1950s, for example, there were predictions that the computer would become an educational tyrant, that teaching would succumb to gadgetry, and computerized courses would amount to little more than show business exhibitions of trivia.

Most educators agree that these fears did not materialize. Indeed, for a brief period, the perfection of this new technological tool seemed more important than the quality of learning it could provide. But that time has passed. The major debates today are concerned with how best to improve the courses presented on computers and which computer systems can best serve the needs of different groups of students. In fact, teachers at every level—from the elementary grades through graduate school—are beginning to view computer-assisted instruction as a concept that can free them for more personal interaction with students, thus helping to maintain the quality of education while working toward its democratization.

As part of the process of improving computer-assisted instruction, ETS, with a one-million-dollar grant from the National Science Foundation, is involved in a five-year evaluation of two major systems, PLATO IV and TICCIT. Under the direction of Ernest Anastasio, Director for Educational Technical Research, our proj-

ect is evaluating which system is best suited for particular subjects and educational levels. We are also comparing PLATO IV and TICCIT in terms of cost, educational impact, and technical efficiency.

Developed at the University of Illinois, PLATO IV (Programmed Logic for Automatic Teaching Operations, Fourth Generation) is a large computer facility that can serve many students at one time. Teachers are taught programming for PLATO so that they can prepare their own courses for the computer. The result is some very exciting and often experimental course work. PLATO IV is now being used at 250 schools and colleges.

TICCIT (or Time-Shared Interactive Computer Controlled Information Television), developed by the MITRE Corporation, came on the scene somewhat later. TICCIT was designed for use by smaller groups of students, and its course content tends to be more traditional. Faculty members at Brigham Young University and the University of Texas are preparing materials for TICCIT, and students are using the system in elementary schools and community colleges in Chicago and Champaign, Illinois, Phoenix, Arizona, and Alexandria, Virginia.

While ETS is evaluating PLATO IV and TICCIT, we are also continuing to develop a computer program which Martin Katz, Chairman of the Guidance Research Group in the Developmental Research Divi-

sion, designed as an aid for students seeking career counseling.

A few years ago, Dr. Katz decided to try to use computer technology to help solve the acute need for more professionals in student career planning. What he wanted to develop was a system of "structured flexibility," a computer program that could "respond to the unique needs of each student within a clearly defined context."

The result of several years of research by Dr. Katz and a small but resourceful team of researchers is SIGI (the System of Interactive Guidance and Information), a program that enables a student to have a dialogue about career choices with the computer. This dialogue and the psychological insights provided by it make SIGI one of the most innovative and sophisticated programs that have been designed for computer learning.

We felt that a demonstration* of these exciting projects would make a useful contribution to our conference deliberations.

*The nature of these demonstrations, involving extensive visual materials, prevented us from including them in these *Proceedings*. We would like to express our appreciation for their assistance in this demonstration to the Video Display Group of the General Electric Company, the American Telephone and Telegraph Company, and the Computer-based Education Research Laboratory of the University of Illinois.

DEDICATION

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Opening Remarks

John T. Caldwell

GREETINGS TO ALL OUR FRIENDS who have joined the ETS family for this happy occasion.

I would particularly like to express our appreciation for the presence of the Columbus Boychoir of Princeton and their director, Dr. Donald Hanson.

This is a two-pronged celebration: We are marking the 25th anniversary of Educational Testing Service, and we are formally dedicating the Henry Chauncey Conference Center.

ETS came into existence on December 10, 1947, when it was granted a charter as a nonprofit corporation under the Education Law of the State of New York, and it formally began operations on January 1, 1948.

ETS was founded by three leading educational organizations: the American Council on Education, the Carnegie Foundation for the Advancement of Teaching,

and the College Entrance Examination Board, each of which was then conducting its own testing and research programs. These groups concluded that a single agency would make a greater contribution to education and to educational measurement than could the smaller agencies severally; more specifically, they felt that such an organization would be more successful in coordinating testing programs, constructing new measures in neglected areas, providing advisory services, and, fundamental to all, conducting a broad program of educational research.

The Presidents of two of the founding organizations are here today:

> Dr. Roger Heyns of the American Council on Education and Dr. Sidney Marland of the College Entrance Examination Board.

Dr. James Bryant Conant, who chaired the Carnegie Foundation-appointed Committee on Testing which recommended the creation of ETS, who was a charter Trustee of this organization, and who served as the first Chairman of the Board of Trustees, was unable, unfortunately, to be with us today.

We salute his vision and acknowledge his many contributions to this organization. Let me share with you a letter he recently sent to Bill Turnbull.

> As you know I have declined your cordial invitation to attend the conference on May 5 and 6. I am sorry that I am too old to participate in such an interesting program. I appreciate being included.
>
> The main purpose of this note is to salute you and Henry at the time of the dedication of the new Henry Chauncey Conference Center. Thanks to your kindness of a few weeks ago, I realize the excellence of the Conference Center. You will carry on the tradition that Henry has over the years established. I am proud of the part I played in the initial founding of ETS. Therefore, when on Monday, May 6, you formally dedicate the Center, please think of me as being present in spirit and applauding as vigorously as I can.

Dr. Conant, we do acknowledge your presence in spirit and I think I hear your applause.

On behalf of the officers, staff, and trustees of ETS, I would like to acknowledge the role played in the founding of ETS by the American Council on Education, the Carnegie Foundation for the Advancement of Teaching, and the College Entrance Examination Board, and to express our gratitude to them.

Henry Chauncey, for whom this Conference Center has been named, was also highly instrumental in the founding of ETS and served with distinction for 22 years as its first President. Under his leadership, and the leadership of Bill Turnbull and the other officers who served during these first 25 years, ETS has de-

veloped from a small testing agency into a multipurpose educational organization. Its measurement programs and related services have broadened in scope and purpose, and its research activities have extended into new areas of learning and human development.

The concept of establishing an educational conference center on the ETS property dates back to 1955 when the decision was made to purchase this tract of land, and it was included on the first master plan for the property. It was Mr. Chauncey's firm conviction then, as it has continued to be over the years, that a conference facility on-site would provide the opportunity for closer working relationships with the many groups ETS serves and would serve to build strong ties between this organization and the educational community generally. After many years of planning, many sets of plans, and many proposed sites, the Board of Trustees at their Annual Meeting in May of 1970 authorized construction of the Center and voted unanimously to name it for Henry Chauncey, who at that meeting retired from the Presidency. Ground was broken for the Center in December of 1971, and it welcomed its first guests in September of 1973.

May I insert that this Center was nursed physically into being by many members of the staff. I would be remiss not to acknowledge the head nurse, Kay Sharp, assisted by technician Trustees such as George Baughman and John Millett.

I now call on Bill Turnbull, who has been Henry Chauncey's strong right hand since the founding of ETS and who is now serving with equal distinction as its President.

Tribute

IT IS MY PRIVILEGE to read the contents of this presentation booklet, which we would like Henry Chauncey to have in commemoration of this occasion.

Henry Chauncey was instrumental in the founding of Educational Testing Service and supplied in generous quantity the wisdom, the vision, and the leadership that were essential to the new organization from its founding in 1048 to his retirement from the Presidency in 1070. But it is not alone for his remarkable accomplishments in the development of this organization that we honor him today. His range has always been wide, and his talents have been placed at the service of all education through his unstinting efforts throughout the distinguished career he has continued to pursue. Such men are rare.

Henry Chauncey is one who relishes action and who treasures people. The Center we dedicate today has 9/67

as its central purpose the assembly of people to plan and carry out action. Characteristically, it was Henry Chauncey who was the earliest, the most ardent, and most persistent advocate of the Center that has now taken shape. It is with deep feelings of gratitude, pleasure, and affection that we now name these buildings the

HENRY CHAUNCEY CONFERENCE CENTER

It now gives me particular pleasure to make a special announcement.

It's not news to anyone here that Ben D. Wood has been for many years a pioneering and creative force for improvement in education. He is also a man who treasures the creative and progressive impulse in others.

Some time ago, Ben Wood told me that when the appropriate moment came he would like to help recognize Henry Chauncey's singular contributions to education through whatever device or invention we at ETS might decide upon. It seemed to all of us who had worked with Henry that this dedication would indeed be the time. Of course, we thought immediately of several

possible tributes: a track for jogging in the early hours, or a set of new paddles for the canoe, a silent muffler for the VW, and so on.

But somehow, none of these highly desirable gifts quite did it. We knew that Ben and Henry share an appreciation of science and, above all, a belief that the decorative and the useful arts should be fused. And we decided, accordingly, that what we would really like to do is have on this property and as part of this Center a sculptured sundial named in Henry's honor. Having reached this conclusion, we looked at some handsome examples. But, you know, neither Ben nor Henry has ever been content with a copy of a model, and so with the help of our mutual friends Kay Sharp and Mike Rapuano we have arranged to commission the creation of a totally original sundial by a noted artist and sculptor. It will, I'm sure, be decorative as well as functional.

This word is totally unexpected on the part of both Henry Chauncey, who had no prior knowledge of the gift, and of Ben Wood, who had no idea what we would decide to do with it. I do hope that the result of the subterranean deliberations we have had will please both of them and you, and will constitute an additional reason for your coming back before long. I'd also like to congratulate Henry Chauncey on this additional tribute and to thank Ben Wood for his sense that some added personal touch would cap the dedication of the Conference Center in Henry's honor.

Response

THERE ARE SO MANY SURPRISES today that I'm completely overwhelmed. But I must say this is about the most heartwarming, wonderful occasion one could ask for—so many old and good friends and so many stalwart supporters of Educational Testing Service over these last 25 years.

However, it's also a humbling experience because I know more than anyone else that I am being given credit for what really belongs to many other people. And, I am reminded of "Rabi's Law"—some of you may recall this Professor Rabi, the Nobel laureate physicist of Columbia, who said, "You either get something done or you get credit for it—never both." When so much of the credit is attributed to me, it must mean that others were responsible for the accomplishments—and that is exactly the case. And I am going to come back to that in a minute.

John Caldwell has given you the official history of ETS

and the Conference Center. Now let me give you the true "behind the scenes" story of how it happened that ETS and the Conference Center came to be located here.

It all started with a Christmas gift costing $1.25 that Laurie gave me some 10 years ago. Laurie and I liked to take hikes on a Saturday or a Sunday—or both. Now this was before the days of Women's Liberation, but when Laurie got tired of carrying the lunch, she knew what to do. So that Christmas she gave me a $1.25 knapsack. Frankly, I didn't think it was very adequate, but it was a truly nonprofit ETS-type Christmas present. Obviously we had to use it at the first opportunity, which happened to be the following Sunday—a bleak, raw December day.

At that time we lived just across Stony Brook, so we forded the stream and cut up through the woods. We came to a place in the wilderness where several paths crossed, which we dubbed "Times Square"—now the site of the sewage disposal plant! We sat down and had our lunch. After lunch we penetrated more deeply into the woods and finally came out upon a vast stretch of open fields invisible from any existing roads. Since at that time ETS was operating in eight different locations in Princeton and we were considering various building sites, this struck me as being a fine piece of property for ETS, so I asked Laurie to stand still in the chilling cold while I paced off the fields to get some

estimate of their actual size. I later reported this find to Mike Rapuano. He was somewhat dubious because it was not "clean" it had houses along Rosedale and Province Line Roads. But, he agreed to look at it, and early one morning we walked in from Province Line Road very stealthily so as not to raise any expectations on the part of the owner only to find that the whole area was blanketed by fog and completely invisible. Nevertheless, the virtues of the property were eventually appreciated, and it was acquired--and here we all are. And I guess the moral is, a $1.25 knapsack can make a surprisingly good Christmas present!

But ETS and the Conference Center would not be here except for the efforts and contributions of many people. And there were so many! I would start with James B. Conant, who had the original idea, and Devereux Josephs, who quarterbacked the merger and supplied important initial funds, and George Mullins of the College Board, who backed the effort. Then there were Carl Brigham, Ben Wood, L. L. Thurstone, and William Learned, who were the intellectual giants and pioneers of the founding organizations. And we owe a tremendous amount to them.

Much is owed, too, to the remarkable group of persons who have served on the Board of Trustees over the years and who have given so much time and unfailing support particularly through the early, difficult times and later when the problems were less

critical but more complex. They have been wonderfully wise and helpful. I am glad that their names are listed on the program and that many of them are here today.

The most important element in making ETS what it is today has been the continuing contribution of Bill Turnbull. He was, to use Dean Acheson's phrase, "present at the creation." He was involved in every aspect of every development from that day to this. No one will ever fully know, I think, except me how central and how great his contribution to the progress and growth of ETS has been.

Others should be mentioned—all of the able, imaginative, hard-working people who have worked at ETS over these years. But, unfortunately, the list is too long. But there is one person who must be singled out today, and that's Kay Sharp. She also was "present at the creation." Throughout the whole history of ETS, her contributions of insight, judgement, and hard work selflessly given have had no small part in molding the quality of ETS' accomplishments.

In the last few years, much of her effort has been focused on the creation of the Conference Center. If my name is attached to the Conference Center, it bears the imprint of Kay Sharp– her high standards of quality, her attention to every detail, and the spirit of hospitality which is so evident in every aspect of the Conference Center.

And I would like to pay tribute to the very unusual group of people who worked on the Conference Center. The architect, Charlie Warner, who is here today, who provided the skillful and imaginative design that fits so gracefully into the surroundings; and the landscape architect, Mike Rapuano, whose artistic touch has given ETS its unique character and provided such an attractive setting for the Conference Center; and Edith Queller, whose taste has given the interiors charm and warmth—but, most of all, to Kay Sharp, who really "put it all together" and brought her own artistic touch to bear on the whole enterprise.

And now I would like to close with a story on myself. It occurred many years ago, when I was first an Assistant Dean at Harvard. I was asked to talk to the new freshmen at a "Smoker." I thought hard about what one might say to students who were just starting their college career in a day, I may say, when students were less mature and less sophisticated than they are today. Certainly I was quite simple in my views.

In any case, when I arrived at the "Smoker," I found somewhat to my dismay that President Lowell was also going to speak. He was quite a venerable and awesome figure at that time. I was first, and I started by telling the story about Andrew Carnegie who was purported to have once been asked which is most important in business—capital, labor, or management; and he responded—which is the most important leg of a three-legged stool? I went on to say that college had

three parts- there was the academic work, the extracurricular activities, and the social life. But, I said, the analogy of the three-legged stool perhaps wasn't quite right- it was more like a cup of coffee—where the coffee corresponded to the academic work, the sugar to the extracurricular activities, and the cream to the social life. I then went on to discuss each of the three parts and their relevance to a full college life. As I turned to sit down, President Lowell leaped to his feet, and he said, "The important thing is to DRINK it!"

It occurs to me that the Conference Center also involves three roles: the business that is attended to at the meetings; the recreational activities that the opportunities provide; and the good fellowship of those who visit here. I am confident that everyone who comes here will "DRINK it."

Benediction

Let us pray.

Our Heavenly Father, *as we bring this dedicatory ceremony to a conclusion, we pause for a moment to raise our minds and our hearts to you. And there are so many, many reasons why it is fitting we should do so.*

First of all, Father, *we need to turn to you lest in man's tendency to inflate his importance we are deceived into assuming that we humans are the only ones concerned with human life, human development, and increased productivity. You not only gave us human life, you sent your Son that we might have life more abundantly. So keep reminding us of your loving concern for us and our need of you, both individually and corporately.*

Secondly, Father, *it is good that we turn to you at this moment with hearts full of gratitude. We thank you for all the persons down through the long years whom you have inspired and sustained in their leadership of this enterprise, which today is beginning a new phase in its history. Thank you for Henry Chauncey. Thank you for all the big people without whom all this would never have happened. But thank you, too, for the little people who carried on so much of its complicated work.*

And finally, Father, *we do want to ask your blessing for what we hope is a promising future. This beautiful Henry Chauncey Conference Center is a substantial symbol of hope. But we are mindful that unless the Lord builds the house, those who build it labor in vain.*

Loving Father, *we must be lovable because you love us. Give us a deeper awareness of the perfectibility of the human person. Give us a deeper sense of our responsibilities to these human persons so that we may be instrumental in helping human beings reach the potential with which you have endowed them, as well as the wonderful destiny that is theirs and ours, to share in your wisdom and your love, now and forever.*

Amen

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