

Nous sommes prêts:
Planning for a decade of change at
Simon Fraser University

The final report of the
Presidential Committee on University
Planning

May 1996

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PREFACE

The Presidential Committee on University Planning (PCUP) has been charged with the task of providing a strategic plan to carry Simon Fraser University from 1996 to 2004. To engage the SFU community in debate about its future, PCUP has issued discussion papers dealing with undergraduate programs, graduate studies and research, and has developed an overall report that articulates a vision of the university and outlines several important measures to achieve that vision. After public hearings, the contents of the discussion papers, appropriately revised, were distributed as draft reports to the community for further comment. The end results of this dialogue and debate are three reports:

The Undergraduate Program at Simon Fraser University

Research and Graduate Studies at Simon Fraser University

Nous sommes prêts: Planning for a decade of change at Simon Fraser University.

In addition, two working groups associated with PCUP developed discussion papers and reports on instructional technology and services to students

All of the discussion papers and reports were circulated to the SFU community through *Simon Fraser News*. Literally hundreds of students, staff, faculty, alumni and members of public have contributed oral and written presentations to our planning process. We very much appreciate the time and effort that these individuals devoted to formulating and communicating their arguments.

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1. SFU'S ROLE IN POSTSECONDARY EDUCATION

The President's Committee on University Planning (PCUP) has discussed at length the significance of the broad economic and organizational changes currently taking place at Canadian universities. These changes present universities with an important and difficult challenge: how can they accommodate the increasing need to be responsive to society while maintaining their commitment to the pursuit of knowledge and the exercise of critical thought? At the same time as they evolve with changing circumstances, all universities have in common the need to value and protect the diversity of their activities from the fluctuations of social fashion and political and economic change.

The discovery of knowledge in the traditionally defined liberal arts and sciences is, and will remain, one of the most important aspects of the education we offer our students at Simon Fraser. We have been successful in this regard for several decades, and there is no reason to decrease our emphasis on this area of learning and research. However, as publicly funded institutions, we have some responsibility to adjust the range of our degree programs as well as their content to reflect the realities of the economic environment in which our graduates must compete. It is our responsibility to society to equip our students not only with knowledge, and the ability to criticize it, but also with the applied skills needed to confront the pressing social, scientific and technological issues of our time.

What is the correct balance of activities at a University for the discovery, application and transmission of knowledge? There is no unique answer: the balance changes with time and the needs of society, and is influenced by many factors. PCUP does not favour the abandonment or diminution of our traditional strengths in arts and science; rather, we believe that we need to augment our roles, and that we are now a sufficiently large and robust institution that we can do so effectively. Our programs and research in arts and science should continue to evolve at the same time that we pursue new ways of discovering, transmitting and applying knowledge.

Postsecondary institutions are concerned with knowledge, and the knowledge-related activities at a research university, such as Simon Fraser University, are governed by several purposes:

- To *create* knowledge in answer to both fundamental and applied questions, and to discover new areas of knowledge through curiosity.

- To *criticize* existing knowledge and its interpretation, recognizing that technical and human intellectual limitations often prevent us from providing unambiguous answers to all questions.
- To *communicate* knowledge to the greater community, to our students, and to our colleagues.
- To *preserve* and synthesize knowledge through a process of collecting and interpreting related knowledge on a topic.

These roles are not the exclusive responsibilities of research universities, although other institutions and organizations generally concentrate on only a selection of the roles pursued at a research university. In particular, the function of criticism is most effectively carried out in the intellectually autonomous environment of a university.

The mandate of a modern university is neither that of a college, devoted primarily to teaching, nor that of a laboratory or institution devoted primarily to research. The activities that Simon Fraser University chooses to pursue in fulfilling the mandate of a research university are broad, but are limited ultimately by the human and financial resources available to the University. The most important activities that we must continue to pursue are:

- Teaching and learning*, at the undergraduate and graduate level, in a variety of programs including academic, professional and continuing studies.
- Discovering and applying* knowledge through research.
- Building a community* that values and participates in the discovery and transmission of knowledge.

It is our opinion that every SFU faculty member has responsibilities in each of these activities. Because the number of degree-granting institutions in BC has more than tripled in the last several years, some aspects of our traditional role in undergraduate teaching now are being carried out by university-colleges. While the number of postsecondary institutions that have graduate studies and research as part of their mandates is still small, SFU must maintain and encourage a strong presence in the discovery and application of knowledge. Further, our research and educational activities will continue to expand beyond Canada's boundaries. SFU now has in place international student exchange agreements with more than 40 universities, and the international programs which SFU leads currently attract more than \$7 million per year in funding. Our programs involve more than 25 different countries around the globe.

In each of our three primary activities, we set four characteristics for which we wish to be known:

- demonstrably *excellent* according to the criteria appropriate to specific disciplines
- *innovative and flexible*, in our knowledge-related activities and in our daily operation
- *cooperative and responsive*, to the communities we serve
- *supportive*, to our students, to the community wishing to use our resources, and to each other.

In most instances, our present activities are accurately described by the characteristics for which we strive. However, the environment in which we operate and are funded, and the expectations of the community we serve, are changing.

Let us briefly review our current situation and the challenges that we expect in the coming decade. The first thirty years in the history of Simon Fraser University have been times of relative stability and prosperity compared with the social turbulence and technological change that characterized the first half of the twentieth century. However, governments at all levels are addressing their accumulated debts with measures that will impact negatively on public sector institutions. Further, the pace of technological change is quickening as the use of computers extends well beyond the manipulation of numbers for scientific purposes and into the storage, transmission and manipulation of words, ideas, images and data in ways that affect our everyday life.

While the twin challenges of financial restraint and technological change face all institutions, there are other pressures that will affect Simon Fraser University in particular. The Lower Mainland of BC has experienced tremendous population growth in the last decade, and its population is projected to increase by a further one million residents over the next two decades. We have met the request for university education among the growing population of young adults in the communities surrounding our campuses, and, correspondingly, the average age of our students has fallen significantly. The strong demand for first degree programs will continue to be driven by local population growth for the next decade. At the same time, we must meet the requirements of mid-career individuals for continuing education and of degree-holders for postbaccalaureate programs, as both the private and public sectors restructure and respond to technological innovation and international competition.

What elements of teaching, research and community-building should Simon Fraser University emphasize? PCUP believes that the way we

deliver programs and the quality of our faculty, staff and students are our most important characteristics, rather than the presence of specific courses or research specialties. Our defining features of excellence should include the following:

- Co-operative education
- Trimester operation
- Accessible instruction via the tutorial system and mentoring programs
- Innovative programs
- Excellence in graduate education and research
- Excellence in undergraduate education.

We provide a detailed discussion of each of these areas in Sections 2 - 4 of this report. Here, we give a short summary of our ideas.

Co-operative Education. While a principal aim of co-operative education is to allow a student to put into practice what is learned in the classroom, co-op programs have many secondary benefits as well, such as fostering strong links with the community outside the University and providing immediate feedback on our curricula. From the student's perspective, Co-op also may provide financing for education, and permit work experience outside of BC or Canada. Numerical targets should be set, and resources allocated, to make SFU's Co-op program the largest in western Canada and one of the largest and best in Canada.

Trimester operation. An important aspect of student accessibility, the trimester system at SFU is almost unique in Canada. While part-time and co-op education students clearly benefit from year-round course offerings, student accessibility in general is improved through the year-round usage of our buildings and facilities. However, improvements still need to be made in course scheduling, and the University should attempt to distribute the offering of upper division courses evenly throughout the year.

An accessible learning environment. The tutorial system and mentoring programs are important components of the accessible learning environment at SFU, providing direct interaction between learner and instructor. Our pedestrian-oriented campus, and the use of electronic communication, also encourage community-building and communication among students, staff and faculty. Orientation programs assist students in transferring from high schools and colleges to our institution. We must innovate continually to improve the learning environment.

Innovative programs. The world's knowledge base, and society's knowledge needs, evolve with time. The intellectual foundation of

traditional disciplines is dynamic, and new areas of study, perhaps called interdisciplinary for historical reasons, continue to be established. We must encourage the development of these new fields while retaining the solid disciplinary bases fundamental to our programs. Further, the cross-cultural nature of the student population at our institution presents opportunities to broaden our teaching methodologies, enhance our curriculum and bring new emphasis to our knowledge-based activities.

Excellence in graduate education and research. The importance of the research role of SFU cannot be overstated, and all faculty should contribute to this role. High standards for faculty appointments and graduate student admissions are vital to research excellence. In many disciplines, the recruitment of outstanding students in the national and international arenas requires extensive scholarship programs, the availability of teaching opportunities and modern research facilities. All of these aspects of research excellence need ongoing attention.

Excellence in undergraduate education. SFU has developed an enviable reputation for excellence in undergraduate education based, in part, on many of the features listed above: co-operative education, trimester operation, accessibility and innovation. Our attention to the learning environment through the use of the tutorial system, for example, considerably enhances the undergraduate experience at SFU. We must maintain high standards of teaching excellence through the reward system and support for innovative teaching.

During the next decade our funding situation will continue to oscillate as it has done in the past: the financial retrenchment of the early 1980s or mid-1990s is no more permanent a condition than the budgetary expansion of the mid-1970s and late 1980s. In times of plenty, we should not support mediocre or inefficient programs simply because we are not under financial stress. Similarly, in lean times, we should develop ideas for new projects that can be implemented once funding is again more plentiful.

Innovation and excellence require a resource allocation mechanism that rewards experimentation, program evolution, and productivity in teaching and research. In Sec. 4 of this report, we propose administrative measures that will enhance the fluidity of the University budget and of the allocation of personnel. In addition to modifying the budget allocation mechanism, the University should remove unnecessary administrative hurdles to new program approval, and should develop mechanisms to terminate low quality or unproductive programs.

In short, change is both upon us, and required of us, and we must adopt a planning framework that will allow hard decisions to be made in compatible ways for the health of the University. We must live up to our motto, *Nous sommes prêts*.

2. STRATEGIES FOR CHANGE

To each of our main activities at SFU - teaching, discovering and community building - we have ascribed four general characteristics for which we wish to be known: excellent, innovative, cooperative and supportive. In this section, each of the activities is taken in turn, and strategies are presented that will help us achieve or maintain those characteristics. Most of the strategies presented here apply across the University, although the implementation of the strategies may require action at many different academic and/or administrative levels. In addition, there are several topics for which we have developed more detailed strategies, and these topics are presented in Sections 3 and 4.

2.1 Teaching and Learning

Excellence

The University should ensure that programs contain up-to-date curricula, which should be reviewed at both the course and program level every two years. Departments should coordinate course offerings, particularly in the upper division, so that material can be offered with reasonable frequency to classes of reasonable enrolment. The SCIMO recommendations on teaching credit for small enrolment courses, and our recommendation in Sec. 4 for resource allocation according to productivity in teaching and research, are two policies that should encourage departments to reduce overlap and streamline their course offerings.

Lectures, seminars, tutorials and laboratories should be taught in an engaging and interactive manner that promotes critical analysis and independent learning. If there is to be good contact between student and instructor, attention must be paid to the physical learning environment. As expressed in surveys of opinion on class size, students show a marked preference for tutorials, seminars and small lectures. Departments and Faculties should take steps to eliminate very large classes where the format is judged inappropriate.

Faculty remain the primary individuals responsible for preparing and delivering courses. All faculty should be part of the teaching process, and the University should set a standard for the minimum number of courses to be taught by full-time faculty, unless they are on secondment or study leave, or have very onerous administrative or service duties. Initiatives now being taken on this issue at SFU propose the adoption of three regular courses per year as the minimum teaching load, with the average teaching load clearly being higher than the minimum. We believe that the route being followed by some smaller universities in allowing highly differentiated teaching loads will ultimately prove destructive to morale. Spreading teaching responsibilities more uniformly across faculty will expose students to talented teachers at all levels of their study and will strengthen the teaching and learning environment. Ultimately, it is the staff and programs by which undergraduate students judge their university, and the University must recognize and value the talents of excellent teachers.

It is an old aphorism that students learn as much from their peers as from their professors. To improve the peer aspect of the learning environment, SFU should recruit a highly qualified student body at both the undergraduate and graduate level. This task can be helped administratively through high school liaison, through local, national and international recruitment of outstanding students, and through the presence of an extensive scholarship and bursary program for both undergraduate and graduate students. Graduate student admission standards also may have to be adjusted to reflect the financial resources and employment opportunities (such as teaching assistantships) available to students.

Innovation and flexibility

Flexible course delivery at SFU is manifested in several ways: trimester operation allows courses to be taught several times during the year and the operation of two campuses and a Centre for Distance Education provides for the education of students at many different geographical locations. A flexible learning schedule can both decrease the time to degree completion, and allow greater accessibility for part-time students. Such modes of course delivery need to be preserved and extended through innovative scheduling (for example, six-week course modules may be effective in specific situations).

Flexible delivery will be enhanced as well by the growing use of instructional technology to supplement or complement existing teaching

methodologies. Appropriately used, such technologies will allow more interactive and independent learning for the student. On the teaching side, limited use of talented non-academic instructors with extensive applied experience may be an appropriate way to bring into the classroom new developments from outside of the academic world.

It is frequently observed that curriculum change proceeds at glacial speed in a university. While there may be *bona fide* academic reasons for proceeding carefully with controversial or far-reaching decisions, there is no need for the administrative approval structure by itself to contribute to the slowness of change. Many aspects of course and program change really do not require oversight from Senate, and approval procedures involving Senate should be reviewed with a view to containing minor paperwork at the Faculty level, leaving Senate to deal with broader issues and take more initiatives requiring University-level intervention. We applaud the efforts of Senate to streamline its committee structure and responsibilities, particularly the Senate Committee on Academic Planning.

Knowledge breadth is increasingly important both with the evolution of traditional disciplines, and with the emergence of interdisciplinary studies. Every effort should be made to reduce barriers against students taking courses outside of their core discipline, and the University should consider a breadth requirement that 20% of a student's "elective" courses be taken outside of the Faculty offering the degree. Ideally, students should take at least one course from each Faculty. To implement this requirement, some Faculties will have to develop courses that are of popular interest and have few prerequisites, yet are delivered at a level of difficulty expected at a university.

The public demands that post-secondary institutions be accountable to society by preparing graduates for future employment, and, in the current climate of economic uncertainty, SFU cannot ignore the need to be sensitive to this demand. While there is no pressure from employers for the wholesale reorganization of degree programs, there is sometimes the observation that university graduates have insufficient workplace skills. Proficiency standards in written and verbal communications, computer use, and interpretation and presentation of numerical information should be established for undergraduate students. The budgetary responsibility for offering non-credit courses to develop such skills lies with the University, and should not be shifted to the departments delivering the courses. Development of these skills is in no way antithetical to the definition of a high quality undergraduate education.

Universities are distinguished from colleges by their research activities and graduate programs. Undergraduates should be exposed to this research environment from the first year onwards through a variety of means that may vary according to the discipline. For example, 1 or 2 credit undergraduate research courses could be offered at the first or second year level, and might include one or more of the following topics: introduction to the research frontier of a discipline, research methodology, and field research. These courses, which may feature guest lecturers from outside the university, also could be used to improve undergraduate communication skills by emphasizing presentations by students through seminars. At the upper division, honours theses also provide a mechanism for involving undergraduate students with the research aspects of the university.

Cooperation and responsiveness

Good communication between town and gown is mutually beneficial, leading to a better understanding of each other's capabilities and needs. Such communication can be fostered through the use of external liaison committees at the Faculty and departmental level, whose membership should include alumni, employers, and representatives from related instructional and research organizations. Partnerships with related institutions should be encouraged, particularly the joint offering of courses and programs in disciplines with limited enrolment demand. The two-way flow of personnel should be encouraged through the use of adjunct appointments and research internships. As discussed further in Sec. 4.2, the involvement of individuals from outside of the traditional academic community may be beneficial to the program review process. Partnerships with postsecondary institutions outside of Canada also may provide opportunities for new program development.

SFU's trimester operation, demanding as it is of teaching resources, has allowed us to develop one of the larger Co-operative Education programs in Canada. Co-op programs provide excellent educational experiences for students, and also facilitate communication with those who ultimately employ our graduates. Although financial pressures have forced a reduction in trimester operation elsewhere, PCUP *strongly* supports the continuation of the trimester system at SFU, in part because of its importance to undergraduate Co-op programs. New opportunities also should be sought for graduate Co-operative Education, particularly at the masters level.

Support

Providing a supportive environment for our teaching and learning activities has many aspects. In this section, we discuss the nature of our teaching methodologies and the support necessary to make them effective. We also comment on several aspects of student services raised in the report of the Working Group on Services to Students. Lastly, we review the financial support available to defray student tuition.

The tutorial system for undergraduate courses is currently one of the main supplements to the traditional lecture method, and is very highly valued by students. Its preservation in times of financial stress not only makes good pedagogical sense, but also provides graduate students with a source of income and a means of gaining teaching experience. Faculty require support for innovative teaching and components of this support include The Centre for University Teaching and sources of innovation funds for teaching (see Sec. 4.2). Departments also should recognize the time required for faculty to overhaul outdated courses and to develop supplementary material for new courses.

Students easily can become anonymous in a mid- to large-sized university: younger students entering directly from Grade 12 and students from different cultures often find the transition to university life to be difficult. Likewise, the transition from the university to the world of work can be challenging. Orientation programs should be expanded, and should include final-year transition programs. Mentoring programs involving faculty, staff and senior undergraduate and graduate students should be established, although it must be recognized that such programs will increase faculty and staff workloads.

Where possible, information technology should be used to facilitate student access to campus information, and allow student service personnel to devote more of their time to tasks requiring face-to-face interaction. For example, an on-line information service could contain information on academic advising, the SFU Calendar, and updates on course enrolment status. Similarly, on-line registration initially could complement and eventually replace teleregistration.

In times of increasing tuition fees, the financial resources available for undergraduate and graduate student support become very important. SFU already has an excellent record for the fraction of its operating budget devoted to scholarships and bursaries. However, given the likelihood of tuition increases, it is important both to increase the amount available for

scholarships and to establish funding on an ongoing basis independent of the provincial budget to the University. Although private donations provide one source of scholarship revenue, such donations are directed towards projects of interest to the donor, which may not include scholarships as a priority. PCUP recommends that SFU commit a substantial fraction of private resources over which it has direct control, such as the anticipated lease revenue from lands on Burnaby Mountain, to the direct benefit of students for accessibility and support.

Of course, the main source of financial support for university education is the operating budget provided by the provincial government. PCUP has heard conflicting opinion as to whether too much or too little of the provincial grant is directed towards graduate studies. In PCUP's *Graduate Studies and Research at Simon Fraser University*, it is recommended that the University attempt to quantify the costs of providing graduate education. We recognize that this is no easy task, given that facilities may play dual roles in graduate education and faculty research, and that some aspects of graduate work in research degree programs contribute to the University's mission of discovering knowledge. However, as a guiding principle, PCUP believes that graduate and undergraduate students should pay approximately the same share of their net education costs. Lastly, departments and Faculty deans, together with the Dean of Graduate Studies, should work together to maintain a graduate enrolment level that is commensurate with available financial and personnel resources.

2.2 Research

As distinct from the growing number of undergraduate colleges and institutes in BC, Simon Fraser University is one of only four postsecondary institutions that receive extensive funding for research and graduate studies. An essential part of our mandate, research will grow in importance in the coming decade, as colleges share some of the undergraduate teaching responsibilities formerly the exclusive domain of the universities. In academic disciplines, research and graduate studies exist in diverse relationships. Many graduate degrees are research-based, and students in these programs are active in the University's research efforts. In this section we discuss only the research aspects of graduate studies; the educational aspects are dealt with in Sec. 2.1.

Excellence

Complementary to our declaration in Sec. 2.1 that all faculty should carry a minimum teaching load, we also believe that all faculty should participate in the scholarly efforts of the University. Normally, this would involve research activity leading to disclosure of results through peer-reviewed publications or patents, or through peer-reviewed public performances and exhibitions in disciplines such as fine and performing arts. Promotion to the rank of full professor requires that a faculty member have a nationally recognized profile in research. Research excellence will be furthered by applying rigorous evaluation of research achievements during regular salary reviews and during tenure and promotion decisions.

By definition, the research frontier constantly advances. Researchers at any university can be active in only a limited number of areas, yet it is important for faculty and graduate students to keep abreast of developments in many topics both related and unrelated to their research specialty. The presence of visiting scholars at SFU should be much stronger than it is now in many departments, and financial resources should be directed from the University to remedy this.

The financial resources available to graduate students, including scholarships and employment opportunities through teaching, are of concern to the graduate student population and to PCUP. In some disciplines, steps may need to be taken, either through redirection of resources or through more restrictive admissions, to match graduate enrolment with the resources available to the student. However, the total graduate enrolment is in rough equilibrium with the financial resources available to the University for the provision of graduate education, and SFU should encourage the development and expansion of high-quality graduate programs. PCUP foresees increasing demand for course-based professional programs at the post-baccalaureate level, some of which may be largely self-funding, and not all of which may lead to an advanced degree. SFU should not force the growth of graduate programs while sacrificing quality; however, if the graduate student population, including professional masters degrees, fails to increase modestly to 15% of the total student population by the year 2000, the University should re-evaluate whether policies are required to stimulate enrolment growth.

Innovation and flexibility

Granting agencies continue to emphasize collaborative and applied projects. Increasingly, research projects that are dependent on personnel or equipment for their successful conclusion, must look towards collaboration with industry and/or other public sector institutions. Cross appointments for researchers, including adjunct professorships for external researchers, and appointments for SFU researchers in external research organizations, will form a part of the flexible environment needed to foster such collaboration. Recognizing recent advances at the boundaries of traditional disciplines, cross appointments within SFU also should be encouraged.

Scholarly work in areas such as curriculum development also may constitute valid research in some situations. To be considered as research, curriculum development must go considerably beyond lecture preparation, and involve the production of substantive material that is placed in the public domain, open to critique, and useful to colleagues. The peer evaluation of such material must be done in a rigorous and appropriate manner: the material must be subject to a critical examination of its conceptual foundations and of its demonstrated benefits in real teaching and learning situations. Comparative measures and standards must be established to ensure that such work meets exactly the same high standards as more traditional scholarship.

More effort must be paid to introducing undergraduates to the research environment. Part of the solution lies with undergraduate research seminars (Sec. 2.1). Another component is the increased involvement of senior undergraduates in research projects, such as honours thesis projects.

Cooperation and responsiveness

External liaison councils should be established to identify research opportunities at the departmental level, as part of the liaison committee structure recommended in Sec. 2.1. PCUP is aware that such committees may not be practical in all disciplines or for some small departments. The purpose of these groups is not to direct research, but rather to enhance the dialogue with individuals outside of the academic environment. As appropriate, the membership of liaison committees should be coordinated through the Co-op office and/or the University/Industry Liaison Office in order to increase the likelihood of employer participation.

Applied and commercial research contracts are common at universities and the diversification of the research base into applied areas probably is healthy. Among its many benefits, applied research enhances our communication with public and private sector organizations. However, we need constantly to remind ourselves of our responsibility to undertake and support research that advances fundamental knowledge and to take seriously the University's mandate for the critical analysis of knowledge claims.

Support

The University provides faculty with one semester per year to pursue their scholarly work without the duties of teaching. Additional time for scholarly work is provided through study leaves. Further support for recently hired faculty who are embarking on a new career may take the form of a reduced teaching load, a start-up grant, or freedom from committee work, depending on the norms of the discipline. We see no need to augment the existing University financial support for ongoing research: salaries are the largest components of university budgets, and an increase in internal financial support for research most likely would result in a reduction in the number of faculty or teaching staff. The issue of financial support for graduate students is addressed in the previous subsection, and in Sec. 2.1.

Two contentious issues that PCUP debated, but did not resolve, are the need for a University Research Professorship program and the necessity of removing the salary ceiling in order to attract faculty in areas of high demand, including professional programs. We acknowledge that differences may exist between professional programs and traditional disciplines in terms of goals, values and modes of operation. Several Canadian universities, including Queen's and Calgary, are considering novel ways of reducing this tension through the privatization of certain programs. For example, the University might consider transferring a program to a company with SFU as the majority shareholder: that is, delivering the program through a university-owned company. Academic employees of the company would not be subject to the employment conditions - including salary restrictions and tenure - of the University. Certainly, the privatization of programs is a difficult and complex issue, but it may allow SFU to address a number of long-standing conflicts.

2.3 Building Community

With its dramatic location atop Burnaby Mountain, surrounded by park, residential and industrial land, Simon Fraser University has not developed a conventional campus community. Instead, our community is geographically distributed, and includes a specialized campus in downtown Vancouver and delivery of selected programs at locations throughout the province. To help link this community, Simon Fraser University offers extensive computer-based communication to all of its students, staff and faculty. The tentative agreement reached with the City of Burnaby on the usage of Burnaby Mountain will provide for the retention of a large urban forest, yet may lead to substantial residential construction - both student residences and private housing - which ultimately may accommodate up to ten thousand people on Burnaby Mountain in addition to four-to-five thousand students in residence.

What characteristics do we wish to see for our new on-campus community and our extended community? Physically, Burnaby Mountain no longer will be just a place to work and study: there will be a permanent, dynamic and vibrant community on campus at all hours. The layout of the commercial and private housing developments on campus should encourage the involvement of the residential population in the academic life at SFU. The provincial presence of SFU will continue, of course, with the expansion of Harbour Centre and the rapidly growing use of information technology for communication and course delivery. But a community has more attributes than its geographical location, and the *Report from the Working Group on Services to Students* presents a vision of the broader aspects of an academic community. Here, we extend several of the ideas from that report.

The academic community at SFU must function in such a way that the excellence of the University's activities and the positive interaction among its members are promoted. Among its attributes, the community should seek to be:

Purposeful - a community in which faculty, staff and students share academic goals and work to strengthen teaching, learning and discovery.

Inclusive - a community in which freedom of expression in both teaching and research is protected, where the tendency to specialization is counterbalanced by an appreciation of diversity.

Just - a community in which individuals accept their obligations to the group and where well-defined governance procedures at all administrative levels allow debate to conclude in effective and timely decisions for the common good.

Caring - internally, a community that values the well-being of each member, and externally, a community that seeks to enhance the function of society through discovery and education.

Celebrative - a community in which the heritage and achievements of SFU and its many communities are remembered and where rituals affirm tradition, change and transition.

Many actions can be taken by the SFU community to achieve these aspirations. As with our discussion of teaching and research, we group our recommendations for change according to the organizing principles of innovation, cooperation and support.

Innovation and flexibility

All universities actively encourage contact and discourse with a diverse community external to the traditional academy - a community that includes alumni, employers, the general public and members of other educational and research institutions. Good communication is necessary for building community, and SFU has a history of innovation in the development of electronic communication as a key tool in bridging the physical gap between its members at both campuses and other locations. The *Working Group on Instructional Technology and Academic Computing* has mapped out a strategy for improved network capacity that will enhance electronic communication for our geographically distributed community. With the rapid development of information technology, it is certain that this form of communication will become both increasingly important and pervasive in the coming five to ten years.

Through the publication of *SFNews* and other services, SFU's Department of Media and Public Relations is pivotal in providing employees, students and the public at large with current information on developments at SFU. Another publication that maintains links with our community is the *Alumni Journal*. PCUP sees an increasing role for alumni, not only because of the feedback that they provide on their experience at SFU, but also because, through activities such as their mentoring program and membership on liaison boards, they contribute to the maintenance of communication with employers of our future graduates. Continuing efforts

should be made to involve our international alumni in a variety of roles, including mentoring our students and furthering SFU's presence outside of Canada.

PCUP has recommended that SFU build innovative linkages and partnerships with other institutions to help fulfill and extend our teaching and research roles. Several administrative ingredients, as well as a positive attitude to change within the academy, are necessary for the promotion of institutional linkages. The University must streamline its program approval mechanisms to permit the efficient and effective building of partnerships. The pursuit of such partnerships should not be haphazard, and must be done within the context of the academic mission of the University. Because the enrolment base of some disciplines never may be large enough at SFU to permit the offering of a conventional academic program, the University should encourage partnerships with other postsecondary institutions for the joint sponsorship of high-quality programs in these areas, especially where the programs take advantage of SFU's core competencies.

Developing partnerships and enhancing communication are costly, but necessary, activities that should be eligible for innovation funds from the University.

Co-operation and responsiveness

PCUP frequently stresses the need for improved and continuing dialogue with the broader community beyond the academic population of SFU. The establishment of liaison boards at the Faculty level, and the greater involvement of alumni, have been proposed as mechanisms for maintaining this dialogue. Complementary to improved communication with employers, there needs to be continuing interchange with practitioners external to SFU. Frequent colloquia and the encouragement of sabbatical visitors are obvious components of that interchange. SFU also should investigate the "in-residence" approach to scholarly exchange, examples being writers-in-residence and executives-in-residence. To be effective, such programs require construction of on-campus residential facilities for visiting faculty. PCUP also sees a need to encourage longer-term exchange of research personnel with external research organizations, which can be encouraged through continued development of facilities such as Discovery Park.

Support

Currently, the physical facilities for building an on-campus community are very limited. Projects that deserve attention include:

- expanded student residences with adequate facilities for community-based activities
- accommodation specifically built for visiting scholars
- improved athletic facilities
- multi-purpose community space for recreational, cultural and spiritual needs
- museums and other facilities of public interest.

Funding for these facilities must be sought from a variety of sources and imaginative approaches to new funding partnerships should be explored actively.

Public performances, popular lectures and displays of art are all activities that SFU should undertake as part of its links with the non-academic community. One example of public community building that has been very successful is the summer camps for children run by the Athletics Department. As the permanent population on Burnaby Mountain grows, there will be an increased audience for an expanded Open House and scheduled events on weekends. However, transportation and parking issues must be addressed if these outreach efforts are to be successful. For example, surely there would be minimal revenue loss to the University by allowing free parking on weekends.

The SFU community must be concerned with more than the narrow educational requirements of its members. For many students, particularly at the undergraduate level, a university education involves the search for a deeper understanding of the human and natural world, an understanding that is relevant to the challenges of everyday life. The provision of student services, and of non-academic facilities, should recognize this dimension of the University.

The work environment at SFU also deserves continuing attention. Staff are expected to contribute to the University as professionals, and deserve to work in a supportive climate, even in times of budgetary stress. Faculty may find themselves in implicit or explicit supervisory roles with respect to staff, including professional staff, and such roles need to be defined clearly: staff deserve professional management. Staff also should be encouraged to play a larger role in the university life of our students. Finally, the University should continue to provide support, on a competitive basis, for an employee's professional growth. PCUP notes the

recent commitment of the University to staff training and development. As with most employers today, SFU must find new, primarily non-monetary, ways to recognize, reward and revitalize the commitment of its faculty and staff.

Because of our flexible course scheduling, the sense of community associated with cohort learning is largely absent at SFU. While not a substitute for cohort-based programs, celebrations can be used to facilitate student interaction, and generate a sense of passage. Celebrations at the first year and graduating year are probably most effective, and are a natural part of transition programs. In the classroom, it may be possible to devise academic activities to encourage interaction among students. Further, mentoring programs involving faculty and alumni are excellent vehicles for fostering a sense of community among undergraduates. SFU has the potential to build a strong and distinctive alumni mentoring program that will make the University attractive to students. Lastly, intramural activities at all levels contribute to building community.

2.4 The SFU Degree

Any university should have an institutional and educational philosophy that is widely known to its students, staff and faculty. The philosophy is important to students when they evaluate the suitability of prospective institutions for their studies, when they face academic decisions as they progress through their programs, and when they complete their programs and enter the working world. The philosophy is important to faculty and staff as they design programs and courses, as they evaluate teaching methodology, as they appraise the proficiencies of their students, and as they judge the success of their own teaching endeavors.

PCUP proposes several principles to guide and enhance the undergraduate experience. Students coming to SFU and remaining in good academic standing should expect:

- to be welcomed in the academic community at SFU,
- to learn in a research and teaching environment with excellent faculty and staff,
- to have their knowledge and skills evaluated fairly,
- to have Co-operative Education as an option in their academic program,
- to have option in their undergraduate program which prepares them for graduate studies in their academic area,
- to be able to proceed through their academic program in an acceptable time,

- to have adequate study space, library and community resources on campus,
- to find a helpful academic, technical and administrative support environment.

Obtaining a university degree represents a considerable financial investment on the part of the student and the taxpayers who subsidize post-secondary education. All parties to the education process - students, staff, faculty, government - as well as employers and professional associations who use the university degree as a qualification benchmark, should know the value of a university's academic programs.

Holders of an SFU undergraduate degree should have:

- a thorough knowledge of at least one academic discipline,
- the ability to analyse critically and solve problems,
- a set of broadly applicable capabilities in written and verbal communications, computer use, and interpretation and presentation of numerical information,
- an introduction to research,
- the basic skills, knowledge and attitudes necessary for life-long learning,
- the ability to work independently and in a team environment.

Holders of an SFU masters degree should have:

- a high level of knowledge in their field of study that goes considerably beyond undergraduate education,
- a thorough knowledge of research methods appropriate to their discipline, if they are in research degree programs,
- a level of expertise which prepares them for employment in their specialty, if they are in professional degree programs.

Holders of an SFU doctoral degree should have:

- the ability to perform advanced, independent research,
- a thorough knowledge of the intellectual frontier in their subject area,
- sufficient skill and experience to teach or transfer their knowledge effectively.

3. NEW DIRECTIONS

The recommendations in Sec. 2 are general and apply across the University. PCUP has given considerable thought to two specific issues, namely Cooperative Education and the need to modify or expand the

program base. We summarize here, the somewhat detailed recommendations relating to these two issues.

3.1 Cooperative Education and Trimester Operation

Students, employers and governments consistently rank co-operative education as a very important feature of postsecondary programs. SFU's trimester operation and urban location provide the bases for a cooperative education option in many programs. In 1993-94, SFU had the fourth largest number of co-op placements nationally (1560), following Waterloo (8100), Sherbrooke (3020) and Victoria (2140). In all Faculties except Arts, there is approximately one co-op placement per year for every four FTE undergraduates.

There is strong opinion within the SFU community that Co-operative Education should be one of the hallmarks of the University, and PCUP recommends that steps be taken to expand Co-operative Education at both the graduate and undergraduate levels. SFU has a co-op administrative infrastructure that includes placement officers and advisory boards, and this administrative structure can be used to identify and establish new co-op programs. Particular attention should be given to the development of co-op in the Faculty of Arts, in which the student participation rate is much lower than the participation rates in other Faculties.

The Co-op Advisory Board supports the expansion of co-op in graduate, particularly masters, programs. While the type of infrastructure needed to support graduate co-op is already in place, greater faculty involvement will be necessary to help identify and supervise suitable projects. The establishment of graduate co-op should be helped by the presence of liaison committees and the increased flow of research personnel between SFU and other institutions, as recommended elsewhere in this report.

There are many ways in which the functioning of co-op options could be improved in undergraduate programs:

- Departments should adopt at least one co-op sequence in their course scheduling.
- Targets for increasing the number of co-op placements should be set and staff resources should be allocated in accordance with those targets. For example, it may be feasible to double the number of co-op placements over a period of five years. The number of co-op staff per placement should be brought in line with competing institutions.

- Resources should be devoted to raising the number of interprovincial and international co-op placements.

The flexibility of the trimester system offers significant challenges to course scheduling, and often presents a bewildering array of options to the incoming student. The SCIMO report has identified, and presented possible solutions to, these challenges, but the implementation of the proposed solutions is incomplete. Efforts should be made to streamline programs and reduce the number of low enrolment courses while maintaining the same graduation rates. There are a number of simple actions that could be taken to reduce scheduling conflicts:

- The scheduling of courses offered by one academic unit, but required in the program of another, should be coordinated between units.
- "Same year" co-requisites should be disallowed in upper division courses except in special circumstances.
- Departments and Faculties should identify related courses in other academic units that could be used as alternate co-requisites.
- Departments and Faculties could define a core course sequence for each program, and publish a guide in the Calendar for completing the sequence in 8 study-semesters.
- The University could implement a variant of block scheduling.

3.2 New Programs

The academic programs of Simon Fraser University emphasize the core liberal arts and sciences, and also include offerings in applied science, business and education. Further, SFU has promoted interdisciplinary studies that encourage the evolution of traditional disciplines. Given that the total FTE enrolment at SFU is now about 15,000, typical of a mid-size Canadian university, it is appropriate to ask whether the existing program mix is the most suitable one for our current and expected student population. As shown in Table 2 of the Appendix, SFU has programs in all of the large occupational groups requiring postsecondary education, except nursing. Although SFU also has many programs in occupations that employ less than 2,000 people in BC (biologists and practicing psychologists, for example), we do not have programs in a number of professionally regulated occupations that require a university education and that employ more than 2,000 people in BC. What is the employment demand for graduates, and the student demand for classroom seats, in those major disciplines not currently offered at SFU?

Because a new program developed at SFU likely would emphasize different aspects of a discipline than may be found in long-established

programs elsewhere, it is difficult to obtain a precise estimate of student enrolment. However, our first concern is whether the enrolment would be above the threshold for program viability, and this is somewhat easier to estimate. Given our traditional “market share” of BC undergraduate students, if a new program at SFU is to have an annual graduation rate of 50 students, then the provincial employment level for graduates of that program should be about 4,000 (see PCUP’s *The Undergraduate Program at Simon Fraser University*). A number of occupations with this employment level can be identified in Table 2, and include engineering, nursing, planning/design, physio-occupational therapy and social work. The enrolment in these programs at a typical Canadian university with 16,000 FTE undergraduates is: engineering (1300), nursing (430), planning/design (290), physio-occupational therapy (270) and social work (220). Each of these areas is likely to have an enrolment above the threshold for sustaining a viable program at Simon Fraser University.

A measure of the market demand for university degree-holders is the unemployment rate among graduates. A survey by Statistics Canada of the unemployment rate in 1992 of degree-holders who graduated in 1990 is given in Table 3. Of new program areas we might consider for expansion, engineering and applied science show average unemployment rates for university graduates, while degree-holders in health sciences show the lowest unemployment rates.

PCUP recommends that feasibility studies be undertaken on the establishment of several new undergraduate professional programs. The studies could be undertaken by departments, schools, Faculties or Senate. Determining the priority for developing each new discipline would be one objective of the feasibility studies, as would the assessment of student and employment demand for the programs. On the basis of employment opportunities and analysis of student demand, examples of candidate programs may include innovative and niche areas in such traditional fields as social work, physio/occupational therapy, nursing and engineering, as well as emerging areas such as planning/design, management of cultural organizations and technology management. New approaches to professional programs involving a 5-year combined undergraduate and masters degree also should be considered.

A crude estimate of the operating costs of the example programs listed in the previous paragraphs is presented in PCUP’s *The Undergraduate Program at Simon Fraser University*. The lower division courses in new and existing undergraduate professional programs should draw heavily on, and not duplicate, existing courses in the arts and

sciences. Where appropriate, Faculties also should review their existing programs to ensure that their graduates are properly prepared for current or emerging standards of practice in occupations close to their academic discipline.

Over the next decade, we expect that enrolment in conventional research-based graduate degrees will continue to reflect the number of faculty available to supervise research, and will not change dramatically unless the faculty complement does. However, PCUP anticipates rising demand for course-based professional masters degrees, which need not be extensions of undergraduate programs. While it is difficult to identify specific subject areas for expansion of graduate programs, both because the enrolments are small and because topical research areas evolve rapidly, PCUP believes that there are considerable opportunities in interdisciplinary subject areas at both the undergraduate and graduate level, such as

- software and systems engineering
- environmental engineering
- management of technology
- planning and design
- cultural studies
- public policy analysis
- interdisciplinary programs in biology, chemistry, physics and engineering science
- health-related programs.

There are also opportunities in new approaches to traditional disciplines, an example being SFU's Masters in Liberal Studies.

Both new and existing programs at Simon Fraser University should strive to have desirable characteristics not found in programs elsewhere in BC. Further, new programs chosen for development should be consistent with the academic mission of the University, and should emphasize:

- strong academic foundations
- adaptability to changing professional requirements
- co-operative education
- interdisciplinary studies.

Some programs may best be offered through a separate subsidiary of the University, as discussed in Sec. 2.2. It may also be advantageous to use clinical professorships in these and other programs.

4. THE OPERATION OF THE UNIVERSITY

PCUP has recommended that excellence should be one of the four defining characteristics of Simon Fraser University. Achieving and maintaining excellence is not a simple exercise: it requires fair assessment of the quality of students, programs and personnel, a budget that rewards innovation and productivity, and mechanisms for dealing with programs that fail to meet the criteria for continuation. While there are policies already in place to review faculty, student and program performance, there remains room for improvement, particularly in the means for allocating the budget.

4.1 Assessment and Accountability

The performance of students and faculty is evaluated regularly at Simon Fraser University. Students who fail to meet the performance standards of the University are asked to withdraw, tenured faculty who no longer meet performance expectations have their salaries frozen and may be dismissed in extreme situations. However, procedures for assessment of administrative and support staff need to be established in a similar way as they are for students and faculty. Indeed, the institution as a whole should evaluate its performance by regularly measuring student and employee satisfaction. A further weakness in our current assessment system lies in the evaluation of programs.

Even though program quality is evaluated periodically at SFU by review panels drawn from peer institutions, the reviews more than occasionally tend to focus on the research success of the faculty, rather than the attributes of the program. While the membership of a review panel must have strong representation from experts in the discipline, there also should be representation from the constituencies that employ graduates of programs. A review should include an evaluation of the performance of the personnel in the program and the activity level as evidenced by the availability and quality of courses and, in the case of graduate programs, colloquia. Further, the evaluation of program excellence should not be exclusively academic (i.e., number of scholarship winners) but should reflect the desirability of entry to the program (through the number of applicants) and the demand for graduates of the program (through the success of graduates in obtaining employment upon degree-completion, for example). Once a program has been assessed, the recommendations of the review should be acted upon.

If these reviews are to have credibility, nationally applicable indicators must be established and used to assess the quality of an academic program. PCUP recommends that SFU participate fully in the development of such indicators. Further, the stakeholders in SFU's operation should be provided with an annual report that not only rejoices in our achievements, but also summarizes the reviews carried out in the preceding year, and the steps taken to deal with shortcomings pointed out in the reviews. The time between successive evaluations of a given program, currently more than four years, may be too long; the University should consider shortening this time frame, particularly in those instances where an external review has pointed out serious deficiencies.

Finally, in the face of ever growing demands on the time of all members of our community to meet their obligations for teaching, research, learning, support and service, PCUP suggests that the University take a serious look at the time and resources devoted to collegial institutional government. Do we really need all of the committees that exist at SFU? Could we significantly reduce the numbers and sizes of the committees? Could we entrust more responsibility and accountability to individuals who serve on committees and/or assume administrative responsibilities? How could we evaluate and recognize such activities?

4.2 Unfreezing the Budget

PCUP has heard complaints that the course and program approval process is time-consuming and leads to lengthy delays in establishing new programs. While PCUP appreciates that the approval process could be streamlined, we believe that a greater problem lies in the budget allocation process. There need to be continuing and clearly identified mechanisms in the budget to support innovation and reward productivity in research and teaching at the Faculty level. The budget must be made more fluid.

We propose two changes to the way resource allocation is currently handled at the University:

- (i) Continuing faculty positions should be allocated to Faculties largely according to productivity in teaching and research, as outlined below. Support staff positions and other Faculty resources that are required for discipline-specific purposes would continue to be distributed using current mechanisms.
- (ii) Funds should be available for innovation in new and existing programs. We propose that the University permit sufficient budget reallocation every year to allow for the possibility of a complete turnover of programs across

the University approximately every 50 years, although we are not recommending that SFU seek to reinvent itself twice per century.

Rewards for productivity

As academic disciplines evolve, the desirability of a program as seen by students and employers, and the necessity of maintaining a research specialization, also change. While one must be careful not to be misled by short-term fluctuations in enrolment, or short-term priorities of granting agencies, the staffing complement of a Faculty ultimately must reflect its teaching and research productivity: the priorities of the University must be driven, in part, by demand.

Currently, the budget given to SFU by the province specifies the number of undergraduate and graduate students that the university is expected to admit. We propose that these two enrolment figures, including appropriate weightings, be used as the primary, but not exclusive, determinants for the allocation of continuing faculty positions (CFLs) to the Faculties. Because graduate students generally draw more heavily on faculty time than do undergraduates, graduate enrolment should receive a higher weighting than undergraduate enrolment in determining resource allocation. For example, graduate students in science and engineering require about 3 times as much weekly contact per FTE as undergraduates. How much attention should be paid to the different resource requirements for graduate students in course-based programs, or in disciplines where graduate students work with minimal supervision, is an issue we have not addressed. In the suggested allocation mechanism, the research productivity of a Faculty is recognized through its graduate enrolment, and a CFL position would continue to comprise one research and two teaching semesters per year.

At the present time, there are about 21 FTE undergraduate students for every full-time faculty position at most Canadian universities with doctoral programs but without medical schools, with some variation about the mean. Using a 3:1 ratio for weighting graduate students, there are about 27 weighted FTE students per full time faculty position at SFU, essentially the same as the Canadian average for universities with doctoral programs but not medical schools. The ratio of weighted FTE students per full time faculty is within 10% of the SFU mean for the three largest Faculties at SFU, but is higher for the two smaller Faculties of Business Administration and Education. The variations among the largest Faculties are within the range that one would expect, given that the Vice-President

Academic should have some latitude to recognize economies of scale, and the changing priorities of the University.

The principle of resource allocation according to teaching and research productivity is an important one, and it should be implemented to allow us to respond more quickly to the budgetary and enrolment challenges ahead. It also provides a mechanism for evaluating the financial impact of decisions at all levels in the University - since the provincial and tuition component of the University budget is, in fact, almost entirely determined by enrolment. As indicated in the previous paragraph, the senior University administration should continue to have some latitude in allocating CFLs, but the general guidelines to the Faculties for obtaining CFLs should be clear. Faculty deans should have the freedom to distribute CFLs in accordance to their perception of the needs of the disciplines within their Faculties. That is, formula allocation should apply only at the Faculty level, and not necessarily at the departmental level.

What caveats should be put in place to prevent abuse of formula allocation? Faculties can be protected from large scale fluctuations in staffing levels caused by yearly fluctuations in enrolment by placing a ceiling on the number of positions to be reallocated annually at the University level; for example, a ceiling of 1-2% of the total faculty complement would be appropriate. Senate approval of admission quotas can be used to prevent Faculties from lowering admission standards for the sake of obtaining more CFLs.

Funding for innovation

A step to encourage program innovation at SFU has been taken through the establishment of the Academic Enhancement Fund. The resources of this fund are modest, only \$250,000 in 1994-95 and \$300,000 in 1995-96. We propose that this figure be raised to 0.5% of the funding received from the province - or \$600,000 per year. The terms of reference of the fund should remain approximately as they are now.

What are the budgetary implications of the combined effects of formula CFL allocation and innovation funding? If half of the innovation funds is directed to CFL positions, and if the University places a ceiling of 1% on the number of CFL positions to be reallocated according to a productivity formula, then the total flow of CFL positions among Faculties is only 1.2 to 1.3% per year. In other words, it would take more than 70 years for the University to completely change its program mix if it so wished. While this rate of change may be too slow for a young institution

like SFU, it is typical of older institutions: for example, the University of Michigan annually channels 1.3% of the university budget through a program renewal fund.

4.3 Program Closure

The changing demand for programs has always been with us, but the review and reallocation process outlined in Sections 4.1 and 4.2 will make these changes, and their consequences, more apparent to all of those involved. Eventually, there will be programs that must be closed, either because of very weak demand or because of low quality. The SCIMO report has recommended policies regarding minimum course enrolments required for faculty to receive credit for teaching a course. What is still needed are policies for the closure of a program.

Several criteria should be met if SFU is to sanction and offer a program:

- it must have high quality, as determined by the external review process adopted by the University
- it must have a minimum graduation rate.

Adequate terms of reference for program and departmental review are already laid out by the University (and in Sec. 4.1). There should be minimum graduation rates required from a given program for the program to continue. Recognizing that SFU graduates more than 2000 students per year, we recommend that a degree designation be revoked if there are fewer than 10 graduates per year for undergraduate degrees and 3 graduates per year for graduate degrees, averaged over several (perhaps 3 to 5) years.

Revoking a degree does not mean dismantling the department offering the degree. There are several alternatives:

- amalgamation and restructuring with another SFU program, including another program offered by the same department, or
- amalgamation with a similar program offered at another BC university.

Of course, if these remedies fail as well, then it may be necessary to close the academic unit, restructure it as a service department, or transfer it to a university-owned corporation.

APPENDIX

The recommendations of this report have been developed for the environment in which we expect SFU to operate for the next decade. We summarize here the statistical snapshots of that environment to enable readers of this report to place the recommendations in context. More extensive analysis, as well as references to the original sources of information, can be found in PCUP's reports *The Undergraduate Program at Simon Fraser University* and *Graduate Studies and Research at Simon Fraser University*.

A.1 Undergraduate and Graduate Studies

Undergraduate enrolment Simon Fraser University draws more than 80% of its undergraduate students from the BC Lower Mainland, a fraction almost identical to UBC. About one-third of the new students admitted annually come directly from BC Grade 12, and about one-third transfer from community colleges. Although "non-traditional" students represented a large fraction of our student body two decades ago, fewer than 10% of our admissions are now in that category, and the average age of our undergraduates is a youthful 22 years. Almost half of our full-time undergraduates come from communities on the eastern side of Burnaby Mountain.

Undergraduate admissions Our undergraduate admission standards have increased steadily in the past decade, and are now very high, typically in or near the top five in Canada. Correspondingly, the undergraduate degree completion rate is also very good, and is expected to pass the 70% completion mark in the near future.

Projected enrolment For the past thirty years, our full-time equivalent (FTE) undergraduate population has increased by an average of 330 students per year, with some variation about the mean. Using population projections from the Ministry of Education, we anticipate that enrolment will continue to climb by 400 students per year if funding rates are kept at their current level, and if our admission standards are not raised further. The FTE undergraduate population is expected to climb from 12,100 in 1993/94 to 16,000 in 2003/04.

Graduate enrolment Our graduate student population has grown along with the faculty complement, and in 1994 there were 1679 FTE graduate students, representing 13% of our total student body. Visa students made up about 14% of our total graduate student population in

1994, close to the Canadian average. The fraction of female graduate students has risen from 43% in 1989-90 to 46% in 1993-94, and one might expect that the gender balance will have shifted to a female majority by early in the next decade, just as it has already in the undergraduate population. Most graduate students study on a full-time basis: in 1993/94, more than 90% of the FTE graduate students were registered full-time.

A.2 Research Activity

Research funding SFU received \$15.3M in research funds from federal sources out of a total of \$21.4M from all sources in 1994/95. Private sector funding for SFU research from Canadian firms and foundations has increased steadily from \$1.4M in 1990/91 to \$3.5M in 1994/95. Unfortunately, research support from BC government sources has declined from \$3.3M to \$1.1M in the same period.

National comparisons National data are not uniformly available for all institutions and for all indicators of research activity that one might wish to construct. On the basis of available data, PCUP defines a comparison group of 19 universities that represents most institutions with extensive research and graduate programs (Alberta, UBC, Calgary, Dalhousie, Guelph, McGill, McMaster, Memorial, New Brunswick, Ottawa, Queen's, Saskatchewan, SFU, Toronto, Victoria, Waterloo, Western Ontario, Windsor, York). Comparisons within this group, as shown in Table 1, should be regarded only as descriptive. Commonly used descriptions of research activity, such as funding levels per eligible researcher, are frequently of limited value in describing the quality of a research program.

Table 1. Comparison of research and graduate studies at SFU against a 19-member comparison group. The term "faculty" means "eligible faculty member". The database used to generate these comparisons was compiled by the Association of Universities and Colleges of Canada and *Maclean's* (1994).

Indicator	SFU	Comparison group		Rank (of 19)
		Low	High	
FTE graduate enrolment	1679	690	5789	13
Total federal research expenditures	\$12.6M	\$5.3M	\$87.0M	17
NSERC \$ / faculty	\$40,000	\$24,100	\$78,700	14
SSHRC \$ / faculty	\$5,500	\$720	\$9,400	6
NSERC graduate scholarship funds per faculty	\$5,500	\$830	\$8,750	7
SSHRC-funded graduate students per faculty	1:33	1:330	1:13	8

A.3 Demand for Degree-holders

Occupational employment in BC The largest employment categories (more than 4000 employees expected in BC by the year 2001) which routinely require university education are listed in Table 2. The rate of growth R (in the table) is a compound rate; for comparison, the compound rate of population growth for BC is expected to be 2.1%.

Employment rates The employment history of our graduates is a partial indicator of their attractiveness to employers. Unfortunately, statistically meaningful data are not yet available for such indicators segregated by university. Nationally, the employment of degree-holders is generally higher at the Ph.D. level than it is at the bachelor level, as shown in Table 3. The obvious counter-example to this trend is fine and applied arts, although we have no indication that SFU graduates in this area suffer the same unemployment rate as is observed nationally.

Table 2. BC occupational employment in positions often requiring university education in 1992, with a projection to 2001 from the Canadian Occupational Projection System. The rate of compound growth. is R, and N indicates no specific program for the category is available at SFU.

Occupation	1992	2001	R	SFU
Nurses*	35,630	48,190	3.4%	N
Specialized managers	24,270	35,190	4.2%	
Elem. school teachers	23,690	28,770	2.2%	
General managers	16,250	20,250	2.5%	
Sec. school teachers	13,890	15,740	1.4%	
Systems analysts*	12,890	23,110	6.7%	
Financial management	9,570	11,230	1.8%	
Communications	9,560	11,390	2.0%	
University/college teachers	7,890	9,750	2.4%	
Social workers	6,830	9,200	3.4%	N
Physicians/surgeons	6,180	7,310	1.9%	N
Lawyers/notaries	6,160	7,710	2.5%	N
Civil engineers	4,660	5,920	2.7%	N
Personnel officers	4,210	4,790	1.4%	
Education administrators	4,180	4,730	1.4%	
Electrical engineers	3,990	5,270	3.1%	
Writers/editors	3,830	4,890	2.8%	
Physio/occup. therapists	2,890	4,230	4.3%	N
Architects/planners	2,920	4,220	4.2%	N
Health administrators	2,870	4,140	4.2%	

*"Nurses" includes R.N.'s and B.S.N.'s; "Systems analysts" also includes software systems analysts and programmers.

Table 3. National unemployment rates in 1992 according to degree received in 1990, shown as percentages.

Field of study	Bachelor	Master	Doctoral
Fine and applied arts	15%	16%	27%
Humanities	13	15	14
Mathematical/physical sci.	11	11	6
Agriculture/biological sci.	15	9	5
Social sciences	12	7	6
Engineering/applied sci.	11	9	3
Education	9	3	4
Health professions	5	5	3