Geographic Isolation and Technological Change: A New Vision of Teaching and Learning in Rural Schools in New Zealand[1]

KEN STEVENS
DEPARTMENT OF EDUCATION
VICTORIA UNIVERSITY OF WELLINGTON
WELLINGTON
NEW ZEALAND

INTRODUCTION Small rural schools[2] in New Zealand face three challenges at the present time: a challenge to prove that they are as educationally viable as big schools, to prove that they can provide access to post-secondary school educational and vocational opportunities to the extent expected of large urban schools, and to prove that their continued existence can be justified. While many small schools in rural areas of New Zealand are currently under threat of closure because of their declining enrolments, some of the most innovative and exciting developments in the application of information and communication technologies to education are, at the present time, being developed within them. At a time when many small rural schools in New Zealand are struggling to survive, some of these institutions are pioneering new ways of teaching and learning using new communication and information technologies. These developments suggest that it may now be appropriate to reconsider the importance of school size (Bray, 1987) as well as the significance of the location of a learning institution.

There has been a trend in many western countries of consolidating small schools, particularly those located in rural areas, and transporting students to a single large institution from their homes by bus or private vehicle (Baker and Andrews, 1991). Economies of scale suggest that it is more appropriate to concentrate students in larger and larger institutions and to close small schools if they cannot be amalgamated. These practices do not fully acknowledge new educational possibilities based on developments in information and communication technologies (D'Cruz, 1990; Fasano et al 1987), nor do they take into account recent innovations in some small rural schools in joining electronic networks which greatly expand the educational scope of a learning institution (Mander, 1993). While it cannot be argued that all small schools should be kept operating regardless of cost or local need, there is a case to be made for reconsidering the closure of many of them because of the negative implications of such action for rural economic development. Rural communities without viable schools quickly become unattractive places in which to live. The closure of rural schools can ultimately have a negative impact on a national economy that is based on primary production, as well as on rural social structures in terms of the consequent out - migration of human resources. If it is accepted that schools are integral to the maintenance of rural social life and that their development is an investment in the rural economy, consolidation and closure of centres of learning in remote[3] parts of the country must be considered in national rather than regional terms (Parker et al, 1989).

The application of new information and communication technologies that is taking place in some small rural schools in New Zealand has implications for all educational institutions,

large and small, rural and urban (Barker, 1988; Buckrell *et al*, 1992). There are particular implications in the introduction of information technologies in classrooms for the professional development of teachers (Gilmore, 1994). The development of inter-institutional teaching and learning, collaborative decision-making, the integration of information and communication technologies across the curriculum, self-managed teaching and learning and the development of regional, national and, possibly, international educational networks within rural New Zealand provide many possibilities and, form a model for the future organisation of other sectors of teaching and learning throughout the country. Through the application of contemporary information and communication technologies a growing number of small rural schools today can provide students with learning environments that are at least equal to those of large urban schools.

The changes that are taking place in some small rural schools now require educationalists to acknowledge that the location of a school is of little significance to align educational planning with developments in information and communication technologies (Stevens and Tate, 1993) and to reconsider what is meant by 'small' and 'large' schools.

The future of many small schools will be determined by the extent to which they apply new information and communication technologies to teaching and learning. Small schools that are extensively networked with other schools nationally and internationally are much more difficult to close on educational or economic grounds. The educational application of information and communication technologies provides ways of extending small schools by linking them to many other institutions and, in effect, making them large schools. It is becoming increasingly difficult to argue that a school is large or small in terms of the number of students that attend it in person. A school may appear small in terms of the number of buildings that it has and the number of students who attend it in person, while, in educational terms, it may be large if the scope of its curriculum and the

number of students in other places that it teaches electronically by linking teachers, computers and telephones is considered. Conversely, a school that is large in terms of the number of buildings that it appears to consist of and the number of students who attend in person, may, actually, be a smaller school than its counterpart in a rural area with few students attending in person, but which is linked nationally and internationally to other schools, polytechnics, museums and libraries.

The test of whether a school (more accurately described now as a learning centre) is large or small will inevitably become the extent to which it is networked with other places of learning. A large learning centre will have an open administrative and academic structure that enables it to provide as well as receive educational material from other places, while a small school will have an administrative and academic structure that is closed to the educational world beyond its gates. A learning centre, regardless of the number of students who attend it in person, that is not open in terms of being part of educational networks within which its students and teachers participate, must increasingly be considered a small and closed institution. The quality of learning centres in future will be in part be determined by the flexibility and adaptability of their educational programmes for learners at both the local and non-local level. This is often more difficult to achieve in educational institutions that have many students and teachers in daily attendance, cumbersome bureaucracies, hierarchical management and, in many cases, discipline issues generated by the concentration of uninterested students in closed learning environments.

SMALL RURAL LEARNING CENTRES AND DISTANCE EDUCATION Some
small rural learning centres in New Zealand are more national in their orientation to education than their urban counterparts and, in this sense, are actually 'big schools'. The next step for these rapidly evolving institutions is to extend the regional and national learning networks that have been recently established to provide

teachers and learners with access to classrooms internationally.

Learning centres that are networking with one another by using computers and other communication and information technologies as integral parts of the day to day life of both teachers and learners are, simultaneously, preparing young people for changing commercial and industrial environments. By integrating information and communication technologies in classrooms and by applying these to the development of educational networks, schools can provide students and teachers with access to industrial and commercial environments. Links with industry, commerce and, in particular, polytechnics, considerably extend the scope of learning centres (Stevens, 1994; Stevens and Bridgeman, 1994). There are many implications in school networking for extending adult education opportunities in small communities and for rural economic development in New Zealand.

The use of communication and information technologies in any educational institution, particularly in geographically isolated learning centres, provide students with new and usually more open personal horizons. Rural students in Australia, for example, have been found to be less likely to become computer scientists or architects than their urban peers (Stevens,1993; Turney *et al*, 1980). This may be an outcome of being educated in small and closed learning environments. Interactive audio and video conferencing may change this situation as young people in non-metropolitan Australia and New Zealand participate and perhaps collaborate in more open learning environments.

Teachers in small rural schools often have to advance professionally more rapidly than those in larger institutions with heads of departments to make both pedagogical and organisational decisions for them (Stevens, 1991b). In geographically isolated learning centres there has traditionally been a difficulty for teachers in having to make organisational, pedagogical and technological decisions in the absence of advice from the senior professional people who

are available in large, urban institutions. There are many implications for the professional development of teachers in the networking of small learning centres, particularly in the development of good management practices. The close alignment of school and classroom management has always been a feature of small school organisation. There is a range of issues to be considered in the organisation of classrooms and learning centres with the advent of inter-school networking, as well as a need for research in this area. The division between management and pedagogy in many New Zealand educational institutions can perhaps be overcome through judicious application of time, resources and careful planning, using educational networks. Management and pedagogy have always been closely interrelated in small rural schools where both have usually been the responsibility of the same person.

SMALL LEARNING CENTRES AND GLOBAL NETWORKS

In 1995 telephone lines combined with computer technology permit audio, audiographics and videoconferencing to be conducted from desktop or notebook computers (Tiffin *et al*, 1992). Using this technology, teachers and students can be in any location as long as they can reach one another through a telephone line and a modem attached to their respective personal computers. Interactive forms of communication technology combine to provide new classroom possibilities for teachers and for learners in which location is of considerably reduced significance. There are particular implications in these practices for the sole teacher in a small rural learning centre with, perhaps, a dozen learners attending in person, ranging from new entrants to senior primary school students. The possibilities of the teacher combining intensive face-to-face instruction for some students while others in the same room are linked to learning centres in distant places, undertaking different tasks, are becoming increasingly obvious (Renwick, 1993). The New Zealand Correspondence School has for many years played a major role in this collaborative form of teaching in many schools and is internationally acknowledged as a leader in this aspect of teaching and learning.

There are also implications for urban secondary learning centres in situations in which only a few students may wish to study a subject such as the Korean language and which is not, therefore, viable in economic terms. By accessing classes from another place, in this case perhaps from the New Zealand Correspondence School or, possibly, from an Australian network, students can learn a subject that would otherwise not be available to them. For the urban or the rural student in these circumstances, the location of their learning centres is irrelevant as long as it is reasonably close to their homes. What is important is the access that the learning centres have to computers, modems, telephones and other technologies combined with the knowledge of how to gain access to the class that students wish to join. Today, regardless of location, students can increasingly access what they want in the curriculum and thereby gain the knowledge that they feel is appropriate to their vocational and educational aspirations. The New Zealand Telelearning Network (NZTLN) is likely to play a major part in this development (Telecom New Zealand, 1992).

While new communication technologies can provide a variety of ways of accessing knowledge and giving geographically isolated people educational and vocational opportunities, it is acknowledged that face-to-face instruction remains a very important aspect of learning. It is likely, however, that teachers and learners will interact in different ways in future and each may have slightly different roles. In gaining access to more personalised and individualised instruction, students in urban as well as rural networked learning centres will require the attention of teachers, and, in particular, guidance in crossing new national, international as well as intellectual boundaries. Students may, possibly, be advantaged in this new educational process if they can participate in networks from small, familiar and intimate learning environments rather than in learning centres with high daily attendances (the traditional 'big school') in which teachers are often busy with administrative matters, including discipline. In rural areas where a full

time teacher is no longer employed, some specialised teacher expertise may be accessed at a distance by students, assisted by a rostered parent or teacher aide. Another solution may be the appointment of itinerant teachers to assist students in a number of rural learning centres. These are issues that require urgent consideration and research to guide future policy development.

With the increasing availability of information and communication technologies, it is questionable why large numbers of students need to be concentrated in a single institution. While there are obvious social and developmental reasons for young people meeting and socialising during their formative years, the *learning* basis for this is becoming increasingly difficult to justify. New information and communication technologies provide a measure of flexibility that has yet to be realised in the organisation of education on a daily or yearly basis in the lives of most students. As school learning becomes increasingly networked as technology becomes more available and familiar and institutions teach to and from one another, it may be more appropriate to create more small, open learning centres rather than concentrate resources into large, closed institutions that have to devote large amounts of time to internal administration.

Many small rural schools are currently considered to be uneconomic, the main reason being the salary of at least one full time teacher for perhaps eleven or twelve students who attend on a daily basis. In addition to the salary of the teacher, there are often additional salary costs in the form of part time and occasional assistance to either support the teacher or replace him or her when attending courses elsewhere or when ill. In addition to the salary of a teacher, there are overheads to be met in small as well as large schools and here economies of scale are a major consideration: electricity, telephone, heating costs as well as the cost of maintenance of school buildings. If young people are not educated in their own neighbourhoods or districts, they have to be transported to another centre. This process leads

to the creation of ever larger schools and the concentration of educational resources in fewer places. It may be appropriate now to reconsider the costs of small schools in relation to networking and the changing role of the teacher in the development of increasingly electronic classrooms.

A NEW VISION FOR TEACHING AND LEARNING IN RURAL SCHOOLS

The introduction of distance education to conventional classrooms involves a paradigm shift whereby teachers and learners have their roles and positions in relation to one another redefined. The advent of school networking will require reconsideration of the ways in which schools, as we presently know them, are organised to become learning centres within educational networks. The model of school organisation as we know it is about to be challenged by the introduction of new communication technologies. Some small rural schools in New Zealand are at present in the forefront of this change. Teachers will have to consider a range of new professional demands as they make new organisational and pedagogical decisions. Perhaps what will be most challenging for the teaching profession is the fact that their decisions, and the outcomes of them, will become much more public as they are examined within learning networks. For some teachers, new communication technologies will be liberating in that they will have their skills and knowledge exposed to the educational world and they may, in some cases, acquire enlarged classes as more and more students want to learn from them. New communication technologies may provide excellent teachers with the recognition and the public acknowledgment that they have always deserved but never attained.

The introduction of new communication technologies can make the task of learning a bigger challenge for both student and teacher as communication technologies facilitate the expansion of intellectual horizons for all. This is almost inevitably going to mean that students will have to consult teachers to an increasing extent about their learning needs, while teachers will have to work ever more closely with students to shape the increasing availability of courses from educational networks to student learning styles and vocational aspirations. Teaching and learning may become, as a result, a more cooperative and collaborative aspect of education. As well as providing the opportunity for increased interdependence of teacher and student, the advent of networked learning centres provides opportunities for both teacher and student to work more independently of one another for part of a school day than is possible in traditional classrooms.

It could perhaps be argued that all teaching and learning are already a form of distance education in that students and teachers use books and references that are usually produced in other places by unknown people. Recently there has been increased political awareness of the implications of distance education for New Zealanders (New Zealand Labour Party, 1993; New Zealand National Party, 1993). Distance education today enables students, both urban and rural, to access educational services from multiple sites through networks. Distance education itself is in the process of undergoing a paradigm shift from a closed to an open model as learners are able to access information from many places within the course of a single lesson. While there will always be an important place for national institutions like the Correspondence School, particularly in the provision of instructional design expertise and learning materials, increasingly, distance education will become more open as it becomes networked.

It is perhaps appropriate to consider the small rural classroom as a model for the future organisation of learning centres. Within a single small rural classroom there are likely to be multiple learning needs. Learners have different learning styles, different levels of interest in what is being taught and different ambitions in terms of the application of what is presented by teachers. Above all, learners have different levels of aptitude for particular subjects in the curriculum and, unlike other educational institutions, students can range widely in age and educational level. The teacher is charged

with teaching all members of such a diverse class at the same time, requiring considerable organisational and pedagogical skill. It is not necessarily appropriate for all these learners to participate in a lesson at same the time; for some it will be too easy and for others too difficult. In such a classroom, it may be appropriate for some students to take time out to learn in their own ways for some of the time, without even leaving the classroom if they have access to a computer that is attached to a network. It is possible for this diverse grouping of students to be together in a single classroom at the same time and participate in a range of other classrooms, some of which may not necessarily be located in the student's own town, district or even country. As distance education shifts from a delivery system that is closed and centralised to one that is open and more of a multipoint access bank of information, learning can be increasingly individualised and the location of the student's home and learning centre reduces in importance. Some teachers of students in geographically isolated classrooms, currently known as rural one teacher schools, realise the potential of using networks in providing appropriate education for young people from other centres while giving others intensive personal instruction.

Concentrating students in large classes in large learning centres for all of a school day is not necessarily the most appropriate form of educational administration. Small and intimate learning centres that provide the student with professional advice and technical and intellectual assistance in learning from a range of other places is an attractive alternative. It may be appropriate to reassess the organisational and pedagogical skills of successful teachers in small schools to provide insights into the educational future which will be based, inevitably, on networked learning centres.

CONCLUSION With the developments that are rapidly taking place in information and communication technologies and their application to teaching and learning, rural as well as distance education may now be redundant concepts (Stevens,1991a). The size of a school and its location will decrease in significance as new technologies encourage the development of national and international learning networks. Through the development of networked learning centres, small schools can meet the three challenges at present facing them: the challenge to their educational viability, the challenge of providing equality of access to post secondary school educational and vocational opportunities as expected of large urban institutions, as well as the challenge to their own continued existence[4].

It is appropriate now to consider matching changes in information and communication technologies with educational planning and policy by developing networked learning centres for all New Zealanders, regardless of where they live. Unless this happens, New Zealand educationalists may soon face a new challenge in the form of increased provision of education in this country from overseas educational networks.

NOTES

1   An earlier version of this paper was prepared for the Rural Education Reference Group, November 1994
2   The Ministry of Education has classified small schools as those schools having a roll of 150 or under as at 1 July.
3   Remote schools have been defined by the Ministry of Education as being at least 30 km from a centre with the most recent census determined population of at least 2000.
4   It would be useful to reconsider Macaskill (1991) at this point in the history of New Zealand's rural education.

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Ken Stevens *is Senior Lecturer, Department of Education, Victoria University of Wellington, Box 600, Wellington.*