

THE RESEARCH ROLE OF SRI LANKA'S UNIVERSITIES

S. N. ARSECULERATNE

This essay is concerned with the research role of universities in Sri Lanka—a poor, technologically underdeveloped country—and relates particularly to the natural sciences although its themes may be equally applicable to other university disciplines as well. Its discussion revolves around a concept of development which, it seems to me, should reflect not only the complex of factors which are included in the Physical Quality of Life Index (PQLI) but which should also include the fulfilment and expression of the less objectively definable areas such as the intellectual and creative potentials of our people.

The basic premise of this essay is that a vital function of a university, in any country for that matter, is the generation of new knowledge, in a word, research. The word *research* as used here has an extended meaning. It includes not only the more obvious, conventional pursuit of simple or esoteric field, laboratory or clinical investigation with or without sophisticated gadgetry leading to the discovery of new data, phenomena and the formulation of new theories, but also the less obvious yet basically as important attitudes and activities of the mind—the capacity for and expression of original thinking, the identification of new interactions and inter-relationships and the construction of new solutions. The latter factors while being indispensable to research in practice could and should, as this discussion attempts to show, be a vital part of the teaching-learning process. It is the lack of a definition of what authors mean by 'research' that has led to much of the confusion about the role of research in higher education.

This discussion could be made around some myths and misconceptions prevalent in our university scene.

- Myth 1.* Scientists in Sri Lanka need not do research themselves; they could use the research data that have been generated in other countries.
- Myth 2.* The legitimate business of a university teacher is to teach; implying that research is a luxury or a dispensable sideline.

Innovative science can only be generated through instruction, whether it be in schools or in universities, which goes beyond the mere cataloguing of scientific facts however extensive the coverage may be. What seems to be more desirable and productive is the integration, synthesis and interpretation

of this data and its creative extrapolation to what is at present obscure. All these activities require varying degrees of original thinking. Our teaching methods are hamstrung by traditional attitudes — the sole reliance on authority, rote learning, the non-questioning of a teacher's views—and do not equip the students to deal innovatively with new situations. It is in this context that I would regard scientific 'scholarship' as incomplete without an overlay of reflection, analysis and expansive thinking about the mass of scientific data that is now applicable to us.

Within each university, the activities of its students and staff which would fall within the broad definition of research made earlier, would appear to parallel the spectrum of activities encompassed by this definition of 'research.' Thus the exercise of original thinking should be the core of the teaching-learning process of under-graduates and as we move up the scale through senior undergraduates, post graduates and the teachers themselves, increasing degrees of the practice of research should be complementary.

The need for sustained local research in a technologically underdeveloped country was discussed in an earlier paper¹ but bears repetition. "Each country is unique in respect of its economic status, its social structure and cultural heritage, its problems of health, ecology and environment, the availability of its resources, raw materials, by-products and wastes. Given a sufficient degree of basic scientific capability" (which I believe Sri Lanka has) "some amount of innovative and not mere imitative scientific expertise must be brought to bear upon developmental efforts which are based on these factors. The uniqueness of each country would imply that little or no relevant information may be available on these aspects in other countries."

In relation to the medical field "I do not subscribe to the idea which trends in medical education in this country would make us believe, that our sole function as practitioners of western medicine, is merely to use the data that has been generated in other countries through their research based on originality and inventiveness. We cannot be mere purveyors of second-hand data and absolve ourselves from the need for contributing of such knowledge, if only because much of the knowledge that is relevant to our patients is not to be unearthed in other countries. It can only be generated by research in our environment." This view is perhaps true of other university disciplines as well.

With this recognition of the research role of a university, it can be argued that a university in a poor, technologically underdeveloped, country, has an essential role in its developmental efforts. This arises from the fact that such development entails mainly agriculture, health, engineering, other disciplines

in the natural sciences (fisheries, animal husbandry, plantations) and even the soft sciences, sociology, geography—all of which are the concern of university departments.

The existence of these diverse faculties, departments and disciplines within a university would equip such an institution to be particularly suited to provide innovative solutions to our developmental needs. For the term 'development' implies, necessarily, a multifaceted approach, the success of which needs the integration of the varied aspects of each developmental plan. For instance, the Mahaweli Scheme involves agriculture, engineering, health, manpower and sociological aspects, none of which tackled individually and in isolation can lead to a successful operation of the overall scheme. It is evident that, for example, a neglect of the health aspects or the use of agrochemicals or of psychological factors in the settlers, would undermine the successful operation of the scheme, however competently the engineering aspects are covered. The requirement is therefore for multidisciplinary as well as interdisciplinary coordination with a recognition of the unique problems posed by Sri Lanka's ecology, resources and social structure, together with a broad overlay of innovative thinking. We cannot transpose the experiences and solutions derived from the Tennessee Valley Scheme in the US or the Aswan High Dam project in Egypt, but we need to study the problems and provide the solutions which are related to our own context. Other examples of such interdisciplinary complementation include, for example, archaeological research with new scientific technology to discover the techniques and materials used in the painting of the Sigiriya frescoes, or the engineering techniques used in our ancient hydraulic constructions.

Having argued that research is an essential component of university academic activity, the problem then arises, of the desirable and feasible depth and scope of a don's research. It seems to me that the situation in a Sri Lankan university (as in most universities of poor, technologically underdeveloped countries) would differ from that of universities of the advanced countries. Firstly, our inputs (manpower and financial) are limited. Manpower shortages would require that the available pool of active researchers diversify their research interests to cover as much ground as possible for the solution of their country's urgent multifaceted developmental problems. Limitation of funds results in the non-availability of expensive or sophisticated equipment and other facilities which are often necessary for in-depth, fundamental research and this would make extreme specialisation in a narrow field as often happens in the advanced countries, a difficult goal in our situation. These considerations lead, in my opinion, to a qualitatively wider scope of research interests though at a less specialised level, of the individual scientists in countries such as ours. Yet it is to be noted that in absolute terms, in whatever country, a wide range of interests has its advantages as expressed

by Himsworth^{3a} ".....the wider a man's awareness of the extent of knowledge to which his particular interests are related, the more effective his research."

As far as the content of student instruction is concerned, this difference between universities in poor and in advanced countries would be less marked. "It is commonplace to say that the amount of knowledge in any major subject is now so large that no man can hope to be an expert on more than one aspect of it. Yet the university department of which he is a member has, of necessity, to give (at least to the undergraduates to whom he is responsible) instruction in all aspects. In the traditional uni-professorial department of customary size, this means perforce that the individual staff member has to teach on and keep up-to-date in, aspects of his subject in which, as his research develops, he inevitably comes to have a less vivid interest."^{3b} In the Sri Lankan teaching situation effective reaching in all topics covered by an individual teacher must necessarily involve a presentation of data that is relevant to our own environment and this data can seldom be obtained from western texts written by alien authors. It therefore means that only research done locally can supply this relevant data for useful student instruction. This in turn implies the need for a wider coverage of research topics than is commonly found in university departments in advanced western countries. It is with this aim in mind that our departmental research has attempted to cover a wide range of diseases and their causative microbes.

Another aspect of the impact of original thinking and research on teaching (apart from providing relevant data) is that effective teaching necessarily involves discussions with both undergraduate and postgraduate students. These discussions should provide answers and explanations to their knotty problems; such discussion can be intellectually satisfying only when the teacher goes beyond mere factual recall to higher levels of thinking such as integration correlation, synthesis and innovative or creative and valid extrapolations which are essentially the substance of research. In this context and in the sense in which I have used the word research, and in terms of the function of a university as discussed earlier, I cannot agree with Carter's views³ ".....Thus it is not true that teachers in higher education are necessarily concerned with exploring new frontiers of knowledge. This is an illegitimate extension to all subjects of a typical activity of the scientific experimenter or observer."

It may be useful to consider the origins of the low key status of research in Sri Lankan universities. A convenient starting point is the fore-runner of the modern Sri Lankan university's faculty—the Ceylon Medical College set up over a hundred years ago, which later became the Faculty of Medicine of the University of Ceylon. This college was set up during the British

colonial administration for the production of medically trained personnel who were to be subservient to their British professionals, to attend to the medical needs of the population especially in the plantations which were vital to the British economic interests in this country. This orientation and training of the local personnel in 'subsistence science' (for the performance of a job or task for which factual instruction through rote learning was barely sufficient) has been maintained over the decades although it is only during the last 20 or 30 years that some degree of medical research by the local personnel had entered academic activity. Yet in undergraduate teaching, instruction remains almost entirely pedagogic with teaching based on the imparting of facts with the limited objective of preparing the graduates for subsistence medical practice. What has happened cyclically is that these graduates who have not been exposed to the role and methods of research have then been recruited to the academic staff on criteria which exclude or ignore their creative or innovative talents or research competence and the cycle is then perpetuated with their persistence in pedagogic teaching. Given a few more decades of this trend with the third generation of such staff, we would find a consolidation of this dichotomy of research *versus* teaching; the science departments might then ultimately become mere museums of fossilised science.

This unfortunate dichotomy between research and teaching is not therefore due to any real differentiation and independence of these two activities but to the faulty orientation and training of undergraduates divorced from the exercise of original thinking or actual research. It is my opinion that it is this approach to higher education which had produced the university staff who consider research as being unnecessary in their academic activities.

Historically, Sri Lanka had its own ancient seats of higher learning—the *pirivenas*. Its modern universities however derive their structure and organisation from the British universities although as far as traditions and functions are concerned, the later development of our universities under Sri Lanka's own governments, has not emphasised their research roles; this is in contrast to the situation in their British models. It is also relevant to recall that research in the universities of Britain as in Europe made substantial contributions to the growth of modern science. Thus "It would seem justifiable to infer that embedded in the concept of a university there must be certain principles of continuing value for the promotion of research and that, whatever the circumstances, a country's institutions of higher education will have an indispensable role to play in its development."^{3c} A proviso to this statement should be added; while it is implied that research is a vital component of the academic activity of a university teacher, the converse that a

successful researcher must necessarily be in an academic institution, is not necessarily true for there are many examples of substantial research contributions to modern science by non-academic staff in non-teaching institutions.

Thus these two myths are prompted and perpetuated by two factors; firstly the incompetence of staff in the performance of research and their ignorance of the need for and the usefulness and the methodology of research. This is the situation which perhaps led to G. B. Shaw's celebrated quip "Those who can, do; others teach." Secondly, the lack of motivation for research which derives either from the lack of an internal drive for inquiry or from the absence of more mundane rewards such as material benefits, salaries and recognition.

Myth 3 Students should not be exposed to the methods, history or practice of scientific research; these are not essential to science students nor are they in a position to assimilate these aspects.

To maintain this myth is to misinterpret the concept of history as applied to science. It is not a mere scissors-and-paste catalog of scientific events with dates and names but includes an analysis of, the philosophy of science, the growth and expansion of scientific ideas, the mechanisms of advances in science, the interactions and complementarity between independently developing scientific disciplines and above all the realization that science is a body of knowledge that is not static but one which is ever changing and evolving.

Myth 4 Students need do no original thinking. Pedagogic instruction on factual data is what they need.

Myth 5 Students are incapable of original thinking at this stage of their careers.

These are some of the most damaging of misconceptions amongst university, or even school teachers, which has largely contributed to the feeble research orientation of Sri Lankan science personnel. A discussion which argued on the contrary, that students and the young are in a privileged position to contribute to new ideas in science was presented elsewhere.¹

Sri Lankan universities have shown in the last decade a marked and sometimes disproportionate increase of its administrative cadres while on the other hand their research activities have been overwhelmed by increasing administrative burdens on their academic staff, dwindling research funds and technical assistance for research, depletion of staff and insufficient exposure of the still active researchers to international centres of scientific activity. In

addition to the correction of these deficiencies, there is an urgent need for an administration that is sensitive to the needs and vital role of a well balanced research capability within our universities, for Sri Lanka's development.

In the student sphere, the proliferation of universities and the increase in student intake have often been cited as indices of the development of higher education in Sri Lanka. More relevant questions can then be asked: has there been a proportionate increase in the research output of the universities and of its graduates who have entered other research departments or institutes or of innovative contributions to the fundamental or applied aspects of science in Sri Lanka, as inputs into its developmental schemes? Don't we, in spite of the increase of graduate numbers, still rely on foreign experts and imported scientists to perform the tasks which we should have prepared ourselves for during the many decades of university education? What are the constraints against productive, original and sustained research? If the pool of researchers has been depleted, what factors have led to this situation? These are some of the questions which have to be dealt with before a viable research tradition could take root in Sri Lanka's universities.

In the larger context of our society, the role of the universities is also that of centres which contribute to the vitality and viability of our society through creative activity in other fields—the arts, drama, literature as much as in the sciences. If there is no such expression then surely ours is a degenerate society.

REFERENCES

1. Arseculeratne, S.N. (1979.) "*The Problem of Creativity*", Presidential Address, Section A, *Proc. S.L. Asso. Advmt. Science*, p. 29-38.
2. Carter, Charles, 1980. *Higher Education for The Future*, Oxford, Basil Blackwell, p. 95.
- 3a. Himsforth, Harold, 1970. *The Development and Organization of Scientific Knowledge*, London, Heinemann, p. 75.
- 3b. *Ibid.*, p. 86.
- 3c. *Ibid.*, p. 75.