

Technology Degrees at BCIT

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Technology degree: the rationale

The Bachelor of Technology degree at the British Columbia Institute of Technology (BCIT) is both desirable and necessary to support economic growth in the Province of British Columbia and in Canada. The degree programs are being developed to meet the changing demands of industry, the economic needs of the province, and the career-advancement requirements of Diploma graduates.

The degree initiative began with a lengthy process of discussion and research. A discussion paper published in February 1991 invited feedback from BCIT staff, Advisory Committees, industry regulatory bodies, educational institutions and government. Meanwhile, visits were made to four British Polytechnic Institutions, one British college of higher learning and to the Warwick University Manufacturing Group. From these, valuable insight was gained into the possible models and diverse pathways that lead to applied degrees.

In response to a subsequent proposal submitted in May 1992, the Government enacted legislation in January 1995 that awarded BCIT degree-granting status. This booklet describes the rationale, evolution, and characteristics of BCIT's technology degree; it then presents the technology degree model. Finally, it defines the place of technology degrees in post-secondary education.

Overview

The years since the end of World War II have seen the gradual building of an integrated global economy. The driving force behind this rapidly increasing economic globalization is the exponential growth of new scientific, technological and organizational knowledge, resulting in greater mobility of people, products and information.

For British Columbia this should have meant the beginning of a shift from a resource-based to a knowledge-based economy and a corresponding shift in our human resources from the factory floor to information-based employment. But, the high prices of BC's natural resources over the last two decades have obscured the urgency of the need for these changes.

Knowledge-based industries must make a greater contribution to wealth creation ... This can only be achieved through a strong emphasis on technological education.

Domestic consumption of our technology-based products and services is expanding at an alarming rate, and there is a widening gap between imports and exports. This is being funded by the production of more and more resource-based products. If BC is to reach sustainable-development goals, this trend must be reversed. Knowledge-based industries must make a greater contribution to wealth creation in the

province. We must foster the development of export-oriented companies creating knowledge-based products and services. This can only be achieved through a strong emphasis on technological education.

Today, the changes in global economics are occurring at a more accelerated rate than ever before in response to an explosive growth in knowledge. As the pace of change quickens, the importance of education and of research and development increase. These factors have been identified as the key elements in determining economic growth, competitiveness and prosperity in a global economy.¹ Essentially, countries are competing with each other on the basis of the skills of their labour force. Improving the general skill level of all citizens will produce a more highly trained workforce that will fuel increased productivity in British Columbia. In addition, to participate effectively and maintain its position in the global market place, BC must produce many more people with advanced and specialized skills, capable of using newly developed technologies and processes.

Because technological knowledge and practice continually change, British Columbians must embrace a culture of lifelong learning. We must target education and training specifically at converting science into marketable products and services. Only in this way can we maintain or enhance our quality of life while preserving and protecting our environment. A technology degree emphasizing both the theoretical and practical aspects of learning allows us to accomplish this.

Shortfall

"Even while we confront jobless rates of nearly eight percent, the job vacancy rate—jobs that cannot be filled because no one can be found with the right qualifications—is the highest in nearly 20 years. There are 600 000 job vacancies in an economy with almost one million unemployed."

*Janice Moyer, President
Information Technology Association of Canada*

Employment and Immigration Canada (1989) estimates that over the next ten years almost half the new jobs in Canada will require more than five years combined education or training beyond high school. This translates into 12 000 graduates per year in British Columbia. This estimate does not include replacing graduates who retire or leave the province (estimated to be around 4500) or upgrading jobs to graduate levels (estimated at 2000). In total, over the next few years in BC, the labour demand for graduates with at least four years post secondary education, will be 16 000 to 20 000 full-time equivalents (FTEs) a year.²

The universities are currently producing around 10 000 graduates per year, and this will increase to 12 500 in five years as the Access for All policy is realised.

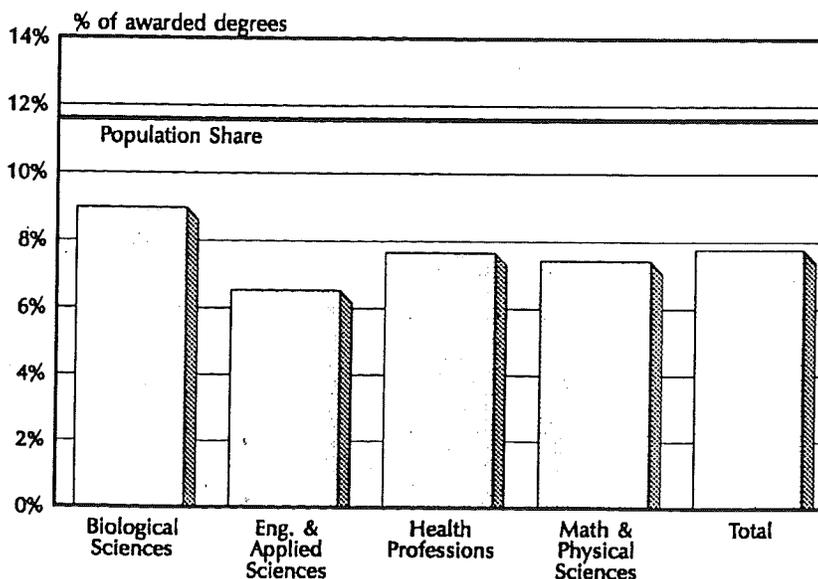
Clearly, based on these projections, the supply of degree-level employees is going to be significantly less than the demand. BC must address this shortage and identify the type of graduate who would best meet the economic needs of the province in the next decade.

In the 1990s science and technology will be a driving force of economic growth. Only through applied research and development, along with the increased application of technology, will BC industries be able to survive increased international competition. The new wealth of BC will come from people who excel in math, science and applied technology and from skilled entrepreneurs.³

Among the OECD countries, Canada has the lowest investment in research and development. Within Canada, BC has the lowest student enrolment in university science and engineering, and BC awards fewer baccalaureate degrees per 1 000 population than the rest of Canada in all fields but especially in math, science and applied science.

The chart below indicates how BC's participation rates in various fields of scientific and applied study are well below its 11.5% share of the Canadian population.

Chart 1: BC's share of university degrees awarded in Canada by field of study, 1989



Given that BC has the highest literacy rate in the country, these statistics are surprising. BC has relied on a policy of immigration and within-Canada migration of skilled and educated people to fill job shortages. Whilst this may be a cost effective way of meeting the human resource demands of the province, it also means that we are failing to offer educational programs that lead to relevant and appropriate career options for some BC citizens.

Indicators show that future job shortages will occur in the “new” knowledge-based industries and the demand for these skills will be worldwide. BC can no longer rely on international or interprovincial migration to satisfy these demands.

Recent increases in university and college enrolment have occurred primarily in non-science and non-technology fields.⁴ To meet the demands of a technology-driven economy and provide good employment opportunities, our education system must be upgraded in terms of diversity, relevance and responsiveness. The technology degree is a major thrust to build our own capability to produce more graduates in science and technology.

Student career choice

Previously, our educational system provided only two options for students wishing to follow a career in science and technology: a four-year, theory-based, engineering, commerce or science, university Baccalaureate Degree, or a two-year, practically-oriented Diploma of Technology. BCIT’s Bachelor of Technology Degree now offers a third option.

This degree gives recognition to the gifted “practitioners:” students with great technical abilities, whose skills enable them to transfer knowledge into practical applications.

Many students do not go to university, preferring to move more quickly into job opportunities. They tend to enrol in practical programs of shorter duration, i.e., career technical and vocational programs. If such students subsequently develop higher levels of motivation, they now have access to relevant, degree-level education. A technology degree-completion program provides these students with a further opportunity and the province with another source of graduates .

Demand for further technological education

Technology is becoming more and more specialized. The growth of knowledge is exponential and in some areas, the two-year diploma program is no longer adequate to give the technologist the long-term depth of expertise to perform adequately in a rapidly advancing technological field.

In a survey by the Applied Scientists, Technologists and Technicians (1989), 15 000 technologists in BC indicated a strong interest in taking further education to keep up with the advancing knowledge in their particular field.

In the early 1980s a survey sent out to 1000 nurses and technologists in the health field, yielded a 63% return rate. The vast majority of respondents supported the need for advanced courses in specialist areas and felt strongly that such courses count towards a degree.

"BCIT responded to the rapid expansion of technological information and to industry's demand for more advanced speciality courses."

BCIT responded to the rapid expansion of technological information and to industry's demand for more advanced speciality courses by offering Advanced Diploma programs and courses in the Schools of Health Sciences, Business, and Engineering Technology—but this was not enough.

In May 1990, in a market research project compiled by a team of BCIT business students, graduates of the School of Business from the past 10 years were polled to determine their response to a proposed Advanced Diploma and a Bachelor's degree program: 34% responded very positively to taking further education at BCIT. Only 7% of these respondents favoured the Advanced Diploma alone; the majority favoured a degree path or a combination of Advanced Diploma and a degree.

In response to the 1991 discussion paper, *Technological Degrees at BCIT*, letters received from technologists already in the workplace welcomed the career advancement opportunities proposed by BCIT, but were unanimous in stating that a return to school would only be considered if it culminated in a degree.

Changes in the workplace

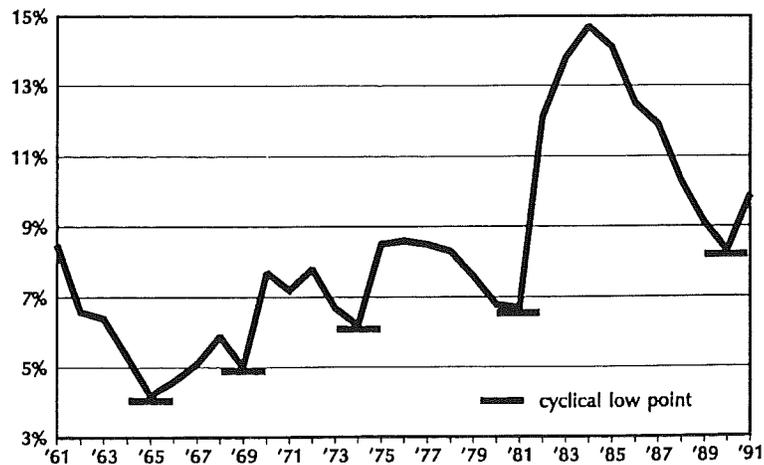
As technology grows, many jobs in the workplace are changing and not only in Canada, but in the whole of North America, there is an urgent need to retrain and upgrade individuals. Retraining and upgrading empowers individuals to improve their economic, social and personal effectiveness, and also leads to overall increase of our national wealth. This has become an even more important function for post-secondary institutions as these technological changes escalate.

Higher levels of education increase efficiency by enabling decentralization of decision making, not only from the corporate down to the divisional level, but also from management to the shop floor. Studies have shown that the high productivity of Japanese factories is due to the ability to push responsibility down to operators on the factory floor, thus requiring greater technical competence at this level.⁵

Productivity improvements in both private and public sectors have hit the routine worker hardest, as standard services are most easily automated. Moreover, projections over the next decade of the emerging job structure indicate that the greatest growth will occur in the professional and technical areas.

The graph below indicates an overall upward trend in BC unemployment. One factor in this is the growing number of British Columbians who do not have the skills required in the modern workplace.¹

Chart 2: BC unemployment rates, 1961-1991



Unemployment rates of BC post-secondary graduates (from the National Graduates Survey) indicate that the higher the level of post-secondary training, the lower the rate of unemployment. Thus, if progressive upgrading for the workforce can be provided, then the provincial unemployment level will be reduced.

It is imperative that this problem be addressed by providing readily accessible retraining opportunities and by establishing in this province a learning culture built around the notion of lifelong learning and continuous upgrading.

Education can no longer be regarded as a once-in-a-lifetime experience. People entering the workforce today should be prepared to pursue several careers during their working lives. In the emerging global marketplace the ability to adapt and learn new skills continually will be the most highly prized skill of all. ⁶

"Education can no longer be regarded as a once-in-a-lifetime experience."

BCIT is the leading institution in the province for retraining students. The Institute provides ongoing service to graduates, giving them maximum upward mobility in their career paths. The training provided has a strong practical emphasis. BCIT has a commitment to its graduates: it produces the best and the most highly employable. It is the commitment of this institution to see that these graduates remain the best and the most sought-after as they progress through their working lives. BCIT's Bachelor of Technology degree offers graduates a career advancement opportunity and parity of esteem in the labour market.

The workplace environment is shifting: employees are now valued team members rather than individual achievers. If ideas are to become productive realities, the university engineering or science graduate with a more theoretical perspective needs hands-on collaboration with the specialist practitioner.

Sensitive to the changing needs of industry, BCIT is unique in its approach to education. BCIT produces team players—students who are used to working in groups towards a common goal, be it creating a new product, solving a technical problem, or doing a team research project. Thus a BCIT graduate goes into the workplace with good communication skills, able to function as a team member in the solution of practical problems, and to be productive.

Demographics

"...the PEOPLE of our province are its dominant economic factor."

A shift in the demographics of society impacts greatly on the shape of the workforce. As the economic viability of BC moves toward a dependence on knowledge utilization, the *people* of our province are its dominant economic factor. Slow population growth in Canada and BC is reducing the supply of young people entering the workforce; thus, retraining from within the established workforce will become increasingly important. In fact, in the student population there will soon be more individuals over 25 years than under. At present, there is a critical mass of older learners whose career paths are blocked, and who are questioning their career goals and seeking alternatives.

The "baby boomers," in particular, place an unusual strain on all social and economic institutions as they progress through their life cycle.

One manifestation of the strain on career paths can be seen in the increase in requirements for upward mobility. Progressively higher and higher levels of credentials are being demanded to determine worth; this results in a demand for diverse and flexible degree opportunities.

Societal values

Society places great value on a degree; its standard is universally recognized whereas an Advanced Diploma is neither well understood nor recognized. Given that we are experiencing a grave shortage of students entering science-related and technical fields, it is imperative that we make these career paths as inviting and valued as possible. By according prestige solely to the academic rather than to the combination of practical and academic, we perpetuate a technologically incompetent workforce at a time when the very opposite is needed.⁷

"Only by offering degrees in career technical programs will society place the deserved high value on this type of education ..."

Germany, Japan, Sweden and Korea have vibrant wealth generating sectors, and all have education systems which place great emphasis on basic scientific and applied disciplines. In Korea and Germany, technical universities and vocational schools provide esteemed alternatives to university training; practical skills are respected and admired, whereas our society seems to denigrate the practical.

Parents understandably want their daughters and sons to achieve a degree, partly because of the brighter economic future it usually brings, but also for prestige. Many high school students with great technical aptitude are initially lost to career technical education because of society's and parental pressure to "go for the degree." Some of these students arrive at BCIT after pursuing university academic studies to do what they wanted to do in the first place. In fact, 67% of BCIT's first year students have previously attended university or college. This circuitous route via college or university to career technical education is undoubtedly a costly process not only for the individual but also for the province.

Only by offering degrees in career technical programs does society place the deserved high value on this type of education and on the work performed by the graduates of career technical education.

Technology degree: the history

For many years the only agents offering post-secondary education in British Columbia were the vocational schools and universities. The role of technologist was played usually by engineers or science graduates. Both industry and students felt that their training was inappropriate for their work.

BCIT was created in 1964 to fill the gap in the education system and to address the need for highly skilled technology graduates. The Institute mandate at that time was stated by Leslie Petersen, the Minister of Education:

The aim of the British Columbia Institute of Technology will be to fit the latent skills and technical capabilities of our young people to the present and future technological needs of our growing province and indeed our nation.

This mandate has translated into a rigorous two-year program requiring about 2000 hours of instruction and leading to a Diploma of Technology for BCIT graduates.

In 1977, BCIT established an institute-wide task force to study post-diploma technology needs in the province. The findings, combined with a desire to differentiate itself from community colleges, caused BCIT to include the following recommendation in its five-year plan submitted to the Ministry in March 1980:

The Institute will plan for the development and implementation of Bachelor of Technology degree programs where there are indications of needs for such programs.

In 1980, the Ministry of Education commissioned a task force to investigate technological training in Engineering Technology, Health Science, and related fields. Responding to this commission, BCIT submitted the document *Vision and Decision*, which recommended Bachelor of Technology degrees for disciplines where the diploma program was inadequate for the needs of industry. It proposed that the diploma be a prerequisite to the degree program. The ministry task force endorsed the need for post-diploma speciality training in technological areas; BCIT responded to the need. In 1985, Advanced Studies programs were started in the School of Health Sciences, followed by Engineering Technology in 1987 and Business in 1989.

The merger of PVI with BCIT in 1985 made the "New BCIT" the most comprehensive trades and technology institution in BC. The complete spectrum of technical programs now include vocational/technical programs to complement and enhance those in technology. A further dimension was added in 1988 when BCIT began doing applied research and development and industry assistance.

BCIT's new mandate was announced in 1988 and showed a definite shift in focus to include advanced technology programs. BCIT offers many part-time Advanced Diploma programs, some of which, along with new initiatives are being developed into Bachelor of Technology degree programs.

Degrees, previously offered collaboratively by BCIT and the Open University, are now being offered as BCIT Bachelor of Technology degrees.

The Institute also established some degree paths through bridging programs with other BC universities. However, this latter approach changes the student's direction, resulting in traditional university degrees rather than technology degrees. The traditional university degree is required by only a very small percentage of diploma graduates. Technology degree programs focus on specialized areas.

Technology degree: the characteristics

"If Canada is to remain internationally competitive we must somehow develop a learning culture - an environment in which millions of Canadians are personally committed to the idea of lifelong learning." ⁸

BCIT's major function is to produce job-ready graduates to meet the needs of industry in various technological fields that support BC's economic development. As these technologies advance at different rates, different levels of expertise will be deemed necessary both for entrance to the work force and for career advancement in that field.

The two-year diploma program is a winner; it is a cornerstone of BCIT. It is on this program that BCIT has built the fine reputation that it enjoys today. More than 2000 hours of concentrated instruction over a two-year period produces not only the technically competent, but also the highly motivated and highly organized, job-ready BCIT graduate that industry holds in high esteem.

Offering a degree program to students will enrich their education and practical training, and establish the value system that education in technology is a career-long, continuous process.

BCIT offers degree-completion programs only in selected areas as required by industry and recommended by industry advisory committees. Foreseeably, this may be a relatively small percentage of BCIT's activity for several years and would slowly evolve, based on industry's need for employment. The primary focus and output will continue to be the Diploma graduate.

Impact on the Diploma

A Technology Degree program will have a positive impact on the Diploma program and will increase recruitment into this program. The Diploma becomes a unique motivator; no other degree program rewards its candidates at the halfway mark with a highly esteemed, job-entry credential. At this point, students may enter the workforce with marketable skills and with the opportunity of pursuing degree studies after gaining valuable work experience.

Interestingly, some British Polytechnic Institutions, who traditionally have run degree programs as four years of continuous study, are now back tracking and offering an exit point to industry after two years with an industry-recognized credential, the Higher National Diploma.

A Bachelor of Technology degree will therefore heighten the profile of the two-year diploma; the diploma will be recognized and valued as a significant milestone at the midpoint of a degree program.

Faculty changes

Degree-granting status for BCIT will attract more faculty at the Masters and PhD level with industrial experience. This will expand the overall knowledge base and teaching capabilities of the faculty, and will thus impact all levels of learning, both at the diploma and degree level. Such individuals will also bring applied research skills to the institute which, through contract applied research and development via BCIT's Technology Centre, can help to advance and develop technology in the province.

Unique degree

A degree in technology is new for the province and will naturally invite comparison with existing degrees. Although it retains academic rigor, a Bachelor of Technology degree should not be compared to a traditional university degree. A Bachelor of Technology fills a different niche in the market place. Increasingly, as universities have tended more and more to emphasize research, *application* of knowledge has not been stressed. Career technical programs are filling this void to progressively higher standards, and these standards deserve recognition.

"Our learning system has served BC well in the past, but the needs of the future are different."

BCIT has an excellent national and international reputation; it has unique elements that provide its competitive advantage. As it develops its degree program, BCIT will continue to build on and strengthen these unique advantages as follows:

- BCIT's strong links with industry will result in curriculum driven by industry needs rather than academic bias.
- Continuous knowledge growth will necessitate continuous refinement of curriculum. BCIT has the infrastructure through its Advisory Committees to respond quickly to changing needs of industry.
- Rather than simple specialists, industry is demanding many more "generalists:" multi-skilled managers with knowledge of production, marketing and technology. A BCIT baccalaureate degree combines advanced technology specialities with some business courses. The United Kingdom Polytechnics have found that, since 1980, this hybrid degree has resulted in its graduates not only being more actively sought after than university graduates by business and industry, but also being better equipped for early promotion.

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- BCIT's Bachelor of Technology degree is designed to meet the individual needs of students. Rather than focusing on one discipline, it has a program focus or multi-disciplinary basis .
 - Our learning system has served BC well in the past, but the needs of the future are different. Teams are now the fundamental work units of most organizations. More and more people work on teams and, increasingly, companies are *empowering* teams and individuals. Industry is now demanding both technical and team skills.

Team experience requires skills not developed in a traditional education: skills such as leadership; ability to encourage or motivate others; innovation; organization to produce a finished product; interaction with other group members; acceptance of group consensus; giving and receiving of honest feedback; anticipation of problems rather than just solving them; creating opportunities; initiating action; and following through to obtain the desired results.

These are integral parts of team work and are neither measured by exams nor developed by discussion. Graduates must be prepared for this working environment. Diploma programs at BCIT already include student-team project work. As it designs its technology degrees, BCIT builds on this team approach to simulate the workplace.

"Specialized technical training must not be confused with narrow, linear thinking..."

- Students of the future will increasingly have one foot in the workplace and the other in a place of learning. Thus BCIT offers its degree via flexible delivery modes and schedules, so as to maximize opportunities for all citizens of the province and to facilitate a symbiotic work-education lifestyle.
- Projections of the future workforce indicate that an individual will need to change career direction several times. Consequently, workers must be provided with a broad base of portable skills.
- A Bachelor of Technology degree, while providing in-depth specialization in advanced technological areas, also provides these portable skills. Specialized technical training must not be confused with narrow, linear thinking. To the contrary, curriculum development for a Bachelor of Technology degree emphasizes such learning outcomes as critical thinking, problem solving, numeracy, ethics, communication skills, computer literacy, and business skills.

Academic autonomy

To be credible, a strong technology degree must come out of the major technical-teaching institute in the province. BCIT has been granted the academic freedom to award its own degrees in order to preserve the following essentials of a Bachelor of Technology program:

- a practical focus, specializing in the *application* of knowledge rather than its acquisition
- a commitment to respond immediately to changes in technology and the workplace

The curriculum of a technology degree is driven by industry needs and must respond immediately to those changing needs. With its ties to industry via the Advisory Committees, BCIT has the infrastructure to be constantly aware of these changes, and can act quickly to ensure curriculum relevance.

“To be credible, a strong technology degree must come out of the major technical-teaching institute in the province.”

Business and industry will determine the credibility of a Bachelor of Technology degree. BCIT has an established reputation in the workplace due to the outstanding performance of its diploma graduates. BCIT has one of the highest placement rates in Canada, placing 93% of BCIT technology graduates in jobs within nine months of graduation. This shows the capabilities of BCIT graduates, and affirms that BCIT programs are known and esteemed. Business and Industry will readily recognize and accept the standard of a technology degree conferred by BCIT.

BCIT faculty are well motivated as educators and as professionals in their fields. They usually have industry experience, and many keep that experience current through regular professional development. BCIT faculty are well equipped and deserve to be members of a degree-granting institution.

Since 1964, BCIT has achieved recognition as one of the foremost educational institutions in British Columbia. With the ability to design, monitor and regulate its own degree program, BCIT will now be able to fulfil its mandate and realize its potential.

Technology degree: the model

"Action is urgently required: the demand for educated, skilled and innovative personnel is accelerating in all sectors worldwide as national economies upgrade their technological base."⁸

Program aims

This program aims to equip the technologist with degree-level knowledge, skills and attitudes to adapt, perform and compete in a continually changing work environment.

The BCIT model

It is clear that traditional academic models for degree programs will not fit with the mandate and culture of career technical programs. The model for BCIT's Bachelor of Technology degree is practical and flexible and meets the changing requirements of the workforce.

Business and industry in both the public and private sectors have been well satisfied with the focus on practical specialist training of BCIT diploma graduates and are adamant that the introduction of a degree-completion program not shift this focus. Industry has also favourably received the Advanced Diploma initiated in 1985, with its focus on specialist training.

Diploma graduates seek degree paths, whereas industry wants "depth" of knowledge and application. BCIT has developed a degree model which accommodates both these needs; a degree with a hands-on, practitioner orientation but with academic rigor to warrant the baccalaureate status.

The Diploma forms the first two years of the degree program. As the Advanced Diploma programs have gained recognition by industry and are already in place and funded, it is both logical and cost effective to have them form the major part of the degree-completion program.

To reinforce the practical focus, the degree requirements include a work-experience component. Work is an integral part of the learning process rather than just a means of paying for it. In fact, basic and advanced skills are learned best and most efficiently when structured work and classroom experience are appropriately mixed.

The degree program

The Bachelor of Technology degree program has five components:

- **Diploma program**
- **Two years of relevant work experience**
- **Advanced technology courses**
- **Management courses**
- **Liberal education courses**

Initially, these advanced technology courses will be offered on a part-time basis so that the work experience may take place before or during the advanced courses. The work-experience component has several advantages:

- It provides a natural break in the training process and the opportunity for students to put to work their "job-ready" diploma program.
- It allows students to bridge from other Diploma-granting institutions at this point.
- It provides students with the opportunity to gain additional knowledge and skills in industry, building experience that forms a sound base for further applied studies.
- It provides students with the opportunity to assess their own capabilities and direction for advancement and satisfaction with their chosen field.
- It is a financial benefit to students.
- It offers a new form of "industrial sponsorship." When employers see how further training will enhance their operation, they may support their employees in the program.

Liberal education

Traditional technology students have not had the benefit of liberal education. As a result, their perspectives in their fields tend to be unduly narrow. The proposed model includes liberal education courses designed to support individual life skills in BC's living, learning and working environment. This component of the model might include topics such as the impact of technology on society, human relations, business entrepreneurship, environmental concerns, global perspectives and ethics.

BCIT may offer some of these liberal education courses but will also arrange for students to take them through BC colleges and universities to make best use of faculty expertise, libraries and other services. This will enrich the learning experience, and provide maximum access to all students in the province. Recognition will be given for liberal education courses previously completed at other post-secondary institutions.

Bachelor of Technology: credit framework

Diploma Programs

	MINIMUM
School of Business	110 credits
School of Engineering Technology	150 credits
School of Health Sciences	150 credits

A BCIT Diploma or Diploma from another post-secondary institution, with a bridging program if necessary, is prerequisite to Advanced Technology Courses.

Relevant work experience

Advanced Technology Courses

	MINIMUM
School of Business	60 credits*
School of Engineering Technology	60 credits*
School of Health Sciences	60 credits*

* includes 12-15 credits in General Education

Total credits for Bachelor of Technology

	MINIMUM
School of Business	170 credits
School of Engineering Technology	210 credits
School of Health Sciences	210 credits

(At BCIT, one credit is equivalent to 15 hours of instruction.)

Degree programs

BCIT currently offers a wide range of Advanced Diploma Programs. Degree-completion programs will be offered only in certain areas to meet industry needs. Initially, BCIT is developing Bachelor of Technology degrees in the following areas:

- Accounting
- Applied Environmental Engineering
- Biotechnology
- Computer Systems
- Construction Management
- Electronics

- Environmental Health
- Geomatics
- Management
- Manufacturing
- Medical Imaging
- Nursing with focus on these specialities:
 - Critical Care
 - Emergency
 - Neonatal
 - Nephrology
 - Neurosciences
 - Pediatrics
 - Pediatric Critical Care
 - Obstetrics
 - Occupational Health
 - Operating Room

Educational standards

BCIT will adhere to two basic concepts to validate, review, modify and monitor each program leading to a Bachelor of Technology degree. These concepts are:

Quality assurance External critical peer appraisal in the validation and review of each program.

Quality control Annual internal critical appraisal of each program's operation and of its success in meeting stated aims and objectives.

Quality assurance procedures

External peer appraisal is fundamental to the integrity of the BCIT Technology Degree. The quality assurance procedures, in both the validation of new degree programs and the periodic review of all degree programs will be based on external peer assessment.

Quality assurance is carried out by Degree Validation Panels and Degree Review Panels with a majority of external members and an external chairperson. Each of these panels include:

- two external post secondary educators
- two industry representatives
- two internal educators.

Members of each panel are nominated by the program and by the BCIT Educational Council Nominating Committee, and are approved by the BCIT Educational Council.

Degree Validation Panels and Degree Review Panels report and make recommendations to the BCIT Educational Council. The recommendations of these panels cover the following:

- approval/conditional approval/non-approval of the degree program
- major strengths
- major improvements needed
- minor improvements needed.

Development of a new degree-completion program begins at least two years before the proposed starting date and quality assurance starts to take place early in the process. Quality assurance procedures involve three principal types of event:

- new program validation
- first program review
- ongoing program review

Schedule

These procedures are scheduled as follows:

New program validation:

1 year before the degree program starts

This is carried out according to a well defined set of standards and procedures established and approved by the BCIT Educational Council. The Degree Validation Panel assesses the new degree program approximately one year before the program starts.

First program review:

3 years after the program starts

A Degree Review Panel will review a new degree program three years after it starts. This will provide an opportunity:

- to review curriculum, its responsiveness to industry needs, and its academic rigour
- to review faculty, facility and capital needs.

Ongoing program review:

every 5 years

After the first program review, degree programs will be reviewed by a Degree Review Panel every five years.

This will provide an opportunity:

- to review curriculum, its responsiveness to industry needs, and its academic rigour
- to review faculty, facility and capital needs
- to deal with matters pertaining to the development and interrelationships of programs at BCIT and at other post secondary institutions
- to monitor industry's response to the graduates
- to project the needs of industry in terms of numbers of graduates
- to consider future plans.

Quality control procedures

Annual program assessment

Although quality control is the ongoing responsibility of all educational staff, the BCIT Educational Council has established formal and well-defined procedures that are program-based. This requires annual critical appraisal by all faculty teaching into the program. An Internal Program Committee has been established to prepare and coordinate this annual appraisal for submission to the BCIT Educational Council.

Program delivery modes

The overall goal of our education system must be to provide access to all levels of learning, enabling all citizens of British Columbia to reach their individual potential.

The majority of potential candidates for the degree-completion program are already in the workforce with full-time employment and possible family responsibilities. BCIT therefore provides flexibility of degree program delivery in terms of time, format and location.

Independent surveys conducted by the Schools of Business, Health Sciences and Engineering Technology, in addition the responses to the 1991 Discussion Paper, *Technological Degrees at BCIT*, indicated a strong preference for part-time studies. Initially, BCIT will offer all degree-completion programs as part-time studies.

In the future, however, certain technological fields may not accept the Diploma as a sufficient level of training to enter the profession. A degree may be required for job entry and BCIT cannot afford to ignore these changes. A continuous program leading to a degree may have to be developed.

Distance Education is also an option in some degree programs. Many Advanced Diploma programs are also offered in this way. Distance Education provides a learning opportunity for those students who are not comfortable in the classroom or who, because of geographic location or work schedule, are unable to attend a formal place of learning.

Flexibility is the key: BCIT must offer career advancement in ways that increase opportunities for all citizens in the province, in keeping with the province's "Access for All" policy. It is an opportunity for BCIT to maintain a leadership position in the BC post-secondary system.

Technology degree: the market niche

The mission of post-secondary education in British Columbia is twofold. It must:

- empower the individual, enabling them to further their social, economic and personal effectiveness
- serve the collective social and economic needs of the province.

BC is currently reassessing its education and training programs to ensure that its citizens can acquire and maintain relevant skills and knowledge to keep BC internationally competitive in a fast-changing world.

In the post-secondary system, parochial and competitive issues must be put aside and the focus must be on the needs of the learner and society. It is critical that new partnerships and networks be developed and coordinated between all types of post-secondary institutions and with business and industry.

A void in the education system

A serious vacuum has existed in our current education system. Now more than ever, the wealth-generating sectors of our economy rely on specialists in advanced technology. Our productivity, our economic viability relies on the use and application of knowledge, and yet appropriate recognition of these skills has been denied. Our previous system recognized only academic pursuits with degree-level status.

The pure researcher needs the technologist—the practitioner—to develop ideas into marketable applications. Theoretical and practical career paths are complementary and warrant equal recognition. A Bachelor of Technology degree fills the void and provides a respected alternative for students with high technical ability.

Value for our money

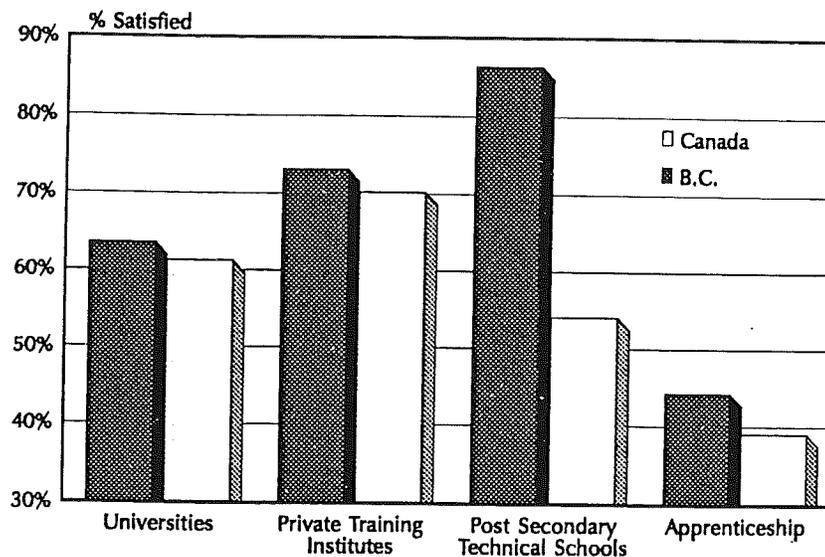
Aging of our population means further monetary demands on the health care system and social services and this may result in a decrease of available funding for post-secondary education. Therefore, it is essential to place emphasis on an education and training system that is focused, purposeful and relevant.

Learning activities and institutions must be regarded as investments rather than costs. However, any investment in learning must be assessed in terms of long-term benefits to individuals, to business and to society as a whole.

Collectively, we must decide which types of education give the best return on our investment.

The Japanese can teach us that the greatest benefit of training comes not from learning something new, but from doing *better* what we already do well. The graph below indicates the high level of satisfaction with the post-secondary technical schools in BC.

Chart 3: Satisfaction with education and training institutes in preparing workers for employment



BCIT is committed to enhance client satisfaction as it builds on the success of the Diploma program and develops its baccalaureate; its graduates will be unique and irreplaceable assets to the work force.

Educational networks

"The development and coordination of new networks and partnerships is critical if we are to forge an effective life long learning system that ensures Canadians can acquire and maintain relevant skills and knowledge in this fast changing world."⁸

Traditionally, students move continuously but not easily between universities, colleges and other institutes of higher learning. To facilitate this movement, and in keeping with the province's "Access for All" policy, BCIT's degree-completion programs are as flexible as possible. Although accreditation and articulation are difficult, BCIT has some bridging programs to BC universities. Also, Diploma graduates can ladder into several degree programs through the Open University.

For students of other post-secondary institutions in the province, BCIT will network with these institutions to provide "bridging and laddering" opportunities at various entry points into the Bachelor of Technology degree course. Specific exit points from the degree course will be marked by a recognized qualification such as a diploma or certificate.

Professional recognition

Diploma graduates are currently recognized by employers and professional associations. Bachelor of Technology degree studies will be recognized as a qualification for advanced technical positions by employers and for advanced certification by professional associations.

Business partnerships

*"Education and training must no longer be perceived as a prerequisite for work but as an integral part of the work process."*⁹

The fundamental statement common to current publications on economic prosperity is that a nation's competitiveness depends on the generic skill level of its workforce. Canadian companies spend proportionately far less on the training and education of employees than their counterparts in other industrialized countries. The dual imperatives of technology and demographics make this training gap a cause of great concern.

As the largest retraining institution in the province, BCIT is working with industry to make employers appreciate the need to invest in their human resource. In both the public and private sector, partnerships are being forged to involve business and industry with BCIT in the design of programs. This gives employers the opportunity to participate in programs which develop and shape their own human resource and bring current technological skills and knowledge to their workplace. Such partnerships motivate diploma-level employees to achieve degrees through possible sponsorship.

New degree

As British Columbia makes the transition to a more mixed economy, a Technology Degree adds to the province's "box of tools" and complements existing university degrees.

The priority in most universities is research. Faculty are expected to publish, and funding is provided in part via grants for pure research. The Bachelor of Technology degree program focuses on teaching competence, professional currency and applied research and development.

The overall quality of education and training depends on the teaching competence of instructors. At BCIT, new instructors with industrial experience are required to attend an Instructional Skills Workshop, comprising one week of lecture and practicum offered by BCIT's Learning Resource Unit. In addition, professional-development programs on new instructional techniques such as Cooperative Learning are regularly available to all instructors.

BCIT's mandate includes the statement that BCIT will:

"...facilitate technology transfer by providing innovation, industrial assistance and contracted applied research."

BCIT recognizes that up-to date information is essential to a good quality technological education. The curriculum must include the latest developments in technology, techniques and concepts, and instructors must always be aware of current developments in their field.

BCIT does not engage in pure research; rather, it is involved in industry-driven research and development, solving practical problems that already exist in the workplace. This supportive role is of particular importance to the growing number of small businesses that now comprise more than 90% of all BC businesses: it involves technology transfer and participative research and development. Faculty are released for limited periods to work with industry on research and development projects. This facilitates technology transfer and keeps faculty fully aware of current industrial practice.

BCIT: Institute of choice

Educating today for the needs of tomorrow

Now that BCIT has its charter to grant technology degrees and also has expanded bridging opportunities to all British Columbian universities, it is surely the institute of choice for technology education now and in the future.

Students entering a BCIT diploma program are able to keep their educational options open for a further two years whilst developing skills and assessing career goals. After receiving their diploma they are "job-ready" and able to enter the workforce. In addition they have two choices of degree path: the university bridging option or the BCIT Technology degree option.

BCIT is committed to the philosophy of lifelong learning as it maintains its leadership in the training and upgrading of British Columbia's technological workforce. Progressive education in technology provides a passport to opportunity for the student, economic growth for the province and a higher standard of living for all Canadians.

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BCIT's mandate

BCIT will be a province-wide, innovative organization, specializing in advanced technology training and focusing on those initiatives that increase the level of economic activity, entrepreneurial activity and employment for the province.

BCIT will:

- Prepare dynamic, highly skilled members of the workforce by delivering full- and part-time courses of study including:
 - certificate, diploma, and degree studies in technologies and trade
 - contracted industry training and upgrading courses.
- Conduct technology transfer activities by providing opportunities for innovation, industrial assistance and contracted applied research.