BRITISH COLUMBIA

British Columbia Ministry of Education

Curriculum Branch

Technology Education Curriculum Cycle

Executive Summary and Report

Prepared by:
Dr. Adrienne Gnidec O'Henly
Coordinator ~ Technology Education Curriculum

Fall 2001

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Dr. Adrienne Gnidec O'Henly
Coordinator, Technology Education
British Columbia Ministry of Education
October 2001

Table of Contents

Executive Summary

Pre-2000

Without a doubt the Technology Education, a.k.a. Industrial Education, curriculum was and continues to be in need of attention. The curriculum is old, the existing pre-1995 programs do not serve all students, and program enrolment is declining, despite the fact that there are shortages of skilled workers in the trades. And this situation will only increase. Further, technology education programs are not generally linked with post-secondary programs.

Development of students' aesthetic understanding of materials and processes forms an essential component of a well-developed technology education. A number of activities and initiatives have been undertaken, both in technology/industrial education and in the larger education context. These include:

- The Skills Initiative.
- K-12 curriculum revision and the development of IRPs.
- The partnership initiative of the Industrial Training and Apprenticeship Commission (ITAC), the Ministries of Education and Advanced Education, Training and Technology, and the BC Technology Education Association. Its aim was to develop a framework for designing improvements to Technology Education. In December 1997, the partners established the Technology Education Working Group, which was responsible for the preparation of *A Vision Paper for Technology Education in British Columbia.*

In November 1998, a Technology Education Design Forum focused on four issues:

1. the meaning of Technology Education,
2. the changing nature of work and learning,
3. the need for broad, agreed-upon articulation standards, and
4. the challenges of implementation.

This vision paper was, in part, an attempt "to search the future." Its recommendations were based on general trends that were evident and likely to continue. These trends include:

- the increasing rate of technological, social and economic change, including the increasing displacement of labour by capital expenditures (automation)
- the change in employment relationships as exemplified in the move from full-time to part-time work
- the change in employment rates with proportionately fewer people employed
- the change from a resource-based to a service- and information-based economy
- the need for skilled technical workers in both the service and information sectors and the continuing need for skilled tradespersons in the service and resource extraction sectors.

The overarching theme of economic, social and technological change is in line with the conventional wisdom that a post-industrial economy has emerged in the last twenty years. Consequently, British Columbia has experienced significant growth in parts of the service sector that already existed in the traditional industrial economy; including the tourism and hospitality industries, maintenance and management services, retailing, professional and personal services, sports and entertainment, and, of course, the health and education sectors. New industries and services based in information technologies and the expansion of the more traditional service sector are the major sources for new work in British Columbia.

The traditional industrial resource extraction sector as a proportion of all provincial economic activity has declined. This sector, which is still the hallmark of industrial activity in British Columbia, has seen the elimination of thousands of jobs over the last twenty years, and continues to do so. The introduction of automated milling technologies, for example, in a lumber mill triples or quadruples production while the number of persons employed declines by a factor of four or five.

The convergence of many other factors may mitigate many of the negative effects of technological displacement and the changed work environment, and may increase the demand for certain types of labour in British Columbia. An aging workforce of skilled technical personnel, requirements for differently trained and educated workers, the expansion of information industries such as software development, and the expansion of service industries such as tourism and filmmaking, may all combine to create skills and labour shortages throughout the trades and technologies.

Into the 21st Century

Declining enrolments in technology education programs in secondary schools
Technology education course enrolments as a proportion of total secondary school enrolments have decreased in the period 1990-91 to 1997-98. Although the reasons for this decline are undoubtedly complex and varied, technology education does not provide an educational choice for many senior secondary school students. There is a need to develop the outlines of a technology education that will appeal to greater numbers of students, including those historically predisposed to ignore it.

Technology education could come to be perceived as highly rewarding in its own right by many more students. Such a change, of course, should be accompanied by assurances regarding availability, adequate instruction and equipment, academic integration, articulation and attention to the development of the program profile and publicity.

The skills shortages argument
The shortage of IT (information technology) workers has been well documented, especially the shortage of those with advanced training. However, there may well be an emerging shortage of labour in some traditional industrial occupations. Although technological change has rendered many positions in the traditional industrial economy obsolete, many tradespersons are still required in the new economy. Many currently employed in these traditional work positions will be retiring in the next few years, and many others may leave if economic conditions elsewhere are more favorable than those in British Columbia. The NOC (National Occupational Codes as defined by Human Resources Development Canada) indicate an increasing need for qualified technical workers in specific areas.[1]

Not maintaining the facilities and knowledge base necessary for the continued delivery of industrial education could prove problematic. Once such programs and facilities are dismantled, it is difficult to recapture the knowledge that grounded them and to recapitalize the system in order to deliver them.[2] The focus for technology education, therefore, should be expanded.

The technology education program
Contemporary economic change and social development makes it all the more important to attract students to technology education. An agenda of inclusion is required not only to address issues of equity but also to ensure that all students can position themselves economically to best advantage.

Economic change further limits possibilities for the 20 percent of the students "in the 'grey area' because they don't fit traditional labels; they do not meet criteria for special education funding. Some of these students receive learning assistance support. They frequently are placed in programs with

modified curriculum in secondary schools where significant changes are made to provincial learning outcomes." [3]

Inclusion and equity
A strategy for inclusion will be required if technology education is to attract students from every culture, ability and gender into its enrolment. The Women in Trades and Technology (WITT) program provides an example of an initiative designed to address issues of inclusion. WITT, a national program offered in a number of BC colleges and institutes, is an example of an initiative designed to involve women in the construction trades. The Gender Technology (GenTech)[4] project provides another example of a current inclusion initiative underway in British Columbia. Initiatives such as these may be a central means by which social responsibility can be more closely aligned with economic and educational opportunity in the area of trades and technologies.

An inclusive technology education program must continue to serve the needs of the seven to eight percent of the province's population with intellectual, physical, sensory, learning, behavioural, and emotional disabilities. As well, programs involving First Nations peoples, form an essential component of an inclusive technology education initiative in British Columbia. A willingness to implement locally developed courses that answer locally identified needs would provide a necessary link for an inclusive technology education.

Transferable skills
Technology education should not address technical education for only those students enrolled in technology education courses but should provide technology for all.

As such, technological literacy provides a cornerstone for the development of transferable skills for the development of conceptual abilities that can be applied across a person's life in various career, social and personal situations. The ability to understand the relationship between materials and the environment is a central component in developing this literacy. For example, an appreciation of craft embedded in a project-based curriculum has the potential to inform many other aspects of a student's life, ideally providing the student with an appreciation of the physical world that leads to an ethic of care for self, society and the physical environment.

The ability to effectively apply broad-based transferable skills across work, home and civic life has increasingly come to define the educated person. The development of this sort of understanding encompasses all the domains of learning: the affective, the cognitive and the psychomotor. The technology education envisioned here would challenge students to develop their cognitive abilities along with the possibility for rapid affective development that can result from immersion in a project-based learning environment. A curriculum that accounts for development in all three domains could provide students with opportunities for affective development often not specifically addressed in traditional curriculum design that emphasizes the development of cognitive abilities and/or psychomotor skills.

Programs
In most school districts in British Columbia, a combination of traditional teacher training and facilities constraints necessitated a "go-slow" approach to the adoption of new technologies and curriculum in technology education. However, with the release of the Technology Education 8-10 IRP in 1995, more districts became actively engaged in the process of reworking course offerings for delivery within traditional shop environments.

Approximately 250 newly trained technology teachers have entered the provincial secondary system during the past 12 years. These new instructors have raised the profile of technology education in British Columbia's schools. Teachers from many districts report that British Columbians are beginning to accept technological studies as a field of endeavour equivalent to many academic programs.[5] While a significant investment in equipment is still required to complete the transformation from industrial education (IE) to technology education, the benefits of exposing all grades 8 to 10 students to technology education likely will lead to increased demand for similarly structured courses at the senior level.

Senior level courses from traditional woodwork craft courses to advanced CAD and graphics design are offered in various schools across the province. In addition, numerous successful career preparation programs and locally developed specific skills-related offerings (e.g., logging equipment maintenance or art metal) continue to attract students. The industrial education curriculum for the core areas, while substantial, was last revised in 1977. The senior core areas are currently in the completion stage of being update and revised, and will serve as the basis for delivering direct job entry skills and for laddering to vocational, career and trades training at the post-secondary level.

At present, few credits earned in technology education courses are recognized as admission pre-requisites at post-secondary institutions. Most post-secondary technology programs, such as computer information systems, list high-school graduation with English, math and a science at the Grade 12 level as entrance requirements. This emphasis on academic courses makes it more difficult to promote technology education at the high-school level than would be the case if entrance requirements at the post-secondary level were modified. However, the variation in the skills levels of high-school graduates with significant concentrations in technical subjects, combined with the lack of specific articulation regarding the skills sets of these students, contributes to the post-secondary emphasis on academic course work for admission.

Curriculum Cycle: Survey Summary

A curriculum review questionnaire for Technology Education Grades 8 to 10 and Grades 11 and 12 Industrial Design (see Appendix A) was carried out as part of the Ministry of Education's Curriculum Cycle for the Integrated Resource Package (IRP) review. Educators in British Columbia who teach Technology Education were invited to answer this curriculum review questionnaire. The questionnaire was used to determine what is happening with Technology Education in BC schools as well as gain feedback on the IRP structure.

Responses to the questionnaire and to discussions between the Ministry and the field indicated support for the IRPs overall, with most support focused on the Prescribed Learning Outcomes. It was revealed that:

- teachers continue to encounter anxiety and frustration in their attempt to implement a quality program;
- curriculum implementation is often uninformed and non-directed;
- curriculum is inconsistent with respect to standards of performance (which are sometimes unknown and not explicit), particularly for beginning teachers.

The common message is that Ministry implementation initiatives are inadequate. Consequently, the problem appears not to lie in the prescribed learning outcomes per se, but in the lack of direction the outcomes provide in moving teachers from the learning outcomes to the instructional planning process.

Educators say that it is critical to have both resources and an implementation strategy attached to any curriculum revision. Common concerns about Technology Education raised during the Applied Skills Curriculum Overview Team meeting in February 2001 and informal discussions with educators of Technology Education were mirrored by the teachers who responded to the Technology Education curriculum review questionnaire.

In addition to comments articulated in the questionnaire (particularly Question #12), responses contributed the following recommendations and suggestions:

Course Name

- Change the name, "Technology Education". It is constantly being confused by educators and the general public to mean Information Technology, computers, and so on.

Prescribed Learning Outcomes / Curriculum

- Ensure that the Prescribed Learning Outcomes are being met. Often, this depends on the staffing within a school, i.e., who is able and visionary enough to plan for diverse technological learning activities.
- Have future revisions to Prescribed Learning Outcomes address the advancement in technology and appear in earlier grades.
- Prescribed Learning Outcomes must be specific and **not** redundant.
- Topics studied in a Technology Education classroom/shop must be relevant to the lives of the students to encourage a curiosity for life-long learning, as well as for post-secondary and career pursuits.
- Make every credit counts toward graduation.
- Acknowledge the fact that a significant number of students who are drawn into Technology Education might be academically challenged, but are extremely able in hands-on technical skills.
- Address the experiential side of participating in technological activities, e.g., elation, confusion, frustration, etc., accompanied by personal and group strategies to deal with these responses.
- Place the main areas of design and problem solving in the Drafting and Design 11 and 12 curriculum. It is too costly and inefficient to include these areas of study in other Technology Education courses.
- Regularly update the curriculum to ensure the importance of Technology Education in the B.C. school system.

Resources

- The Ministry of Education must establish minimum standards/requirements regarding money, facilities, equipment, tools, and materials for all BC schools.
- Direct more money into shop programs to alleviate teachers' worries about funding so that they can direct their focus on teaching.
- Provide more opportunities for the sharing of project and instructional materials on the Web.
- Provide funding to maintain and upgrade hardware, software, obsolete equipment, new technology (e.g., lab equipment, shop equipment such as CNC machines, etc.).

Implementation

- Provide funding for teacher pre-service and in-service.
- Provide assistance for teachers in addressing the problem of plagiarism.
- Encourage teachers to be authors/designers first. The teacher as activity designer cannot be over-emphasized.

Dual Credit

- The Ministry should consider course pairings in which there is a technology education focus in one course and a fine arts focus for the other. Both technology education teachers and fine arts teachers could be comfortable instructing such courses, and such a concept could help implementation and reduce competition between subject departments over "course ownership".

One trend that stems from the present diversity of courses and appears to be gaining momentum is the amalgamation of content knowledge and skill sets into courses that strongly link to specific career pathways. The impetus for such development, in part, comes from the graduation requirement that students receive two credits for Fine Arts and two credits for Applied Skills usually in Grade 11. Some of the larger secondary schools have developed four-credit courses designed to give students dual credit.

One approach to increasing enrolment in courses with a technology education component is through the creation of ministry-authorized courses that allow students to meet both their Applied Skills and Fine Arts requirements. The content of these courses would draw from areas of technology education (e.g., drafting and design, woodcraft products, architecture/habitat design) and any one of the arts areas (e.g., dance, drama, music, visual arts). The availability of dual credit courses could significantly reduce the reliance on locally developed courses. It is anticipated that the Applied Skills and the Fine Arts Curriculum Overview Teams will have the opportunity to continue this discussion in February 2002.

Recommendations

See pages 33 and 34 of the report.

INTRODUCTION

Why is Technology Education important?

As technology assumes an increasingly dominant force in society, technological literacy is becoming as essential as numeracy skills and the ability to read and write. In providing the fundamentals of technological literacy, technology education helps young people prepare to live and work in a world of continuously evolving technologies. A technologically literate person uses tools, materials, systems, and processes in an informed, ethical, and responsible way.

To be responsible members of society, students must be aware of the impact that ever-changing technology has on their lives. They need to reflect critically on technology's role in society and consider its positive and negative effects. Technology education fosters the development of skills and attitudes that increase students' abilities to responsibly address the social and ethical issues of technological advancements.

Not only is it important to the economy to attract more young people into the trades, but the trades themselves are an increasingly appealing alternative to college or university. It is estimated that close to 700,000 jobs will open up in British Columbia during the next 10 years, the majority of them in trades and technology. By the end of this decade, the proportion of workers about to retire, i.e., aged 55 to 64, will outnumber new labour force entrants. In industries traditionally involving apprentices, attrition is expected to account for 60 per cent of job openings (about 420,000 jobs), compared to 53 per cent for the labour force as whole.

What are some new directions for Technology Education curriculum development?

In a rapidly changing society, the Technology Education curriculum needs to be assessed and updated where necessary. In-depth understanding of Technology Education concepts enables students to have a solid basis on which to build and acquire new knowledge and solve problems.

The aim of the Technology Education curriculum is to help students develop technological literacy and lifelong learning patterns that they need to live and work effectively in a changing technological society. To achieve this, the curriculum provides a framework for students to learn how to construct and design solutions to real-world problems and opportunities to put into practice what they have learned, i.e., making Technology Education personally relevant to the lives of students.

Technology Education programs are designed to help students make career choices, and to develop the necessary marketable skills to expand their knowledge and education in the technology field. The curriculum will provide students with opportunities to focus on:

- preparing for transition to post-secondary education,
- preparing for the workplace, and/or
- avocational pursuits.

The Technology Education curriculum emphasizes skills needed in a changing society. As a result, emphasis is given to the following:

- *Strategies that develop applied skills.*
  In order to see technology education, in general, as relevant and useful, students must learn how it can be applied to a variety of real workplace situations. Students learn more quickly and retain their learning better when they are actively involved in the learning process. Using a variety of

activities with built-in learning situations will help students to understand, identify, and solve problems that occur in life.

- *Strategies that foster the development of individual and group skills.*
  In the workplace, people need to know how to work effectively, individually and with others, to solve problems and complete tasks. Students need opportunities to work independently to enhance their organizational and self-evaluation skills. Students also need to experience the dynamics of group work to enhance their understanding of group problem-solving processes. Group work focuses on such skills as collaboration, communication, leadership, and cooperation.

- *Strategies that foster research and critical-thinking skills.*
  In order to make informed and responsible choices about the appropriate use of technology, students need to receive and process information critically. To develop decision-making and problem-solving skills, students need to be challenged to identify problems and develop solutions.

- *Strategies that use technology.*
  The ability to use technology to solve problems is a necessary skill in the workplace and in post-secondary education. Students use technology to access information, to perform calculations, and to enhance the presentation of ideas.

- *Strategies that require solving design and production problems.*
  Students identify needs, pose real or invented problems of their own, and respond to problems presented by the teacher.

WHAT IS HAPPENING WITH THE B.C. TECHNOLOGY EDUCATION CURRICULUM?

We are living in an era of rapid change – technological, scientific, technical, economical, environmental, social and cultural. It is important that we are prepared to understand and benefit from these changes. Just as changes are happening around us, revisions in Technology Education are necessary to promote technological literacy among today's and tomorrow's youth.

The Industrial Education curriculum guide originated in the 1960s and was revised in 1977. In 1990, "Industrial Education" underwent a name change to "Technology Education", signifying the move towards a technology-based focus. Subsequent revisions to the curriculum did not occur until 1995 with *Technology Education 8 to 10,* followed by *Technology Education 11 and 12: Industrial Design* in 1997. The *Industrial Design* course was designed to encompass all components of the 1977 Industrial Education curriculum. However, decisions ensued to revise the individual grade 11 and 12 courses of the 1977 curriculum. Consequently, the Curriculum Branch is finalizing revisions to the grade 11 and 12 Construction, Mechanics, and Drafting components of the 1977 Industrial Education curriculum. Revisions to the grade 11 and 12 Electronics and Metalwork courses will begin in Fall 2001.

Curriculum Cycle

The Ministry of Education K-12 Provincial Curriculum Cycle requires the regular review of provincial curriculum to ensure that it continues to be both current and relevant. The four phases are defined below.

Phase 1: Input, Research, Review, and Planning
- maintaining a database of comments, and input from several sources
- coordinating provincial assessment activities with the curriculum cycle for the subject area
- collecting assessment results where available

Phase 2: Workplan Development and Consultation
- use of standard questionnaire instrument to seek input on several aspects of the IRP and its implementation
- preparation of a report on the status of the IRP/curriculum including requests for decision where
- changes, development work, or revisions are proposed
- provision of collected input to Overview Team and other partners for responses and recommendations

Phase 3: Curriculum Development or Revisions
- workplan completion
- production phase completion (print and electronic versions)
- implementation plan development in conjunction with Field Services and other partners where appropriate

Phase 4: Implementation
- curriculum has Minister's Order
- implementation plan executed by School Districts in conjunction with Field Services and other partners where appropriate.

The *Technology Education 8 to 10 IRP* and the *Technology Education 11 and 12: Industrial Design IRP* are currently in phases 1 and 2 of the Curriculum Cycle. The focus of these two phases is the review of these IRPs for the purpose of determining what action, if any, should be undertaken in terms of IRP revision. The grade 11 and 12 Construction, Mechanics and Drafting courses are in

phases 3 and 4 of the Curriculum Cycle. Phase 3 involves producing the revised curriculum leading to the last phase of implementing the revised IRPs. The three courses have been re-named as: Carpentry and Joinery, Automotive Technology, and Drafting and Design. The following chart illustrates the implementation schedule for the Technology Education IRPs.

TECHNOLOGY EDUCATION IMPLEMENTATION SCHEDULE

Note: All these courses meet the Applied Skills Foundation Studies requirement. There are no provincial exams for these courses. These courses may also be fully implemented during the optional implementation year.	**SCHOOL YEAR**			
Course Title	**01/02**	**02/03**	**03/04**	**04/05**
Automotive Technology 11 and 12 IRP				
Automotive Technology 11		◊	✔	
Automotive Technology 12		◊	✔	
additional courses [1]*:*				
Automotive Technology 12: Engine and Drive Train		◊	✔	
Automotive Technology 12: Automotive Electricity and Electronics		◊	✔	
Automotive Technology 12: Body Repair and Finish		◊	✔	
Carpentry and Joinery 11 and 12 IRP				
Carpentry and Joinery 11		◊	✔	
Carpentry and Joinery 12		◊	✔	
additional courses [1]*:*				
Carpentry and Joinery 12: Residential Construction		◊	✔	
Carpentry and Joinery 12: Cabinet Construction		◊	✔	
Carpentry and Joinery 12: Furniture Construction		◊	✔	
Carpentry and Joinery 12: CNC Wood Processes		◊	✔	
Carpentry and Joinery 12: Woodcraft Products		◊	✔	
Drafting and Design 11 and 12 IRP				
Drafting and Design 11		◊	✔	
Drafting and Design 12		◊	✔	
additional courses [1]*:*				
Drafting and Design 12: Engineering and Mechanical Drafting		◊	✔	
Drafting and Design 12: Advanced Design		◊	✔	
Drafting and Design 12: Technical Visualization		◊	✔	
Drafting and Design 12: Architecture and Habitat Design		◊	✔	
Electronics 11 and 12 IRP				
Electronics 11			◊	✔
Electronics 12			◊	✔
additional courses [1]*: to be developed*				
Metal Fabrication and Machining 11 and 12 IRP				
Metal Fabrication and Machining 11			◊	✔
Metal Fabrication and Machining 12			◊	✔
additional courses [1]*: to be developed*				✔

Shaded column denotes curriculum is available for planning

◊ Denotes Optional Implementation

✔ Denotes Full Implementation

[1] Working together with the Applied Skills Curriculum Overview Team and the IRP writing teams (comprised of educators from secondary schools and post-secondary institutes), there was agreement

to provide more clarification in course designations. For example, the current “A”, “B”, “C” course designations for Construction, Drafting, and Mechanics will be removed from the list of approved Provincial Curriculum, effective **August 2003**. Instead, the Provincial Curriculum will be designated as indicated in the above chart. The Prescribed Learning Outcomes for these courses are listed in Appendix E of the respective IRP (the same will apply to the additional Grade 12 courses for Electronics and Metalwork).

SUMMARY OF THE TECHNOLOGY EDUCATION TEACHER QUESTIONNAIRE FOR CURRICULUM REVIEW

This Technology Education curriculum review questionnaire (see Appendix A) was carried out as part of the Curriculum Cycle for the Integrated Resource Package (IRP) review. Educators in British Columbia who teach Technology Education were invited to answer a Technology Education curriculum review questionnaire. This questionnaire was used to determine what is happening with Technology Education in BC schools as well as gain feedback on the IRP structure.

Timeline for the Questionnaire

February 2001: questionnaire distribution and collection
March 30, 2001: questionnaire return date
Summer 2001: data analysis
Fall 2001: summary report

Questionnaire Distribution

- mailed to every school in the province to the attention of the Technology Education Department Head or the Technology Education Contact Teacher with an introductory letter and a copy of the questionnaire
- mailed to every School District Superintendent with an introductory letter
- posted on the "What's New" page of the Curriculum Branch website in English and in French
- distributed to members of the Applied Skills Curriculum Overview Team at a meeting held on February 8 and 9, 2001
- advertised in the February issue of the Ministry of Education Career Memo Highlights

Questionnaire Objectives

There was one questionnaire. Teachers could select the IRP to which they were responding, i.e., Technology Education 8 to 10 and/or Technology Education 11 and 12: Industrial Design. The first page included questions relating to teacher demographics and general IRP questions, followed by twelve questions related specifically to the Technology Education IRPs. The questionnaire objectives were to determine the:

- usefulness of the different components of the IRPs
- preferred IRP versions (print, CD-ROM or Web)
- appropriateness of the Prescribed Learning Outcomes (PLOs)
- principal learning resources used by educators
- factors that determine the content of Technology Education teaching
- use of information and communication technology in Technology Education teaching
- barriers that hinder the implementation of the school Technology Education program

The information from the questionnaires was then entered into a comprehensive database and analysed to identify any patterns and trends. Some of the responses are displayed graphically to assist in the analysis. Similarities and differences among the answers were identified and a synthesis of common responses is provided.

ANALYSIS OF QUESTIONNAIRE RESULTS - GENERAL

Demographics of Questionnaire Respondents

Respondents were requested to indicate 1) in which school district they teach and their current teaching assignment, 2) the number of years they have been teaching, 3) in the type of school they teach, and 4) the size of the school.

Distribution of Returned Questionnaires

School District	8 to 10 IRP	11 and 12 IRP	Both IRPs	gen. IRP Qs	Total
05 - Southeast Kootenay	1				1
06 - Rocky Mountain	1				1
10 - Arrow Lakes			1		1
20 - Kootenay-Columbia	1				1
22 - Vernon	1				1
23 - Central Okanagan	1				1
33 - Chilliwack	3	1			4
35 - Langley	1	1			2
36 - Surrey	2				2
39 - Vancouver	3		3		6
40 - New Westminster	1				1
41 - Burnaby	2				2
43 - Coquitlam	1	1			2
44 - North Vancouver	1				1
49 - Central Coast		1			1
57 - Prince George	1				1
60 - Peace River North	1				1
61 - Greater Victoria	1				1
62 - Sooke	1				1
64 - Gulf Islands	1				1
68 - Nanaimo-Ladysmith	1				1
69 - Qualicum	1				1
71 - Comox Valley		1			1
72 - Campbell River	1				1
73 - Kamloops/Thompson			1		1
83 - North Okanagan-Shuswap		1			1
85 - Vancouver Island North		1			1
Independent Schools	7		1	1	9
No School District named				1	1
***TOTAL No. of Respondents = 49**	34	7	6	2	***49**

There were a total of **49** respondents, 40 of whom indicated that they taught in a Public School and nine in Independent Schools. None responded from First Nations Schools. The majority of respondents indicated that they teach in large-sized schools with over 500 students:

- small (<100 students) = 4%
- medium (101-500 students) = 33%
- large (> 500 students) = 63%

The number of years of teaching experience amongst the questionnaire respondents ranged from seven months to 35 years with a mean of **13.59 years** of teaching experience.

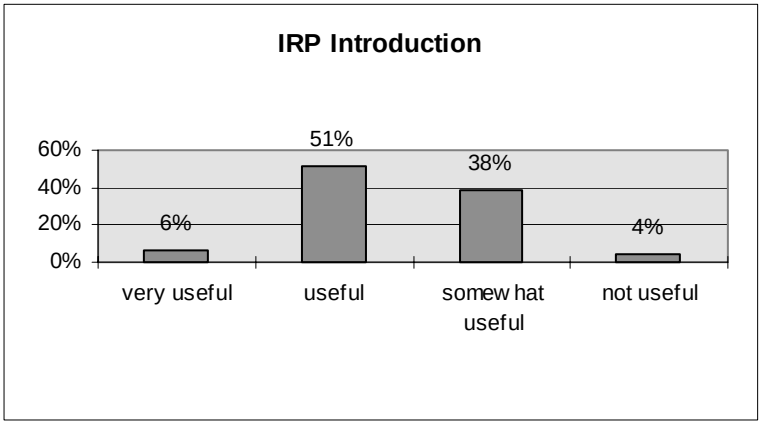
IRP Versions

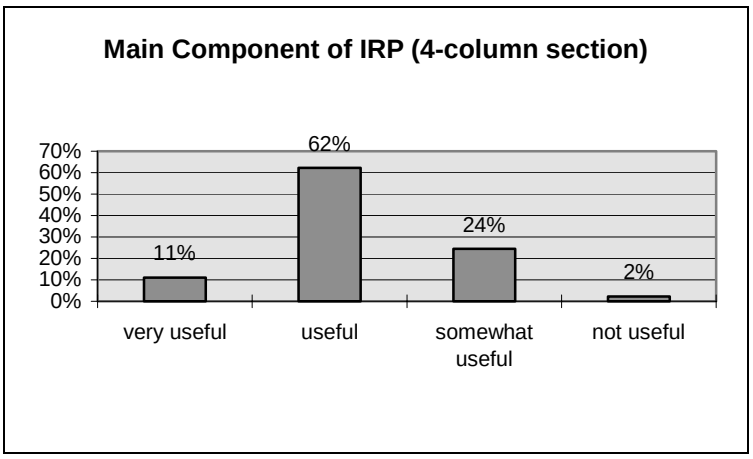
Respondents were asked to indicate the IRP versions (print, CD-ROM, and Web/HTML) that they have used and the version of the IRP that they prefer to use. The majority of respondents chose the print version of the IRP.

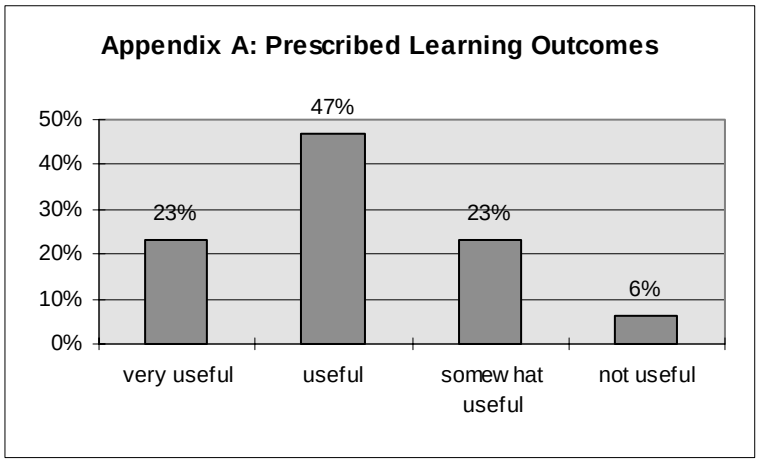
Version of IRP	IRP Version Used	IRP Version Preferred
Print	92%	73.5%
CD-ROM	20%	14%
Web (HTML)	37%	16%

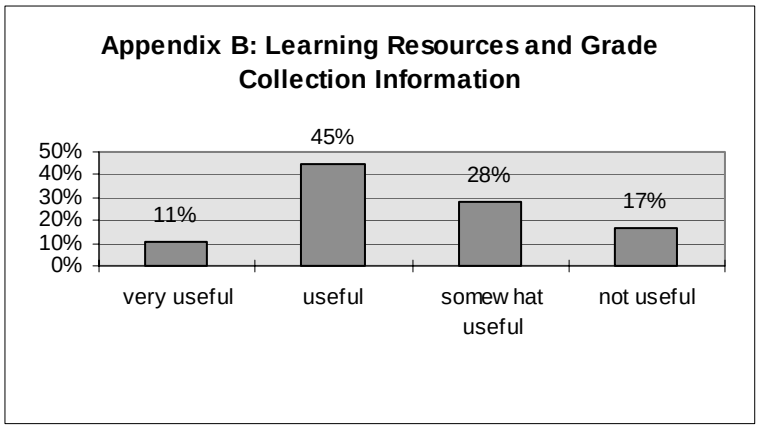
General IRP Questions: Rating of IRP Components

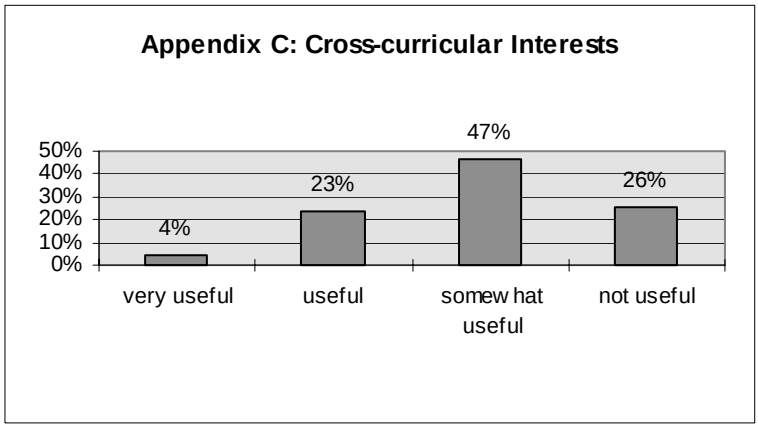
Respondents were asked to rate the different components of the IRP. Fifty-seven per cent of respondents indicated that they find the main body of the IRP useful; 49% found the introduction to the IRP useful; while Appendices A, B, and D received similar ratings for their usefulness. Appendix C which contains cross-curricular interests received the highest "not useful" rating of 24.5%. Note: It has already been decided that Appendix C will not be included in future IRP revisions.




Main Component of IRP (4-column section)
70%
60%
50%
40%
30%
20%
10%
0%
11%
62%
24%
2%
very useful
useful
somewhat useful
not useful


Appendix A: Prescribed Learning Outcomes
50%
40%
30%
20%
10%
0%
23%
47%
23%
6%
very useful
useful
somew hat useful
not useful


Appendix B: Learning Resources and Grade Collection Information
50%
40%
30%
20%
10%
0%
11%
45%
28%
17%
very useful
useful
somew hat useful
not useful


Appendix C: Cross-curricular Interests
50%
40%
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very useful
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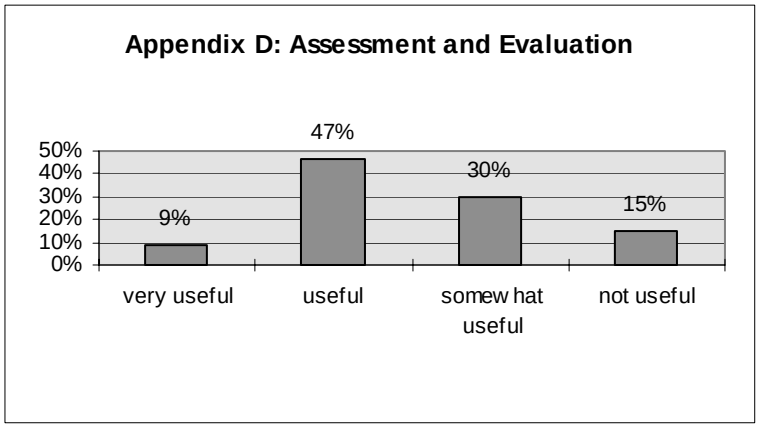
Appendix D: Assessment and Evaluation
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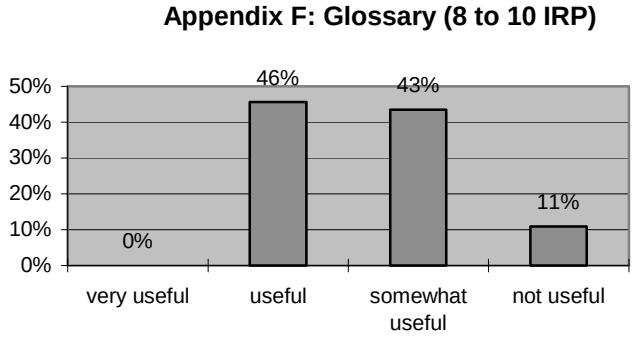
Appendix F: Glossary (8 to 10 IRP)
50%
40%
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20%
10%
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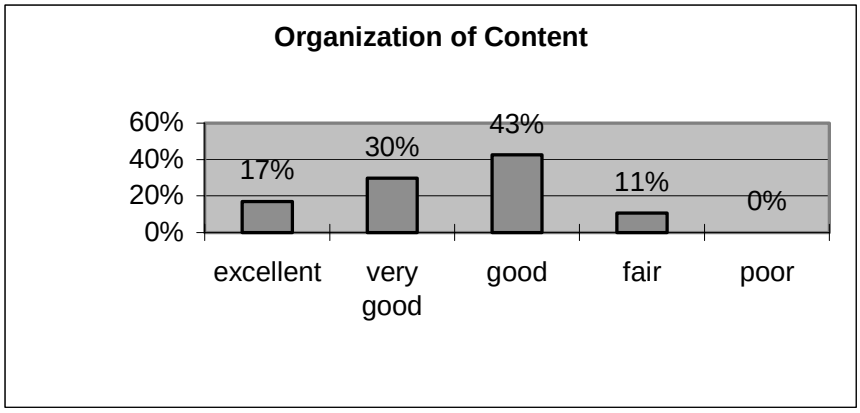
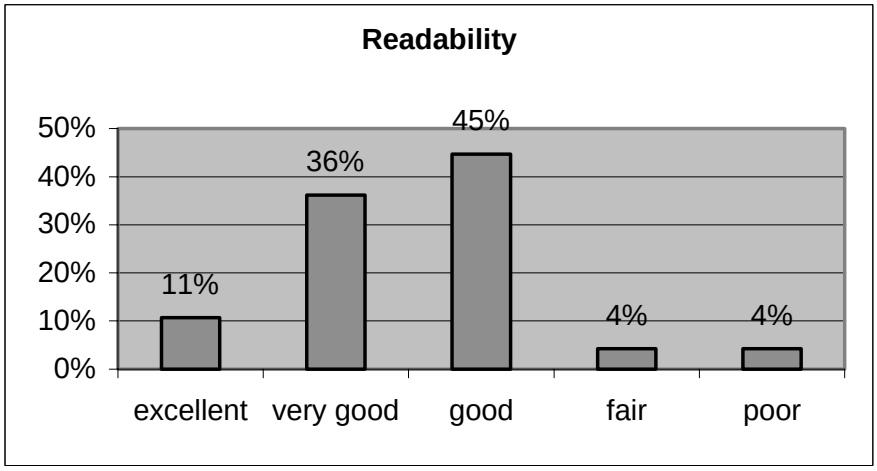
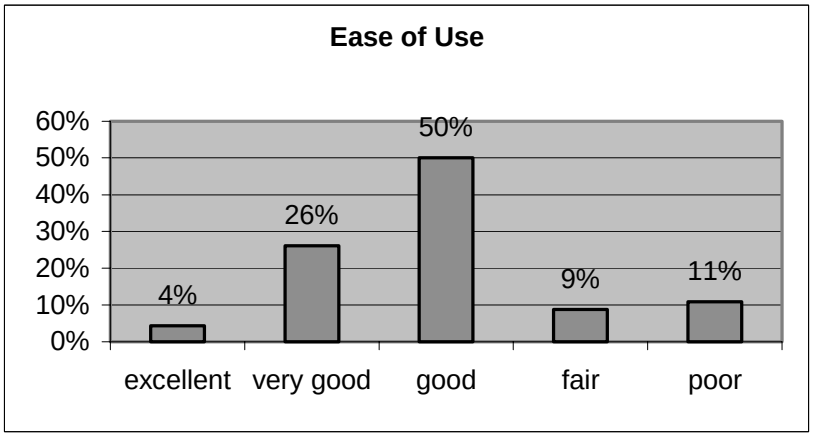
0%
46%
43%
11%
very useful
useful
somewhat useful
not useful

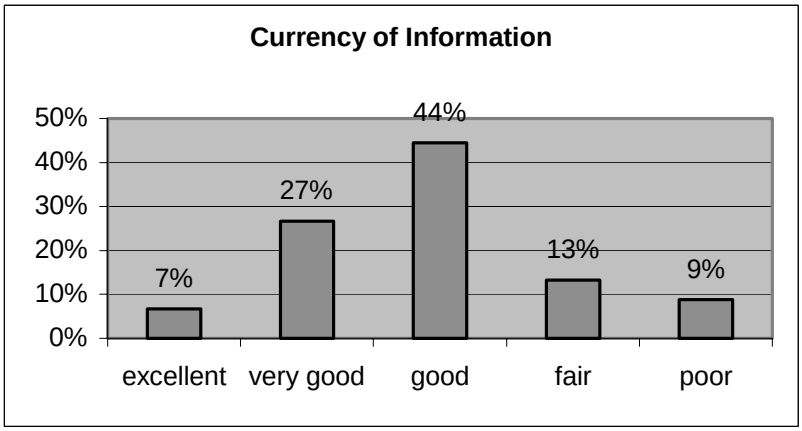
General IRP Questions: Rating of IRP Elements

The graphs below indicate how respondents rated different elements of the IRPs. There appears to be general consensus among respondents with respect to the organization of the content, the readability of the IRPs and the design. Respondents were not as satisfied with the ease of use and the currency of the IRPs.








Currency of Information
50%
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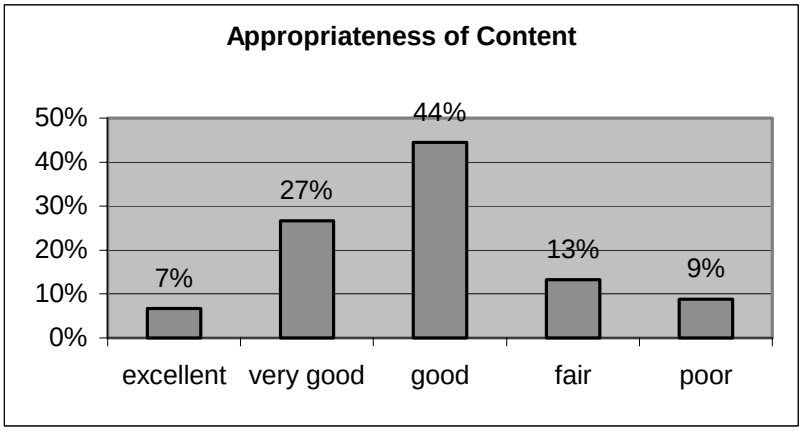
poor


Appropriateness of Content
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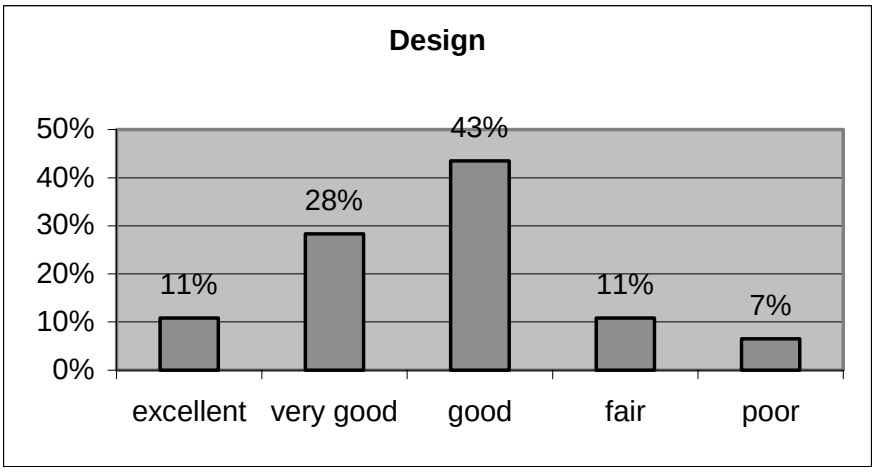
Design
50%
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10%
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11%
7%
excellent
very good
good
fair
poor

ANALYSIS OF RESPONSES RELATED TO THE TECHNOLOGY EDUCATION IRP QUESTIONS

Of the 49 responses received, 34 educators responded to the *Technology Education 8 to 10 IRP*, and seven educators responded to the *Technology Education 11 and 12 IRP: Industrial Design IRP.* Six respondents provided feedback regarding both IRPs, and two respondents provided feedback to the General IRP Questions only.

Regardless of whether the responses referred to the 8 to 10 IRP or the 11 and 12 IRP, the rating placement was consistent. Overall, the top two ratings can be realised thus:

Question re: Technology Education IRP	Rating	%
1. Prescribed Learning Outcomes		
⇒ Wording	Appropriate as is Vague and requires more specificity	59.5 % 33 %
⇒ Number	Appropriate Insufficient	71 % 14 %
⇒ Guide Lesson Planning	Mostly Somewhat	40.5 % 50 %
⇒ Grade-appropriate	Agree Disagree	70 % 17.5 %
⇒ Better addressed as an integrated part of another subject rather than as a separate subject course	Agree Disagree	39 % 39 %
2. Change, add or delete topics of study	No	67 %
4. Sufficient resources	No	63 %
6. Curriculum Organizers are appropriate	Yes	76 %
7. Instructional Strategies are useful	Agree	78 %
8. Assessment Strategies are useful	Agree	82 %

Respondents' comments to the questions have been compiled in the following table.

Question	Favourable	Concern
1. Prescribed Learning Outcomes	• Good, general, prescriptive guidelines re: expectations. • Keep them, and keep them in a handy section of the IRP. • They are necessary!	• Specific outcomes are missing. • Vague expectations. Language terminology is so vague that could be referring to almost any course or grade level. • Confusing for a new or inexperienced Tech. Ed. Teacher. • They cover too broad an area. • More specific direction need. • Too many "revise", "describe", "develop", "evaluate"; all PLOs must be couched in dynamic classroom activities. The attitude of the student when working with technology is very important. • Appears to be a large leap in PLOs from Grade 10 to Grade 11.
2. Topics of study to add, change, or delete	• All aluminum welding and jewellery making. *(Note: unclear whether response referred to these topics to be deleted or added).* • More emphasis on the Internet re: communication, Web page design, etc.	• Main portion of design and problem-solving should be placed in the Drafting and Design 11 and 12 curriculum; too costly and inefficient blended in other tech. ed. courses. • Introduce design, drafting and CAD at earlier grade levels, e.g., 8-9, so that a true project course and work experience programs can be in place by grades 11 and 12. • Main topics/descriptors are problematic re: understanding, e.g., "Self and Society", "Control". Preference for "Communication", "Production", "Energy/Power". • Too much information and material to cover. Remove and place auto in the auto class, electronics to the electronics class. • Becoming a Community Citizen; awareness of ecological values, giving projects to charity, etc.

Question	Favourable	Concern
3. Principle learning resources used	• Handouts completed by the teacher. Lessons are taught, then followed by practical application. • Personal collection of self-made materials and plans. • Personal experience. • Keyboarding book. • Other curricula: Science, Drafting 10, Electronics 8-10, Drafting 11-12, Technology 8. • Internet. • Lego. • Building Box model #2. • Pro-D days. • Simple Text, HyperCard, HyperStudio, AppleWorks. • Other teachers' resources. • Autosketch 6.0, Technology Learning Wheel, The Way Things Work, The Incredible Machine, Westpoint Bridge Builder, Crocodile Clips, Car Builder Text. • CD-ROMs. • Internet tutorials. • Oscar Program.	
4. Are there sufficient learning resources?	• Lots of resources, but funding poses a problem due to costly materials.	• Lack of funds to purchase resources. • Need money to implement these types of courses. • Budget is very tight; would like an inexpensive package on the design process. • More computer software to enhance the program. • The Technology Wheel sounds interesting, but it is very expensive. • Difficult to find material specific to a specialized course. • Always looking for more. • The subject area is so dynamic that the learning resources need to be upgraded on a regular basis. • The Ministry should name specific equipment so that school boards will be forced to

Question	Favourable	Concern
4. Are there sufficient learning resources? (cont'd)		supply. • Need for greater band width so that download time is faster. • Ministry should develop minimum standards re: equipment and money for all BC schools.
5. Factors that determine content of teaching Technology Education	• Vary projects and content over time for variety and stimulation. • Look at what other Technology programs are offering. • Affordable project material, i.e., if it's free it's used. • Professional development. • Available prep time.	• Budget. • College curriculum. • Demands of the technology field. • History of the course at the school. • Software availability. • Teacher proficiency. • Time of year. • Time restraints.
6. Appropriateness of Curriculum Organizers	• "My curriculum is all integrated and linked to subject areas."	**Grades 8-10:** • Energy, power, and transportation do not seem to fit into this course. • "Production" is an inappropriate term; it does not describe manufacturing. **Grade 12:** • Topics are excessively broad, requiring an ideal teaching environment. Every school has different facilities and resources causing inconsistency in the Graduation experience.
7. Usefulness of Suggested Instructional Strategies	• A few good ideas. • Well thought-out.	• More diversity needed. • IRP seems to assume that Technology Education programs have an up-to-date complement of equipment. This is not the case. • Most strategies are too vague to learn or teach. A need for detailed resources, especially for teachers new to tech. ed. • Strategies are out of sync with the student's needs. Too much "reflection", discussion", interview", report", etc. • Vague or not realistic with the timeframe.

Question	Favourable	Concern
8. Usefulness of Suggested Assessment Strategies	• Good. • Gives a variety of methods. • Helps to get feedback if content has meaning and interest to students, and to assess effectiveness. • Student/peer evaluations are good combined with criterion-based evaluation for projects. • Due to the nature of the variety of courses offered in BC schools, teachers have developed fair and appropriate assessment systems. These are unlikely to change.	• They do not take into account the innate ability of the student and the effort put forth by those with lesser ability. • Could have Rubrics and criteria forms in greater detail. • Some help for teachers in addressing the problem of plagiarism would be helpful.
9. Information and communication technology used in teaching	***Also see Question # 3.*** • AutoCAD • EZ Route • Technology Learning Wheel • Auto Sketch • VR (3-D house plans) • AppleWorks **Grades 8-10:** • Artcom • Rhino 3D • AutoSketch • AutoCAD • Technology Wheel • Corel Draw • Punch Home Design • CAPD • Electronics Workbench • EZ route • VectorWorks • DataCAD • World Book/Encarta • Hyperstrider **Grades 11 and 12:** • AutoCAD LT • 3D Home • Director. • Photoshop • Page Master • Go Live • Live Motion • Illustrator • WORD	• Need the hardware in order to utilize the software.

Question		
10. Courses with overlapping content of Technology Education IRPs	• Science, perhaps; not familiar with that IRP. • All traditional/artisan tech. ed. courses. • Fine Arts: screen printing, drafting. • Computers: design. • Many tech. ed. courses cross over into almost all areas of curriculum. • Language Arts 8 (media component). • Business applications. • Career and Personal Planning (CAPP). • Measurement skills are similar for both Sheet Metal and Woodworking. • Auto and Electronics. • Information Technology and Drafting.	
Question	**Favourable**	**Concern**
11. Barriers hindering delivery of Technology Education		• Classroom size and design. • The IRP is too broad. • Budget. No funding! • No new and replacement budget for equipment. • Lack of teacher's passion in teaching Technology Education. • Expensive to offer more courses. • Lack of software. • "I'm going to get lung cancer if my ventilation system isn't improved."
Question		
12. Suggestions for improving Technology Education	**CLASSROOM / SCHOOL** • There are many well-equipped schools that deliver fine Technology programs. • There are many "converted" schools (i.e., where over a period of time the Tech. Ed. Curriculum replaced the Industrial Ed. Curriculum) that deliver a variant Technology program, based on the equipment, funding, etc. • There are schools that ignore the IRP and continue to operate as Industrial Education material-specific shops. • Technology Education is the most dangerous place in the school due to a greater chance of injury occurring. Classroom size of 24 maximum throughout the province; districts can then bargain for even lower class sizes. For example, in Burnaby, safety is an issue with a class of 26. Also, there would be less stress on the teacher, better lesson delivery, more students entering the trade fields, and more fun.	

Question	
12. Suggestions for improving Technology Education (cont'd)	**CURRICULUM / IRP** • Change the name, "Technology Education"; too often confused with information technology. • Change the name "Production"; too broad in meaning. • "Get the new IRPs out. The 1977 curriculum forces teachers to fend for themselves and to promote their own program." • Have the Tech. Ed. IRPs revised every year or at least every two years (some BCIT courses do not even hand out course outlines due to the ever-changing nature of technology). • There are many great items to study here (Industrial Design 11-12), e.g., planning, engineering, CNC, use of tools, safety. Simplify this course a bit so it could be more useful to a larger number of students. • Technology Education should be directed by students' needs and interests; should have a practical focus and designed according to students' expertise. • "I have never used the IRP. My courses were established and remain as they were prior to the IRP. I found the IRP of little value. My colleagues do not use the IRP either. I much prefer the 1976 model." • Too much material to cover in two semesters; overwhelming in its bulk. • Crosses over into other technology courses, e.g., "explain digital logic" (Electronics!); "diagnose the efficiency of an engine" (Auto!); etc. • Impossible to cover all the PLOs; IRP is designed to teach all things to all people. Somewhat like trying to teach English 12 and Math 12 as one class…there needs to be a separation. IRP is set up for failure if all PLOs are expected to be met. • Need to ensure that the learning outcomes are addressed. • "The IRPs are a very poor attempt to take the "materials" out of materials-based programs. The "old" curriculum does an excellent job of introducing students in the junior grades to electronics, drafting, wood, and metal. • "The IRPs are too vague, are full of politically correct verbiage, are laughable in the area of ethics…In short, they are totally useless." **FUNDING** • Allocate more funding to technology education. • Funding to keep hardware, software and in-service up-to-date. • Increased funding to upgrade outdated resources, obsolete equipment, and new technology, e.g., computers, lab equipment, CNC machines. • More funding for materials and equipment. • More money needs to be directed into the shop programs so that teachers can concentrate on teaching and not worrying about money problems. • Many districts have no money available for new equipment, and very little funding for supplies. • Put the money where it will have the greatest impact, i.e., tools, equipment, and facilities; rather than into more and more unsupported computer systems. • One example of funding inequity: "I was recently charged with setting up a new Tech. lab with a $37,000 budget to cover all equipment and resources. A neighbouring school did the same with a $100,000 - $200,000 budget…Please set equipment costs as a fixed amount so Principals do not favour one program over another.

Question	
12. Suggestions for improving Technology Education (cont'd)	**IMPLEMENTATION** • "Clone me so that I can focus on energies in two directions." • Encourage teachers to teach more variety of Tech. Ed. Courses and to share their knowledge and experiences. • Encourage core teachers to enter the Tech. Ed. Arena by taking on lower-level courses such as Plastics 8-9, Wood 8-9. This would enhance teacher/student relationships and bring new Tech. Ed. teachers in the content area. • More public display of student work outside of school. • Help in setting up pre-apprenticeship programs rather using own prep time. • More time needed for teachers to adapt and to learn • More prep time and a better budget. • BCTEA PSA conference should provide teachers with [more] opportunities to present, share, and discuss the revised curriculum. • A number of tech. ed. teachers don't have the confidence or interest to teach the revised curriculum; more support materials needed to implement the curriculum. • Encourage tech. ed. teachers to bring a wide a variety of tech. ed. skills, a passion for learning additional tech. ed. skills, and a strong sense of "people" skills.
	PROFESSIONAL DEVELOPMENT / TRAINING • Provision of more release time for technology education teachers throughout the province to meet and share ideas. • More training for teachers, e.g., upgrading courses offered evenings or a week in summer. • The BCTEA PSA conference must be more stimulating and offer more "new ideas". • Hands-on seminars. • Troubleshooting seminars. • More prep time. • More training and teacher resource training via the Web.
	PROMOTION • Promote Technology Education. There is/will be a shortage of skilled trades persons and labourers. Students have been conditioned to keep as many doors open as possible rather than pursuing a trade. Society's emphasis pushes students towards a university/post-secondary education; anything else is regarded as inferior. • There is limited involvement of female students in tech. ed. courses. There must be a review of what factors are contributing to females not participating in these courses. Then, develop strategies and implement them to improve the situation.

Question	
12. Suggestions for improving Technology Education (cont'd)	**RESOURCES** • A textbook or package of project ideas would be helpful; a Ministry approved collection would be helpful as reference. However, do not want the course be textbook-driven. • Technology changes rapidly and it is difficult to have appropriate resources to address content, objectives, and PLOs. • More funding for materials and equipment. • More sharing of project and instructional materials on the Web. • More specificity re: activities and resources. • District-wide presentation packages, so that everyone's on the "same page". • Provide good resource materials with real tutorials for teacher practice and implementation.

Recommendations

Based on feedback to the Technology Education questionnaire, the following recommendations apply specifically to Curriculum Cycle activity.

Technology Education 8 to 10 IRP (1995)

1. **Postpone revision to this IRP until all grade 11 and 12 courses are updated and implemented.**

Rationale
The senior courses are currently undergoing revision. It is anticipated that all Grade 11 and 12 courses will be revised by year 2004. It would be easier and more logical to undergo another thorough review of the Technology Education 8 to 10 curriculum at that time, in order to determine what kinds of revision would be required for this curriculum to align with each of the senior courses. The senior courses would also be reviewed around this time.

Background
Respondents' Feedback:

- Prescribed Learning Outcomes need to address the advancement in technology and appear in earlier grades.
- Topics have to be relevant to the lives of the students in order to encourage a curiosity for life-long learning, as well as for post-secondary and career pursuits.
- Address experiential side of participating in technological activities, e.g., elation, confusion, frustration, etc., accompanied by personal and group strategies to deal with these responses.
- Place the main areas of design and problem solving into the Drafting and Design 11 and 12 curriculum. It is too costly and inefficient to include these areas of study in other Technology Education courses.
- Investigating careers in grade 8 is not always of interest to grade 8 students, i.e., not realistic or useful; it is introduced later in Career and Personal Planning (CAPP).
- Introduce design, drafting, and CADD in grades 8-9, so that a true projects course and work experience programs can be in place by grades 11 and 12.

Technology Education 11 and 12 IRP: Industrial Design (1997)

2. **Update (and revise) this course so that it reflects and will formally replace the "old" Technology 11 and 12 curriculum (1977).**

Rationale
Revision to the senior courses in the 1977 Industrial Education curriculum is nearing completion. The Grade 11 and 12 courses for Automotive Technology, Carpentry and Joinery, and Drafting and Design were made available to schools in October 2001. Electronics and Metalwork are planned to be in schools by September 2002.

In the initial curriculum development phases, the plan was to have the Industrial Design 11 and 12 IRP (upon full implementation) replace the 1977 Technology 11 and 12 curriculum in the Industrial Education curriculum guide. However, Technology 11 and 12 continues to be offered in BC schools, and continues to maintain high enrolment. Consequently, since the release of the Industrial Design 11 and 12 IRP, enrolment has been nil, or at best, minimal. There has been zero enrolment for Grade 12; and in 1999/2000, 13 enrolled in the Grade 11 course.

Background

The respondents to the survey agreed that the Industrial Design IRP was "overwhelming in its bulk", that it was impossible to cover all the material in two semesters, and that there was too large a leap between Prescribed Learning Outcomes in Grade 10 to those in Grade 11. It is assumed that this course is not popular because of its magnitude and complexity; the topics are "excessively broad" and require an ideal teaching environment. This is difficult to provide since every school has different facilities and resources, which, in turn, cause inconsistency in the Graduation experience.

Additional responses expressed that the IRP:

- was "designed to teach all things to all people." For example, it is "somewhat like trying to teach English 12 and Math 12 as one class…there needs to be a separation."
- crosses over into other technology courses, e.g., "explain digital logic" (Electronics); "diagnose the efficiency of an engine" (Auto); and so on. Therefore, "remove and place auto in the auto class, electronics to the electronics class, and so on.
- is "set up for failure because it is impossible to cover/meet all the Prescribed Learning Outcomes".

Appendix A

Teacher Questionnaire for Curriculum Review

Technology Education 8 to 10 IRP

Technology Education 11 and 12: Industrial Design IRP

Dear Educator:

THANK YOU FOR PARTICIPATING IN THIS SURVEY. It is part of the review process that we are using at the Ministry of Education to determine where we should be focusing our attention to improve the **Technology Education IRPs** (Integrated Resource Packages). We appreciate your input (which will remain anonymous). This questionnaire can also be downloaded from the Ministry Web Site at http://www.bced.gov.bc.ca/branches/pser/whatsnew.htm. **PLEASE ENCOURAGE YOUR COLLEAGUES TO PARTICIPATE!**

1. What is your current teaching assignment? (Grade(s) and Subject(s))
   _____
2. How many years have you been teaching?_____
3. In which school district do you work? Please give name and number.
   _____
4. Do you teach in a ❒ public school or an ❒ independent school or a ❒ First Nations school? **Please answer**.
5. Please indicate the size of your school:

   ❒ small (fewer than 100 students) ❒ medium (101 to 500 students) ❒ large (over 500 students)

GENERAL IRP QUESTIONS

6. Which of the following IRP versions have you used? Please check all that apply.

   ❒ in print ❒ on CD-ROM ❒ on the Web (html)

7. Which of the IRP versions do you prefer to use for your planning? (**Please check only one**.)

   ❒ in print ❒ on CD-ROM ❒ on the Web (html)

8. Please rate the usefulness of the following components of the IRPs:

Introduction including philosophy, rationale, content overview	❒ very useful	❒ useful	❒ somewhat useful	❒ not useful
Main body of the IRP containing the 4-column format	❒ very useful	❒ useful	❒ somewhat useful	❒ not useful
Appendix A: Prescribed Learning Outcomes	❒ very useful	❒ useful	❒ somewhat useful	❒ not useful
Appendix B: Learning Resources and Grade Collection Information	❒ very useful	❒ useful	❒ somewhat useful	❒ not useful
Appendix C: Cross-Curricular Interests	❒ very useful	❒ useful	❒ somewhat useful	❒ not useful
Appendix D: Assessment and Evaluation	❒ very useful	❒ useful	❒ somewhat useful	❒ not useful
Appendix F: Glossary	❒ very useful	❒ useful	❒ somewhat useful	❒ not useful

9. Please rate the following elements of the IRPs:

a) organization of the content	❒ excellent	❒ very good	❒ good	❒ fair	❒ poor
b) readability	❒ excellent	❒ very good	❒ good	❒ fair	❒ poor
c) ease of use	❒ excellent	❒ very good	❒ good	❒ fair	❒ poor
d) currency of information	❒ excellent	❒ very good	❒ good	❒ fair	❒ poor
e) appropriateness of the content	❒ excellent	❒ very good	❒ good	❒ fair	❒ poor
f) design including 4-column format	❒ excellent	❒ very good	❒ good	❒ fair	❒ poor

Comments: _____

_____

_____

TECHNOLOGY EDUCATION IRP QUESTIONS

Please choose a course that you have taught *within the past two years* and answer the following questions.
Please complete a separate questionnaire for each course that you would like to have input into for the review process.

***Please indicate the IRP that you are responding to*:**

❒ Technology Education 8 to 10 ❒ Technology Education 11 and 12: Industrial Design

1. **Prescribed learning outcomes** (PLOs) are content standards for the BC education system. They set out the knowledge, enduring ideas, issues, concepts, skills, and attitudes for each subject. The PLOs are statements of what students are expected to know and be able to do at an indicated grade.

In general, the wording of current PLOs is:	❒ appropriate as is ❒ vague and requires more specificity ❒ too detailed and requires less specificity ❒ inconsistent ❒ very inconsistent and requires significant revision
The number of PLOs in the IRP is:	❒ appropriate to cover the content/topic ❒ excessive ❒ insufficient to cover the content ❒ address content that is not appropriate for this level
To what extent do the PLOs of this IRP guide your lesson planning?	❒ always ❒ mostly ❒ somewhat ❒ not at all
The PLOs are grade appropriate.	❒ strongly agree ❒ agree ❒ disagree ❒ strongly disagree
The PLOs are better addressed as an integrated part of another subject rather than as a separate subject course.	❒ strongly agree ❒ agree ❒ disagree ❒ strongly disagree

Comments about PLOs

_____

2. Are there topics of study that you would like to see changed, added or deleted from this IRP/course?
❒ Yes ❒ No

Please identify each topic and explain why the change should be made:

3. Please name the **principle learning resource(s)** that you use for this course:

4. Do you feel that there are sufficient learning resources to complement this course? ❒ Yes ❒ No

Comments

5. What are the factors that determine the content of your Technology Education teaching? ***Please mark all that apply*.**

❒ topics in the IRP ❒ student interests ❒ topics in the textbook
❒ student knowledge ❒ equipment availability ❒ current events
❒ my interests ❒ other

6. The Curriculum Organizers are appropriate:

❒ Strongly Agree ❒ Agree ❒ Disagree ❒ Strongly Disagree ❒ Not Applicable
Comments

7. The suggested ***Instructional Strategies*** are useful.

❒ Strongly Agree ❒ Agree ❒ Disagree ❒ Strongly Disagree ❒ Not Applicable
Comments:

8. The suggested ***Assessment Strategies*** are useful.

❒ Strongly Agree ❒ Agree ❒ Disagree ❒ Strongly Disagree ❒ Not Applicable
Comments:

9. Identify the information and communication technology that you use in your teaching. *(Please check all that apply).*

❒ administration of data (handout preparation, marks gathering, etc.)

❒ communication via e-mail with technology education colleagues (inside and outside of school)

❒ using the Web to find instructional materials

❒ teacher presentations (Power Point, demonstrations)

❒ student use for lab activities (dissections, probeware, graphing, simulations)

❒ student use for accessing information for research projects (internet, Web resources, reference CDs)

❒ publishing of student projects on the Web

❒ student use for word processing

❒ technology education software. Examples:_____

❒ other_____

10. Are there any courses that you think may have overlapping content with the chosen Technology Education IRP? If so, please indicate which course(s).

_____

11. Identify and rate any barriers which (may) hinder the delivery of Technology Education.
*Please rank each of the barriers from 1 to 5 with **1** indicating it is a minor barrier and **5** indicating it is a major barrier.*

❒ lack of background knowledge	❒ lack of sufficient class time	❒ lack of equipment
❒ lack of textbooks/resources	❒ lack of teacher in-service	❒ lack of sufficient prep time
❒ lack of student interest	❒ lack of expertise in this subject	❒ other_____

12. Do you have any suggestions that would improve Technology Education?

_____

_____

_____

_____

Attach additional pages if necessary.

☺ Thank you for completing this questionnaire!

PLEASE RETURN BY FRIDAY, MARCH 30, 2001

to:

Adrienne O'Henly, Technology Education Curriculum Coordinator
British Columbia Ministry of Education

BY FAX: (250) 356-2316 OR BY MAIL: PO Box 9152 Stn Prov Govt Victoria, BC V8W 9H1

QUESTIONS OR COMMENTS? adrienne.ohenly@gems7.gov.bc.ca OR phone (250) 356-2571

Appendix B

REGIONAL GRADE COLLECTION SITES

Teachers can preview resources at the Regional Grade Collection Sites listed below. This may diminish the time spent in searching for appropriate resources.

#73 Kamloops (Provincial Host) Henry Grube Education Centre 245 Kitchener Crescent Kamloops B.C. V2B 1B9 Corinne Parvantes Phone: 250-376-2266 Fax: 250-376-7966 Email: cparavan@sd73.bc.ca	#57 Prince George (Regional Host) District Offices 1894 - 9th Ave Prince George V2M 1L7 Carrie Yuen-lo Phone: 250-561-6800, ext 258 Fax: 250-561-6801 Email: carrie@central.scdist57.bc.ca.
#8 Kootenay Lake (Regional Host) District Resource Centre 421-9th Ave Creston B.C. V0S 3P5 John Solly Phone: 250-428-2051 Fax: 250-428-5115 Email: jsolly@pop.sd8.bc.ca	#61 Victoria (Regional Host) S. J. Willis Centre 923 Topaz Ave. Victoria B.C. V8T 2M2 Judith Reid Phone: 250-360-4302 Fax: 250-360-4371 Email: jreid@sd61.bc.ca
#34 Abbotsford (Regional Host) Resource Centre 2272 Windsor St Abbotsford B.C. V2S 5W6 John Morrow Phone: 604-852-1250 Fax: 604-854-5444 Email: John_Morrow@sd34.bc.ca	#72 Campbell River (Regional Host) Program Services 425 Pinecrest Road Campbell River, B.C. V9W 3P2 Byron Dart Phone: 250-830-2300 Fax: 250-830-2329 Email: byron.dart@sd72.bc.ca
#41 Burnaby (Regional Host) Schou Education Centre 4041 Canada Way Burnaby B.C. V1Y 3A8 Ken Kiewitz Phone: 604-664-8416 Fax: 604-664-8424 Email: kkiewitz@csi.com	#82 Coast Mountains (Regional Host) District Resource Centre 3211 Kenney Street Terrace, B.C. V8G 3E9 Warren Wilson Phone: 250-635-4931 Fax: 250-638-2399 Email: wwilson@cmsd.bc.ca.

Appendix C

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FOOTNOTES

1. For example, data collated by Robert Mattioli of the Vancouver office of Human Resources Development Canada (HRDC) projects above average demand for tradespersons in areas as aircraft mechanics (NOC7315), carpenters (NOC7271), construction trades helpers and labourers (NOC7611), construction millwrights and industrial mechanics (NOC7311), average demand for telecommunications installation and repair workers (NOC7246) and motor vehicle mechanics, technicians and mechanical repairers (NOC7321), and below average demand for sawmill machine operators (NOC9431) and sheet metal workers (NOC7261).

2. This has been the experience in some jurisdictions in the US that replaced "shops" with computer labs in their schools, only to find the need for traditional industrial skills still existed. New Zealand has encountered problems with its agenda of radical educational reform, and is finding that it cannot adequately train workers for either an industrial or knowledge-based economy.

3. *Addressing Student Differences: Next Steps* (Victoria: Ministry of Education, 1997), p. 2.

4. Dr. Suzanne de Castell of Simon Fraser University and Dr. Mary Bryson of the University of British Columbia recently initiated the GENTECH Project (See www.educ.sfu.ca/gentech/index.html).

5. This comment is based on conversations with technology instructors from across the province as well as enrolment figures from *The Public School Secondary Course Headcount Enrolment by Grade, Subject Area and Gender within District/Authority*, Ministry of Education, School Finance and Data Management, Report #2069, July 9,1997.