

*W. O. Twaits*

## EDUCATION AND ECONOMIC GROWTH

HISTORICALLY WE HAVE TAKEN IT for granted that the pursuit of higher education has been an end in itself, initiated by the individual's cultural and financial ambitions. In fact the general emphasis on the value of education has been from the individual standpoint rather than from the contribution to the welfare of society as a whole. While this has been the public conception, industry has had to recognize the importance of higher education to productivity and progress, as demonstrated by financial and other forms of support to universities and colleges. Industry management, in short, has been faced with the day-to-day realities of the "knowledge explosion" and the necessity of rapidly increasing its educational resources. In my own company, 15 per cent of the total work force hold university degrees, and we would expect that this will rise to 25 per cent in relatively few years.

The importance of higher education to the national economic health was not sufficiently realized until the dramatic report of the Senate Committee on Manpower and Employment was made public in 1961. This report, it will be recalled, established a direct correlation between low standards of education and high and continuing levels of unemployment. Even this somewhat negative proof, however, did not properly indicate the need or the real nature of the problem. In the intervening period major studies that have been carried on in Europe and more particularly in the United States have dramatically reinforced the connection between standards of education and national progress. Thus it was that, following the formation of the Economic Council of Canada, it quickly became apparent that policies for economic growth in this country could not be devised without a thorough inventory and assessment of our skills. It is of no use to talk about resources, capital availability, or other factors pertinent to our competitive position, unless we are armed with competent knowledge and skills. In simpler terms, it is only people and the abilities of people that can make effective use of tools and resources.

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The Council will supply important statistics in its second Annual Review on the effect of education on economic growth. There can be no doubt from these data that a higher educational level is a major and positive factor in augmenting national productivity and the gross national product. There are also some rather disturbing features of this evaluation of our educational capital and the size of the task that confronts us.

First of all, contrary to a widely-held Canadian belief, our average educational level in this country does not rate well by comparison with that of the United States. In our male working force only some six per cent had university degrees (1961 census) compared with almost eleven per cent in the U.S. About 25 per cent in Canada had completed four years of high school, whereas for the U. S. the figure was almost 50 per cent. In comparative working forces, therefore, our neighbours had a relatively much larger educational stock at the higher end of the educational spectrum.

In years of education, a gross but representative comparison is possible. The U. S. was ahead of Canada in every age grouping. In particular, the gap was widest in our most important age group, that of persons between 25 and 44 years of age. In this age group the average American has more than two years of school time over his Canadian equivalent.

The relationship between education and income, as evaluated in this study, is obvious but rather startling. For example, the lifetime earnings of the average university graduate (again calculated on a base of the 1961 census) would be almost three times greater than the earnings of those with elementary school education or less, 75 per cent more than four-year high school graduates and 50 per cent more than those with senior matriculation or a partial university education. These, to repeat, are average earnings which would vary substantially between occupations or disciplines. However, on this basis each year of university is worth to the graduate about \$35,000, and even each year of high school increases a secondary school graduate's lifetime earnings by nearly \$20,000. There are many of us who think that these figures are very conservative and tend to understate the case, and that they are worth remembering by those who feel inclined to complain about fees or contemplate the difficult grind of an academic year. Statistics only re-establish the accepted fact that it is in the financial interest of the individual to pursue higher education.

The figures also suggest the dramatic effect of educational "upgrading" on the nation and its economy. The Council's studies go on to point out that educational upgrading has increased average real income substantially less in Canada than in the United States. The calculations are carefully adjusted

to avoid attributing to education other influential factors. And while precise measurement of the influence of education on productivity and income may be impossible, the conclusion is unavoidable—a high-education content in the economy indicates a high income economy, which in turn rests on and fosters high economic growth rates.

Incomes, in fact, reflect productivity, and it is apparent that each time we move an individual from the bottom to the top of the educational scale, we are trebling his productivity. This, of course, has tremendous implications for the development of national economic policies. For example, for many years Canadian productivity measured in terms of per capita GNP has remained at a level of approximately 70 per cent of the U. S. figure—that is, individually we produce only about 70 per cent of the U. S. output, a situation that has an obvious bearing on our comparative standards of living. One of the most significant aspects of these new data is that during this same period it would appear that we have also made no gain in our comparative educational levels with the U. S. Certainly this is not a simple cause-and-effect relationship, but added to our other data it establishes the improvement of our stock of educational capital as the major task of the country.

If we accept the economic importance of higher education, as we must, many of our established actions must change in a revolutionary rather than evolutionary way. Higher education is now assuming, and must assume to an increasing degree, the social and economic importance that elementary education held thirty-five to fifty years ago. What does this development suggest for higher education as an institution? Without entering the already controversial field of the professional educator, and considering the question only as it concerns the demands of industry for trained personnel, I suggest that we must look forward to three areas of change. These are all interdependent and in a practical sense cannot be separated. They are as follows: (1) greater accessibility to higher education and changes in organization; (2) major changes in the nature of both the study and research carried on in the educational process; (3) an end to traditional academic isolation and, by corollary, increasing communication between the universities and the public.

In regard to the first, it is clearly apparent that the community must rapidly develop a recognition of the importance of the educational "mix" to the community's productivity and income. With this recognition it is axiomatic that community interest will ensure that every person becomes as well educated as his ability allows. Can we then take a position in which the door is slammed on further educational development by a flat percentage ruling

on university entrance—a position in which there is little opportunity for the “dropout” to resume his studies and in which terminal curricula give the individual little opportunity for higher learning. Can such situations be compatible with society’s general need for upgrading the levels of education?

In the past, these situations did not present problems because our traditional view of higher education was related to the single problem of maintaining academic standards. In the future, it will be our problem to maintain and even increase standards while at the same time permitting much broader participation in the process of higher education. One possibility, already under development in some areas, is the community college with its welcome to the “mature student” who may not have achieved formal entrance requirements. Another is the experiment at the University of California which, at least on one campus, will attempt to abolish the formal degree.

Another aspect of this shift in emphasis and broadening is the increase in importance given to teaching methods—considered in their broadest sense—in institutions of higher learning. Today we see the adoption of tutorial methods and of a variety of devices aimed at communicating the greatest amount of knowledge to the student in the most efficient manner. This is in sharp contrast with a classical tradition of professorial excellence which has placed a premium on incomprehensibility. I am not suggesting, of course, that we attempt to stuff the student with facts. Our first objective should be and must be to develop thinking ability and the acquisition of knowledge acquisitiveness at any stage of the learning process. But we should not let teaching methods continue, as they have sometimes done in the past, to act as a barrier to learning.

Obviously this trend poses a great challenge to the system of management of higher education. Heads of universities and colleges will be entrusted with the job of increasing the output of institutions of higher education by several hundred per cent without permitting a diminution in quality. Already this situation is imposing a considerable strain on traditional university organization. The role of the layman and the academician in university administration, and communication of the universities with the government and the public, are even now under close and often controversial scrutiny. Traditional university government never contemplated the current and foreseeable dimensions of higher education. The cloistered life and the segregation of disciplines really date back to the origin of the university in mediaeval Europe.

Now we have the problems not only of numbers but of an overlapping of disciplines which is increasing at a frightening pace. I have no intention

of intruding my views into what is already an overcrowded forum, except to note that there is an increasing body of informed opinion which advocates that the universities must take a long and careful look at the principles of organization established in large-scale industrial enterprises. Here, surprisingly enough, are gathered the same problems of professionalism, a variety of disciplines, and similar problems of co-ordinating the efforts of intelligent and individualistic people towards a common objective.

The second area in which I look for major change is in the process of study and research carried on in the educational process up to and including the university level. Here it would appear that there are two distinct parameters. First, we are attempting to crowd into the same span of years an increasing amount of knowledge and learning. It may be that with promised medical advances and greater longevity we can at some time in the future anticipate a normal graduation age of 30 or 35 with an appropriate and satisfactory working span of life to the individual. In the meantime, it is difficult if not impossible to envisage a longer period of higher education, including additional postgraduate training. The other parameter is that the universities *per se* can not in themselves accept the responsibility for the total upgrading of higher education that is so urgently required.

These conditions, I believe, are self-evident and imply first of all that elevation of basic standards of knowledge must be emphasized at an earlier point in the educational process. New teaching methods and subjects must be introduced at the primary and secondary school levels. This is already being done in a number of areas with rather startling results. For example, languages, mathematics, elementary economics, and sciences can be introduced in the early primary grades with an almost unbelievable effect on the rate at which the child subsequently absorbs a higher degree of learning. Parents must face the prospect of being confronted with the horrifying spectacle of an eight-year-old playing around with binary systems, supply and demand equations, and similar problems. Languages are a matter of particular concern to Canada, and it is hard to understand why we did not realize sooner that the simplest way to learn another language is the way by which we learn the first one—by listening, not by receiving instruction in grammar and composition.

This is probably the most important change that must be made in the nature of the study process. It is to be hoped that parents who have become indignant over Johnny's adaptation to new methods of teaching will not lose sight of the overall advantages and importance of improving instruction both quantitatively and qualitatively in the early years. This in turn, of course,

affects the process all the way up, putting even more of a burden on the student's powers of absorption which, it must be conceded, are already unduly loaded under today's system in the upper secondary and the early university years.

This trend also has a potentially large impact through its contribution to the development of useful theory in many university disciplines. For example, it is a matter of concern to many of us that economic theory contributes much less than it should to the decision-making processes in business and government today. This, I suggest, is because some people in the discipline have neglected the objective, scientific approach upon which economic theory was founded by Adam Smith and have substituted for judgment artificial criteria derived from contemplation of abstract models, models that do not and cannot exist in today's society. Economic theory, for example, has largely failed to accept or understand the implications of technological as well as social change.

As a result, we have public attitudes and political thinking even at the high academic levels which are not only obsolete but dangerously out of context with the realities of modern industrial society. Our thinking is still grounded in the classical definitions of monopoly, pure competition, and supply-and-demand relationships which are neither practical nor socially desirable. We have failed to understand the market economy, the roles of the consumer and of capital, and particularly the role of technology.

A simple example is the use of synthetic materials. It is perfectly easy to envisage the raising of sheep, the spinning of wool, and the weaving of material. But I doubt if many of those who wear them have the least idea of the sophisticated chemical processes and the industrial organization involved in the production of nylon, celanese, dacron, and the hundreds of other synthetic fabrics that are so common today. Yet economic theory is based largely on the elementary production sequence. Again, there is no such thing today as a monopoly—there is no captured consumer because technology has developed alternatives. The invasion of synthetics into the field of metals is dramatically in evidence in the equipment around our own homes. Finally, there is that elusive and unpredictable factor, the modern consumer. He is not a demand cipher, he is blithely unconcerned with marginal cost or demand elasticity, he is in complete command of his disposable income, and he therefore wants to purchase the best quality at the lowest price at the most convenient time and place. He is responsible for supermarket one-night shopping, modern home conveniences and many other accepted necessities of modern

life which many economists have not yet learned to accept as the great and companion force to technology in our market economy.

Considerable emphasis has been directed to this area because in reality everything under discussion comes down to greater public understanding of the socio-economic process. It is here that the universities and only the universities can and must make a great contribution in the future if we are to achieve the improvements that we all desire. In part at least the problem has been due to over-specialization. This is inevitable for academic excellence, particularly in the research function of the university; but in the teaching function—which is our present concern—it is far less desirable. Even at the research level the abstract model can be used only for testing simple variables. The application of these abstract models to public education blocks the very awareness that we are trying to develop.

In corporate life we are very much aware of this situation. Inter-disciplinary overlapping is something that we must accept and foster. The mathematician who knows nothing about operating techniques and the operating manager who knows nothing of mathematical techniques are a dangerous combination in this computer age. Similarly we find geology, chemistry, geophysics, economics, and mathematics all penetrating into one another's traditionally sacrosanct disciplinary boundaries.

The final area of change that I foresee is almost a product of the two that have already been mentioned: an end to academic isolation and, by corollary, a closer identification of the university with public thinking and policy. Despite modernization and expansion the cloister still tends to dominate the academic atmosphere. There is not, in other words, that vital link with day-to-day life, in the sense of the major elements of the community, that would be so productive toward our future well-being.

In a sense, the recent student demonstrations at the Berkeley Campus of the University of California might be considered a symptom of this problem. Here the students attributed the outburst to a feeling of alienation or separation from everyday life and its institutions. I find it hard to accept this hypothesis, since it is evident from the figures that have been quoted that the university graduate today is guaranteed a place in society, and failure to recognize this appears to be anachronistic. Yet, making due allowance for the normal crusading attitude of undergraduates, some weight must be given to the vigour and intensity of student criticism of the system. The theme "this is not real life" is hardly appropriate to the view that higher education must in fact become mass education. Somewhere, obviously, there is the need to identify the

institutions of higher education with our daily life, just as we do primary schools, the automobile, and taxes.

I know of no quick way of achieving this; certainly the solution cannot simply be the result of changes in university government or of academic initiative. Only widespread public recognition of the vital economic role played by higher education will, over a period, break down this sense of isolation and allow the institutions of higher learning to identify themselves more directly with the social and economic progress of the community.

At least in one area this has already begun with the trend toward much closer links between higher education and the business community. Those of us in technically-oriented industries have, of course, long maintained close liaison with the disciplines of science and engineering. The industrialist and the academician, it is true, are now finding more and more common ground, an increasing awareness of each other, and a recognition of the similarity of their problems. Important though it has been, however, in the financial support of higher education, this in itself involves a relatively small element of the community.

As I see it, public recognition of the importance of higher education must be accompanied by financial support from the public at large. This is being given today to the extent that provincial governments are carrying, from general revenue, the major burden of university expansion. It is constitutionally the correct point of burden under the B.N.A. Act. Yet I find it difficult to see how we can any longer ignore the need for additional federal support in this field. Local responsibility for primary and secondary school education can be justified on the ground of serving a narrow area, although even this has become a problem in urban concentration. The universities, on the other hand, cannot serve a local area only. Nor can appropriate educational standards in terms of university rating be maintained equally at all points in the country. The advance of Prince of Wales College to degree-granting status is only one example. Another is the ability to develop graduate schools, so important to our future supply of academicians, which can only be done at large centres of learning. Are these not indeed a national responsibility if, as I submit, higher education is fundamental to the progress of the nation as a whole?

I could argue reasonably that some of the social service measures we are adopting under federal-provincial sponsorship today should be secondary to the more important problem of upgrading our total educational system. I know that this view would be supported by many leaders of thought and industry outside the educational community itself. Yet the practical political



obstacle to such a course of action is lack of public understanding or recognition of the problem. Once there is the public demand there will be no problem of public identification and support by political action.

At the outset it was suggested that in contrast with the current 15 per cent, within a generation or two there will be perhaps 60 per cent of our young people in universities. When we achieve this level, public opinion will not be a problem—the requirements of both identification and support will have been met. In the shorter term, our main objective must be to initiate this ultimately self-sustaining cycle by whatever means possible.

The path is not going to be easy. Development of community colleges, major reforms in the curricula at the primary and secondary school levels, the evolution of graduate schools, and other necessary changes, all offend the status quo and are therefore subject to resistance, particularly by the uninformed. Perhaps our first step should be to give much wider dissemination to the economic impact of educational level on individual income. In other words, we should pursue and emphasize the individual's own interest. Today in many cases this is being vividly demonstrated but in a negative form—by the unskilled man who cannot find a job. We need more positive terms such as we now have from the study of the Economic Council of Canada.

Finally, the socio-economic cycle of the future should be envisaged as a benign cycle. The increasing proportion of university graduates in our working population will sharply increase productivity, which in turn will be reflected in increasing participation by subsequent generations in the educational process. Through this greater participation the university will become more identified with public life, with socio-economic developments, and thus close the cultural lag which today is seriously handicapping public policy in many areas.

In short, the meaning of the word "academic" will no longer carry the connotation of isolation from the work-a-day world. But one of its connotations—that of academic discipline—will, I think continue unabated. It is appropriate to close on this note. In an address honouring the memory of a great classicist one can reflect that he would note a great many changes in the academic world of tomorrow from the one he knew. But one thing that would remain unchanged would be the discipline of academic life. Regardless of the transformation of curriculum and campus, Robertson would find no change in the dedication required of the student, the teacher, and the researcher. The more it changes, the more essential will become the central character and spirit of higher education.