



PRECEPT AND PRACTICE IN THE
UNIVERSITY:
EDUCATION OR VOCATIONAL TRAINING

G. N. DAVIES

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PRECEPT AND PRACTICE IN THE
UNIVERSITY:
EDUCATION OR VOCATIONAL TRAINING

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IF THIS WERE 6 October 1664, it would have occasioned no surprise if I had appeared before a group of my peers clad in raiment similar in colour, but not design, to that which I am now wearing and described my expertise in the following doggerel verse:

“Ye Worthies of the British Nation
Attend to my new Operation
Let Colt’s-Teeth or Decayed Ones come
My Pinchers quick shall ease your guin.”¹

My strength, of course, would have been my greatest asset and I should also have been the village blacksmith.

A hundred years later I should have realized the importance that the public attaches to a diploma as evidence of some form of training or competence and I should, therefore, be speaking to you from beneath an impressive diploma on a rostrum at a public fair or market. My doggerel verse would have changed and I might have sought to allay the apprehension of potential clients with the following words:

“Why squeeze your Hat and seize my Cap
As if you dreaded some Mishap?
Keep not your Spirits on the Rack
I’m a Licentiate — not a Quack.”¹

These itinerant charlatans were displaced by the barber-surgeons, and then, like the development of its parent discipline, Medicine, dental education evolved from the artisan stage through a system of apprenticeship to the present position of a formal course at a university.

To-day, of course, the universities have accepted the task of training a large and increasing number of professional men and women and, since they accept public money for this, they must attempt to convince the public that they are working in the interests of society and not for themselves. The extensive experimentation in education at the new universities in the United Kingdom is, I think, a reflection of a high degree of public confidence which the universities now enjoy. This, of course, encourages increasing financial support so that the universities may put their precepts into practice.

The extent to which a dental school can put its precepts into practice is also determined in part by the extent to which its aims and function are understood and approved by the university, the community and the government. Furthermore, since the education of dentists is largely financed from public funds, I believe the public have the right to know what a dental school stands for.

In this address I propose to deal with three aspects of this matter in Queensland. First, the size of the Dental School in relation to the requirements of the State for graduates; secondly, the role of the University in the community; and thirdly, the role of the Dental School in the University and its responsibility to the community.

THE SIZE OF THE UNIVERSITY OF QUEENSLAND DENTAL SCHOOL IN RELATION TO THE REQUIREMENTS OF THE STATE FOR GRADUATES

The size of the Dental School, like the size of the University itself, depends upon what the people of the State want and are willing to pay for. In the United Kingdom the Teviot Inter-departmental Committee on Dentistry (1944)² said that the supply of dentists should be measured, not in a theoretical sense as measured against the need for dental treatment, but in a practical sense as measured against the present or prospective demand for treatment. Macdonald, the President of the University of British Columbia, went further than this and claimed (1956) that the character, function, and objectives of dental education should be based on need, i.e. the extent, severity, and cost of dental disease; whereas the size of a dental school should be based on the demand for dental services.³

This distinction is important for it differentiates between the number of graduates and the qualities that these graduates should possess. I shall elaborate on this latter aspect later but consider the

numbers question first because, and for understandable reasons, governments, and the people they represent, are generally more concerned with the availability of services than with the quality of those services.

The Murray Committee on the Australian Universities (1957) considered the numbers question in broad terms and said that :

high intellectual ability is in short supply and no country can afford to waste it; every boy with the necessary brain-power must in the national interest be encouraged to come forward for a University education, and there must be a *suitable* place for everyone who does come forward.⁴

The Committee also noted that “ the most urgent demand which is made to the Universities of to-day is for the provision of *sufficient* graduates ”⁴

Unfortunately, the Committee did not define what it meant by a “ *suitable* place ” nor did it define what it meant by “ *sufficient* graduates.”

I should have thought that their use of the word “ *suitable* ” implied that they envisaged some system of selection, or at least vocational guidance, to ensure that a student entered a course for which he had some theoretical or practical aptitude. In a later section of the report (paras. 96–100) there is a description of the system in the United Kingdom where the selection of students is based on separate post-matriculation examinations at which most candidates could not succeed before they were eighteen years of age. The Committee opposed raising matriculation standards as a method of selection since matriculation requirements are devised to exclude students who are not *suitable* to go to university at all; they are not devised to enable a judgment to be made on the student’s *suitability* for a particular profession. The Committee acknowledged the tremendous burden being placed on departments in Arts and Science which are responsible for teaching those subjects which are required by almost all departments, but they concluded that the demand for graduates was so great that *instead of adopting a system of selection, the universities should be given staff and facilities so that they could accept all who wished to enter and give them a reasonable opportunity to pass their courses.*⁴

Unfortunately, the Universities have *not* been given the necessary

staff and facilities; there is in this regard a considerable gap between precept and practice.

Aptitude tests for the selection of prospective dental students are universally used in the United States, and it is interesting to note that the Robbins Committee⁵ in the United Kingdom recommended an investigation of them. In the United Kingdom, selection is based on the academic record of students, headteachers' reports, and the results of personal interviews in which stress is laid on the following qualities: integrity, sense of duty, patience, practical bias in interests, and personality (Kantorowicz, 1964).⁶ In Australia, a limitation on the number of students entering Dentistry I is imposed in the Universities of Melbourne and Sydney. Selection there is based on academic record only.

At the University of Queensland there is no selection and no limitation on the number of students entering the course in Dentistry. Provided the clinical block of the new Dental School is completed in 1966 it may not be necessary to limit numbers; but if the additional facilities are not available by that date the School will be in serious trouble. Existing facilities are satisfactory for the provision of optimal clinical training for seventy-three students. We are now attempting to cope with ninety and by 1967 we will have to provide clinical training for more than double this number. Unless the clinical facilities are also doubled the University will be faced with two alternatives — either to accept a standard of clinical training which does not meet the minimum requirements of the General Dental Council, and thus to risk losing recognition for our degree, or to limit the number of students. In all probability we will have to do both.

An analysis of the progress of students in the Faculty of Dentistry who began their course in 1960 showed that 95 per cent of students who passed first year at the first attempt graduated with only one failure or less. On the other hand, only 12 per cent of students who failed first year at the first attempt proceeded without further failure. These and other data suggest that in this University academic performance in first year is the best available criterion upon which to judge the suitability of a student for a career in dentistry. They also suggest that when limitation of numbers becomes necessary, those students who do not pass first year at the first attempt should not be allowed to enrol in Dentistry II.

On the broader issue of the future expansion of the University,

the Murray Committee considered it essential that the prediction of university enrolments should be made department by department and that it should be based on a judgment of the national requirements.⁴ The prediction of population trends is difficult, but the prediction of the number of dentists required now and in the future is even more so. Virtually every man, woman, and child in Australia should have dental treatment at sometime in their lives and the majority should have it regularly. There is, however, a marked disparity between the need and the demand for dental care. According to a survey made by Rayner and Kruger, not more than 25 per cent of the Queensland population seeks regular dental care.⁷ There are many reasons for this, among which the most obvious is that certain sections of the community cannot afford the cost of dental treatment. Increased prosperity, better education of the public in dental matters, dental insurance schemes, and other factors would increase the demand for dental treatment, but the change would be gradual rather than dramatic unless, of course, a National Health Scheme was introduced.

The number of students which should be admitted to the Dental School in this University is also affected by its role as a national as well as a state institution. It is, I think, worthy of note that in the thirteen years from 1950 to 1962 inclusive the University of Queensland, whose home State has about 14 per cent of the population of Australia, has produced 22 per cent of all Australian dental graduates. Yet the School has failed to attract financial assistance from the Australian Universities' Commission commensurate with this role.

One should also consider the opportunities for graduates to be gainfully employed when they leave the University. The number of Queensland graduates on the United Kingdom Dentists' Register increased from twenty-nine in 1957 to ninety-eight in 1964. This one-way traffic suggests that conditions for dental practice are far from ideal in Queensland, and this observation is supported by the following facts. Of all the graduates from 1950 to 1962 inclusive, only about 36 per cent are now in private practice in Queensland and 25 per cent are in various government services. The remainder (39 per cent) are overseas, in other states, or deceased. Of the forty-three students who graduated in February this year, only twenty have remained in Queensland — five in private practice, fourteen in government service, and one in the University.

From what I have said it should be apparent that any estimate

of the optimal size of the Dental School in this University involves a number of compromises. My conclusion is that we should plan for an output of sixty graduates a year. This is obviously a much greater number than can be presently absorbed in the State of Queensland, but a new School is expensive and must be planned on the basis of the prospective as well as the present demand for its graduates. Even if Queensland fails to fulfil its potential for growth, any graduates in excess of its requirements should find gainful employment elsewhere in Australia.

THE ROLE OF THE UNIVERSITY IN THE COMMUNITY

In the broadest sense the role of the University in the community depends in very large measure on the image that the community has of its own future. It is true, of course, that the prime function of a university is to provide the large number and variety of graduates necessary to sustain and guide the economic, social, and cultural development of the community. But, as the Murray Committee pointed out, the University must provide much more than a technical or specialist training; it must also provide a full and true education,⁴ not only by teaching subjects, but also by giving students an insight into the ideas and ideals of people outside their chosen profession.

But, as the Committee on University Government of the Federation of Australian University Staff Associations noted in the June issue of *Vestes* :

In Australia there is an emphasis on a "Service Station" concept of a University not only in faculties like medicine, dentistry, engineering and agriculture but also in the pure sciences, the social sciences and the humanities.⁸

I have not been here long enough, and have been too isolated from the University proper, to find out how true this assertion is, but it does come from a representative group of University Staff and, as such, requires attention. The extent to which it is true is another measure of the disparity between precept and practice.

We are, of course, living in a world of rapid economic, scientific, political, and social change. Many, perhaps most, of the ideas which generate these changes come from individuals within the universities.

This is as it should be for it is an essential function of a university to discover new knowledge and for its students to accept the intellectual discipline required to maintain a proper balance between the rejection of old concepts and the critical acceptance of new ideas. Research is an essential function of a university but it should not be placed in a separate category to teaching. The dichotomy which is suggested by the expression "teaching *and* research" is false and misleading. Research is an educational tool which can be, but rarely is, used for undergraduates as an alternative to the lecture or practical class. As Sir Wilfred Fish has said:

No mental *attitude* could be more important to a professional man in these days of rapidly advancing scientific accomplishment than one that is critically receptive . . . it is much more important to learn how to think clearly and to reason than it is to acquire mere factual knowledge.⁹

And yet a glance at the papers set at the annual degree examinations in this University, and in many others, will show that a large number, perhaps the majority, of questions are designed to test the factual knowledge of the student rather than his understanding of the subject. If this were true of all subjects in all courses, in say science and technology, university degrees in these fields would be of little real value. First, scientific knowledge is changing and expanding at such a rate that much of the detail learnt in the early years of the course would be out of date by the time of graduation. Secondly, if the examinations reflected the content of the courses, and emphasis were given to facts and techniques, one might question whether the student had received a university education at all. For the acquisition of a technique the student requires training only and this is the antithesis of a liberal education.

In his inaugural address as Chancellor of the University of Pittsburgh, Dr. Edward Litchfield drew attention to the danger that, with the growth of specialization, the students tend to absorb isolated groups of facts, whereas it should be the function of the University to facilitate the integration of many specific areas of knowledge. He says:

Let those who seek only a liberal education attend institutions devoted to that purpose and let those whose

professions are not dependent upon breadth of background seek their training in technical institutions. But let those who desire the combination find it in the University.

He concludes by saying that: "The University is principally concerned with those who have the capacity and the motive to become the professional and intellectual leaders in their communities."¹⁰

I am sure you have all heard of Zirkle's imaginary graduation certificate which carries the inscription:

The John Hopkins University
certifies that
John Wentworth Doe
does not know anything but
Biochemistry.¹¹

I submit that the pressure of numbers in our present situation should make us regard this certificate not as a joke but as being too close to an expression of reality for our peace of mind. I further submit that the present isolation of some Departments, like my own, from the main University Campus results in an excessive emphasis on technical training at the expense of a university education.

Students too are fully aware of this trend. In this year's issue of *Tangka*, the President of the University of Queensland Dental Students' Association deplored the fact that dental students "let four years of their life slip by at a University without gaining an all-round University Education . . . over and above what is fed to them by the administering body to help them reach a prescribed standard of scholarship."¹²

I believe that if the modern university is to measure up to the precepts of its founders and commissions like the Murray Committee, it will become of increasing importance for it to build more and more bridges between the specialisms. Not just between Snow's two cultures but between every field of knowledge, both within and between the humanities and the sciences. As Sognaes has said, in relation to the health sciences, there is a need "to amalgamate the various health sciences with a view to dealing with broad *issues* rather than individual tissues."¹³ Concepts and ideas are subject to change just as the facts from which they are derived are shown to be partly or completely false by the discovery of new knowledge.

We must avoid the temptation to develop skill for a particular job before we have established an adequate level of general knowledge. The difficulty of course is that our schools and universities must adapt themselves, not only to the current needs of our society, but to its future needs as well. This adaptation will never be completely successful if the graduates from the universities are no more than highly trained specialists. It will only be successful if we recognize that: "The humanistic search for high intellectual and cultural standards will be important to whatever civilization we manage to retain."⁴

In short, a university must do more than satisfy the needs of the community for men and women with specialist skills. It must also promote understanding between disciplines, discover new knowledge, and promote and sustain intellectual and cultural standards of excellence.

THE ROLE OF THE DENTAL SCHOOL IN THE UNIVERSITY AND ITS RESPONSIBILITY TO THE COMMUNITY

The establishment of the Dental School in this University was unusual in that it antedated the establishment of the Medical School, and in that the person most responsible for its foundation was a Professor of Biology, Professor Goddard. The Faculty of Dentistry was founded in 1935 and in 1946 its degrees were recognized by the General Medical Council of Great Britain.

It is, I think, important to realize that when this University confers a degree in dentistry it also ensures that when a graduate has registered his degree with the appropriate licensing authority he may practise his profession in any state in Australia, in Great Britain, in most countries of the British Commonwealth, and in certain other countries with whom there is a reciprocal recognition of degrees. Oddly enough, however, recognition of a degree as a sufficient guarantee of fitness to practise is determined not by the universities but by governmental or quasi-governmental institutions such as the Dental Boards. If, for example, I had an Australian degree I could teach at a Dental School in the United States but I would not be able to practise in any state until I had obtained an American degree and passed the appropriate State Board examination. Similarly, as a *quid pro quo*, an American graduate would be unable to register as a dentist in Queensland. This situation is stupid but the universities have been unable to do anything about it.

What it also means, of course, is that the universities have to be very careful to ensure that when changes are made to the curriculum the revised course meets with at least the minimum requirements of the licensing boards in countries with which we at present enjoy reciprocity. There is, therefore, a limitation, small but real, on the freedom of a university to put all of its educational ideas into practice.

Before I comment on the place of a dental school in the University it is, I think, necessary to state some views on the objectives of dental education and to examine these objectives in relation to university education generally and to society.

The importance of stating one's objectives right at the beginning is illustrated by this modern fable by Mager in his book *Preparing Objectives for Programmed Instruction* (1962).¹⁴

Once upon a time a Sea Horse gathered up his seven pieces of eight and cantered out to find his fortune. Before he had travelled very far he met an Eel who said:

"Psst. Hey, Bud. Where 'ya goin?"

"I'm going to find my fortune," replied the Sea Horse proudly.

"You're in luck," said the Eel. "For four pieces of eight you can have this speedy flipper, and then you'll be able to get there a lot faster."

"Gee, that's swell," said the Sea Horse, and paid the money and put on the flipper and slithered off at twice the speed. Soon he came upon a Sponge who said:

"Psst. Hey, Bud. Where 'ya goin?"

"I'm going to find my fortune," replied the Sea Horse.

"You're in luck," said the Sponge. "For a small fee I'll let you have this jet-propelled scooter so that you will be able to travel a lot faster."

So the Sea Horse bought the scooter with his remaining money and went zooming through the sea five times as fast. Soon he came upon a Shark who said:

"Psst. Hey, Bud. Where 'ya goin?"

"I'm going to find my fortune," replied the Sea Horse.

"You're in luck. If you'll take this short cut," said the Shark, pointing to his open mouth, "You'll save yourself a lot of time."

“Gee, thanks,” said the Sea Horse, and zoomed off into the interior of the Shark, there to be devoured.

The moral of this fable is that if you're not sure where you're going you're liable to end up some place else.

The first job of a dental school is, of course, to train dentists to prevent and treat dental disease.

Time will permit me to define the objectives of the undergraduate curriculum only in general terms as follows:

1. To provide students with the knowledge, skills, and attitudes that they require to become competent general practitioners of dentistry.
2. To ensure that students have a thorough understanding of scientific method and its application to the assessment and evaluation of clinical problems and techniques.
3. To encourage students to recognize the limitations of their knowledge and to continue their education throughout their professional life.
4. To ensure that students have the ability to diagnose and understand what a patient needs to maintain dental health and treat dental disease, to devise measures by which that need can be met, and to have a high degree of technical skill in the application of those measures to the individual patient.
5. To encourage each student to recognize that upon graduation both he and his professional colleagues have a collective responsibility for the promotion of the dental health of the community.

I suspect that this brief statement will confirm the idea held by a few of my professional colleagues in private practice that dental schools are staffed by well-intentioned (I hope) idealists who are quite out of step with the facts of life — decent chaps on “cloud ten” who train men and women to a standard of academic knowledge and professional competence far in excess of that which they will have the opportunity of using when they enter independent practice.

This type of criticism was answered by Martin Rushton in his Presidential Address to the British Dental Association in June this year when he said:

This, in my view, is the expression of a most deplorable opinion If it be true that the conditions of practice render such high standards superfluous, this is indeed a valid criticism of the conditions of practice, but not a valid criticism of the standards of dental education.¹⁵

We must, as Sognaes says, “remind ourselves that we are grooming our students of to-day for senior professional leadership in the year 2,000.”¹⁶ To suggest that dental education should be restricted to producing competence in only those procedures which the existing order of things renders profitable is to deny that the education of dentists is a university responsibility.

We must also, I think, remind ourselves that the institution of higher education is both the creature and the servant of society. The Dental School must not only produce dentists to provide a health service to the public; it must also focus its attention on the user of the services. Students and Staff must be reminded of the interdependence of the professional man and the purchaser of dental care, who is also a taxpayer and in good part responsible for the provision of facilities for the education of dental students. They must be aware of the socio-economic factors which influence the relationship between the need and the demand for dental care. This is, of course, a fertile field for research by social scientists.

There is, at present, no clear picture of the dental health of Australians. Such surveys as have been done are mainly concerned with the prevalence of dental decay in selected groups of the population, chiefly children. There is no representative information on the prevalence of other dental diseases and anomalies. It is known, of course, that in a general sense dental ill-health is a serious public health problem and that existing services, both private and public, are insufficient to cope with the need. But the scale of the problem at the Federal and State levels is not known. Moreover, as Moser and his colleagues found in England,¹⁷ we in Australia know virtually nothing about dental ill-health as seen from the standpoint of the individual: the extent and duration of his dental troubles, how much pain and inconvenience they cause, their effect on loss of time from school and industry, his attitude to dental health and to his dentist, what treatment he gets, how he views and uses the different dental services available to him.

Investigation of these factors requires a cooperative effort on the part of social scientists and dentists along similar lines to that recently sponsored by the Nuffield Provincial Hospitals Trust in the United Kingdom.

Research must, of course, be a central aim of a dental school if it is to function as a university department as well as a vocational training school. All students should feel that their teachers are producing new ideas in addition to repeating the old. To quote Martin Rushton again: "Dentistry without an active research branch would be like a tree in which sap no longer rises."¹⁶ Unfortunately it is here that the gap between precept and practice is widest.

There is a shortage of staff in all University Departments, but when this reaches a stage where most of the full-time academic staff spend at least thirty hours each week in "Class Contact Time," some drastic measures are necessary. Extra time can, of course, be devoted to reading and research at night and during week-ends, but provision must be made to permit this during normal working hours. According to the University Grants Committee in the United Kingdom, the university teacher there spends nearly half his working time in research.¹⁸

In the past, dental research has been concerned primarily with the biological aspects of dental problems and with the properties of materials and apparatus used in therapy. Recently, however, the emphasis has changed to what has been called an ecological or multi-disciplinary approach. I have already cited an example of the need for collaboration between the dental and behavioural sciences to investigate social attitudes to dental health. Let me give you another example in the field of epidemiology — which is concerned with the study of the factors that influence the occurrence and distribution of disease, defect, and disability in *groups* of people. Epidemiology differs from clinical science in the unit of study. It is, if you like, the diagnostic discipline of mass disease. Initially, as its name suggests, epidemiology was concerned with the study of epidemics of infectious diseases; events which were primarily within the domain of medicine and veterinary science. Eventually, however, epidemiologists recognized the need to apply ecological principles to the study of the endemic behaviour of disease, and once the principles which govern the occurrence of epidemics were understood it became possible to bring infectious diseases in man under increased control. Following these advances, epidemiological

research broadened to include chronic diseases and disabilities, including dental caries and diseases of the tissues which support the teeth in the jaws. The discovery of the inverse relationship between the fluoride content of water and the prevalence of dental decay is a good example of the value of epidemiological research. This research, together with some recent work in New Zealand which has demonstrated an association between soil type and the prevalence of dental caries and the much earlier discovery of the inverse relationship between the intake of iodine and endemic goitre, has heightened the interest of epidemiologists in the role of other trace elements in promoting resistance to disease.

One important lesson we have learnt from studying the epidemiology of a chronic disease, such as dental decay, is that a great variety of environmental factors influences the frequency and severity of its occurrence. What is more important in the context of this address is that an assessment of the relative importance of these many contributing factors calls for a team approach by scientists in several disciplines. The search for causal factors to explain the soil-caries relationship in New Zealand, for example, required team work from geologists, soil scientists, veterinarians, chemists, biochemists, nutritionists, microbiologists, and dentists. This serves to emphasize that the old and familiar classifications of knowledge appear to be no longer as useful as they once were. As John Millis says: "The boundary of a single field is a shifting line, or perhaps there is no line."¹⁹ Regroupings of pieces of knowledge produce new insights and clearer understanding. The development of biochemistry, biophysics, and molecular biology has established examples of this trend and in dentistry the emergence of oral biology has occurred in an attempt to promote an understanding of the development and function of an important part of the body in both health and disease.

The third and final function of a dental school to which I shall refer, briefly, concerns graduate education. The science and technology of dentistry, like any other form of higher education, is growing at such a rate that it is quite impossible to give a student the whole of knowledge in even this one single discipline.

But the point I wish to stress is that we must place greater emphasis upon "how" to learn rather than upon "what to know." According to one oversimplified definition: "education equals the sum of learning and being taught."¹⁹ The less mature the student

the more he is taught and the less he is expected to learn by himself; the more mature the student the less he is taught and the more he is expected to learn on his own. If this is a fair evaluation then there is something radically wrong with present-day dental education with its totally prescribed curriculum and fully scheduled time. If this is true of the undergraduate curriculum it is also true of postgraduate education which usually consists of short courses of *more teaching* with emphasis on bringing clinical skills up to date. These courses add to the training of the dentist, which is necessary, but they do not add particularly to his education. At best, they help to prevent degrees from becoming obsolescent but they are not enough. There is also a need for the Dental School to provide opportunities for independent study with greater emphasis upon the use of research as a learning device.

Research and graduate education require time and facilities, but there is a chronic shortage of both.

The gap between precept and practice is wide indeed — but it can be closed. At the heart of the matter lies the need for the Dental School to be located on the main campus of the University. The close association with the physical, biological, and medical sciences will give a much needed stimulus to research and will facilitate a better co-ordination in the teaching of these subjects with those in the basic dental sciences. It will facilitate opportunities for multi-disciplinary research projects by the staff of the Dental School and other University Departments. It will provide an opportunity for experimentation in the provision of specially designed elective courses in the humanities relevant to dentistry. It will provide facilities for, and a stimulus to, graduate education. Above all, it will enable dental students to participate actively in the cultural, social, and sporting life of the University, to meet and share their growing knowledge, ideas, and ideals with students from diverse fields of study.

In this way some at least may be able to claim that they received a vocational training *and* a university education.

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