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# Focus on Information Technology Program

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Focus on Information Technology (FIT) is an innovative two-year program that teaches Canadian High School students essential ICT and business skills. Developed by the Information and Communications Technology Council, FIT offers a solution to future ICT labour needs by championing youth employment and empowerment.

## A 21st Century Learning Model

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# The Focus on Information Technology (FIT) Program: A 21st Century Learning Model

## Overview

***The Focus on Information Technology (FIT)*** program was created by the *Information and Communications Technology Council* (ICTC) which is a not-for-profit sector council funded in part by the Government of Canada. ICTC strives to create a prepared, diverse and highly educated Canadian ICT industry and workforce. The FIT program was designed to help Canada's secondary school students understand the importance of ICT in industry and their daily lives, while encouraging them to continue on to post-secondary institutions. It is carefully aligned to individual Provincial outcomes and expectations, allowing students to focus their learning on the ICT sector while still meeting the requirements of their Provincial Secondary School Diploma. FIT supports students by helping them gain the knowledge and work skills necessary to make ICT a career choice using FIT program learning outcomes that have been validated by business, industry and educators. These outcomes include the ability for students to complete industry recognized credentials such as A+, Java and Network+ certifications such as CISCO's IT Essentials or CCNA. ICTC has partnered with CISCO and CompTia to provide industry recognized certification and training opportunities for teachers at lower cost thereby encouraging students to achieve industry standards without incurring the high expense normally associated with industry certifications. FIT also allows students to investigate specific concentrations that might be of interest to them which include such important topics as Networking, Programming or Media, Design and Communication Arts. All concentrations are integrated with a Business component.

## ICTC Background

**ICTC** is a catalyst for change, conducting labour market research, establishing occupational standards, and pushing for innovations that will provide programs and resources for the Canadian Information and Communications Technology (ICT) industry, educators and governments. These programs consist of talent development initiatives for both global and Canadian talent, including Internationally Educated Professionals (IEPs), women in IT and secondary and post-secondary students.

ICTC works closely with a vast network of partners and has had many years of experience working with Canadian provinces, Not for Profit Organizations and the ICT sector. Spear-headed by its President, Namir Anani, ICTC has actively and successfully influenced the Government of Canada and the ICT industry to support the youth of Canada to consider careers in ICT through its Focus on IT program. Supported by a FIT team of qualified ICT educational professionals, FIT has been well received across Canada by a network of schools, school boards, businesses, government agencies, Aboriginal Peoples and the ICT Sector as a whole.

## Introduction

Technology is one of the fastest-growing areas of our economy, and its innovations vastly affect our everyday lives. Computers, cell phones, video gaming, personal electronic devices – all these things and more are being created, maintained and upgraded by ICT-trained professionals. Is it any wonder that Information & Communications Technology is such a major industry, with the promise of enormous future potential?

Over the next five years, Canadian employers will need to hire an estimated 106,000 ICT workers. (Outlook 2011 – 2016) Canada is not unique. Many Countries around the World are struggling to meet their own ICT needs (Bridges.org). Industry demands for ICT workers are ever increasing but the supply of qualified candidates has not kept up with these demands. There are a variety of reasons for this shortage.

In Canada,

- There is a pervasive mismatch between the industry skill requirements and the available skill supply in the labour market. This mismatch affects all regions of the country;
- Information Systems Analysts and Consultants, the largest ICT occupation in Canada, will continue to drive the shortages with demand for this complex mix of skills being much greater than the available supply;
- Recent graduates with co-op or internships as part of their education will, for the most part, be able to obtain relevant employment. Those graduates without co-op or internships will experience prolonged frustration in finding a relevant job;
- The gender imbalance for ICT occupations (males make up approximately 75% of all ICT employees) limits the qualified pool of employees for industry recruitment. This compounds the skills shortage in Canada.
- New arrivals of internationally educated professionals (IEPs), who have no Canadian experience, will have considerable difficulty in securing an ICT job that is commensurate with their qualifications, unless their English or French language skills are strong.

In Canada students are influenced by their parents and peers. The selection of a suitable career focus starts early in secondary school but unfortunately many of the influencers of these students are sorely miss-informed. Their opinion of ICT careers is based on knowledge of the sector that may be years if not decades old. Careful research using statistics and longitudinal studies by ICTC has shown that there are more opportunities in the ICT sector than can be met by today's graduates. We simply don't have enough students selecting ICT as a career choice to meet our current needs. And, as Outlook 2011 – 2016 points out, we will need even more qualified applicants in the near future.

Therefore, since colleges and universities are not graduating enough students with ICT qualifications to meet our needs, ICTC developed a program that encourages students in secondary school to consider a career in ICT as they complete their high school graduation requirements. It has the added benefit of informing parents and teachers of how strong this sector is and why a career in ICT would be challenging, rewarding and profitable.

## What is 21st Century Learning?

Students today need to be encouraged to develop the kind of complex problem-solving skills that are required in today's world. By becoming fluent in the use of information and communication technologies, they will learn to use the essential tools of the 21st century. By gaining meaningful experience, they will learn how to be responsible local and global citizens.

## What Are 21st Century Learning Environments?

21st Century learning environments are schools that help students become comfortable with ideas and abstractions, to become skilled at analyzing and synthesizing new information, to learn quickly and flexibly, to be creative and innovative, and to be able to work well as part of a team.

Students in schools that teach 21st century skills will spend significant time on basic skills, including reading, writing and math. They will debate ideas, be capable of creating meaning from multiple texts, and have the ability to generate new ideas.

Teachers will become facilitators and coaches, helping students find information they need while helping them make informed judgments about its accuracy and relevance. They will emphasize *how* to learn, along with *what* to learn.

## What Skills Do All Students Need?

In order to succeed in our rapidly changing world, students need to acquire the skills to feel fully engaged in learning. In a 21st Century school students would:

- Solve real problems.
- Engage with knowledge that matters.
- Make a difference in the world.
- Be respected.
- See how subjects are interconnected.
- Learn from and with each other and people in their community.
- Connect with experts and expertise.
- Have more opportunities for dialogue and conversation.

## How Will They Acquire All This?

To ensure that all students build content mastery and lifelong-learning skills, we must give them access to opportunities that emphasize:

- Applied, project-based and interdisciplinary learning
- Collaborative learning
- Inquiry and investigation
- Technology for learning
- Demonstration of competence
- Personalized learning
- Information access, analysis, synthesis and the generation of new ideas.

## What is FIT?

*Focus on Information Technology* (FIT) was designed to capitalize on the technological revolution by encouraging students to consider ICT as a career choice. Over a two-year secondary-school academic pathway, a student masters the 21st Century Essential Skills[1] that have been identified by Canadian industry as extremely important. FIT, developed by the Information and Communications Technology Council (ICTC) in conjunction with the ICT industry and educators, lets secondary-school students develop the necessary technical, business and interpersonal skills through a relevant, timely and exciting project-based program.

Best of all, upon graduation, students receive a nationally recognized FIT certificate from ICTC and will be ready to write major ICT certification exams, should they choose to do so. As well, they may receive advanced standing, dual-credits or other articulation benefits in certain post-secondary programs.

## Specifically, How Does a Student Achieve a FIT Certificate?

Today's schools are very busy places. Teachers must meet the Ministry of Education's outcomes / expectations and work with their students to help them achieve their best while also developing new and interesting ways of introducing challenging topics that often have few available resources. Therefore, rather than try to add a separate curriculum to an already busy workload, ICTC chose to align the FIT criteria to already established Technology and Business courses in today's classrooms.

## Aligning Curriculum

Once the FIT criteria had been validated by industry, teachers across Canada were asked to join their peers at "focus" group meetings. These teachers were asked to study the criteria and decide if they covered it in their current curriculum or in a specific classroom activity. If the answer was positive for a

[1] Trilling, Bernie & Charles Fadel; "21st Century Skills, Leaning for Life in Our Times", John Wiley & Sons, San Francisco, CA, ISBN 978-0-470-47538-6

number of criteria, a team of teachers was asked to create a spreadsheet which identified the course and the specific criteria that were being met. Obviously not all criteria were met by all courses and so a "Pathway of courses" was developed. In the province of Ontario, for instance, a student taking Computer Science for two years along with a business course met the criteria. Careful study produced a number of pathways that would work for students who took different courses such as Media and Communications, Programming or Networking.

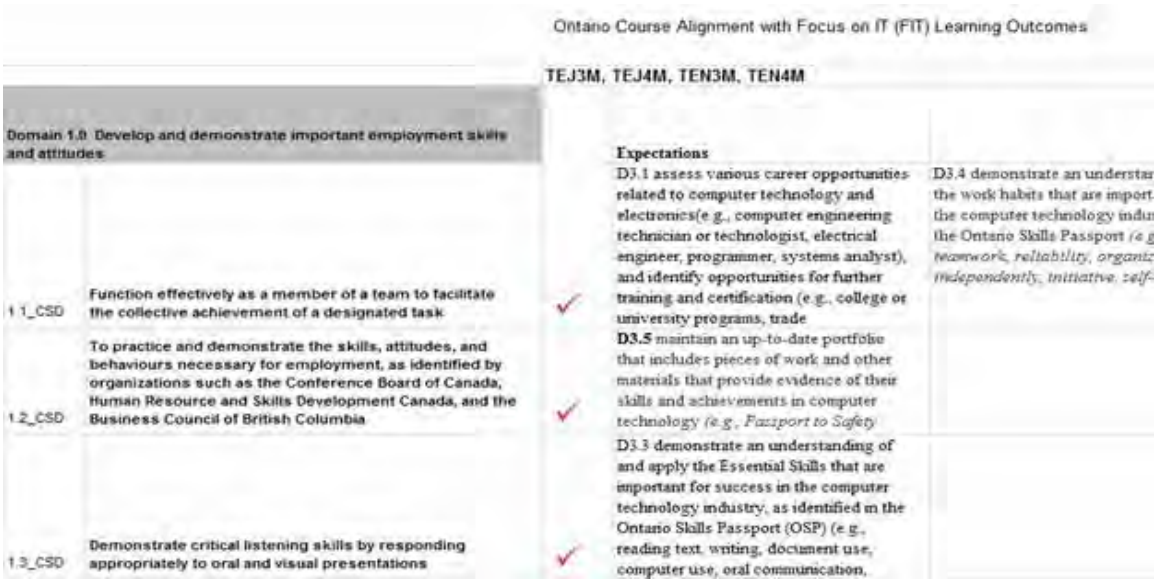
**Using local teachers for the alignment had several benefits for the FIT program**.

- It acted as a validation by teaching professionals that FIT was a suitable program for classrooms. Often teachers are reluctant to accept the word of outside sources and because of their busy schedules do not have the time to study the plethora of resources available on their own. Being able to demonstrate to teachers that their peers across the province and in other Canadian provinces found the FIT program useful was a positive step for the program.

- As teachers discussed and clarified the criteria prior to aligning them to their curriculum, they had a chance to share ideas and better understand activities that might be used to meet the FIT criteria and their provincial curriculum. In this sense the alignment focus groups were a form of teacher in-service.

- The Ministry of Education in most provinces was more open to considering FIT as a suitable resource because it had been "peer reviewed" by local teachers; not just by professional educational consultants.

The following illustration shows the structure of a FIT alignment spreadsheet with the courses listed at the top and the FIT criteria in the left column. Teachers then copied the outcome from the specific Ministry of Education course they were using to meet the FIT criteria and pasted it into a cell beside the FIT criteria. If the alignment was viewed as appropriate, after review and discussion by the teachers as a group, a red check was placed in the box beside the criteria confirming that the FIT criteria had been met. This allowed teachers to select courses of study that met all the FIT criteria by forming multiple "Pathways" or entry-points to a FIT certificate.



Ontario Course Alignment with Focus on IT (FIT) Learning Outcomes

TEJ3M, TEJ4M, TEN3M, TEN4M

| Domain 1.0 Develop and demonstrate important employment skills and attitudes | | | Expectations | |
|---|---|---|---|---|
| 1.1_CSD | Function effectively as a member of a team to facilitate the collective achievement of a designated task | ✓ | D3.1 assess various career opportunities related to computer technology and electronics(e.g., computer engineering technician or technologist, electrical engineer, programmer, systems analyst), and identify opportunities for further training and certification (e.g., college or university programs, trade | D3.4 demonstrate an understan the work habits that are import the computer technology indu the Ontario Skills Passport (e.g. teamwork, reliability, organiz independently, initiative, self- |
| 1.2_CSD | To practice and demonstrate the skills, attitudes, and behaviours necessary for employment, as identified by organizations such as the Conference Board of Canada, Human Resource and Skills Development Canada, and the Business Council of British Columbia | ✓ | D3.5 maintain an up-to-date portfolio that includes pieces of work and other materials that provide evidence of their skills and achievements in computer technology (e.g., Passport to Safety | |
| 1.3_CSD | Demonstrate critical listening skills by responding appropriately to oral and visual presentations | ✓ | D3.3 demonstrate an understanding of and apply the Essential Skills that are important for success in the computer technology industry, as identified in the Ontario Skills Passport (OSP) (e.g., reading text, writing, document use, computer use, oral communication, | |

Figure 1 - Ontario Course Alignment

### Project-based Curriculum

Technology courses by their very nature are experiential. Technology teachers use a variety of resources created by industry and supported by the FIT program that are project-based. In fact, many FIT teachers run their classrooms as "project offices" in that students must form teams and submit proposals for specific projects. In this way, teachers re-create the atmosphere of a technology-based business. It reinforces the points learned as part of the Business courses most Technology students take as part of their FIT pathway and makes the study relevant, exciting and challenging for students in today's classrooms.

### FIT Endorsement

Mastering ICT curriculum can be challenging for students. This is especially true if they feel they already know a great deal of the information being taught. To overcome this problem, teachers use a variety of resources in their classroom that have been produced by leading industry educational partners. Cisco and Microsoft are two companies that have developed a large number of resources that can be used in the classroom for specific activities. Besides making the courses relevant and interesting for the students, this has the added bonus of helping students meet already established industry standards. In this way, a student participating in the FIT experience can also learn the content of a major industry standard.

The FIT certificate will display an endorsement or embossed gold seal if a student has taken and passed a suitable industry standard test. These tests are usually adjudicated by an external institution and not the student's teacher. For most secondary school students this means IT Essentials or CCNA from Cisco or one of the A+ certifications. Although the student may have earned more than one industry standard, only one FIT endorsement will be found on the certificate for accomplishing this challenge.

Students can earn a second endorsement, however, for Work Experience or Coop studies. For example, in Ontario and several other Canadian provinces, a student can take a course in secondary school that is 110 hours long which gives them an opportunity to work at an industry location. They learn workplace safety skills, vocabulary and other essential skills through the coop placement. There is no limit on the number of hours a student could work at a work experience but currently the minimum number of hours is based on the definition of work experience / coop defined by the Ministry of Education in each province.

### How Many Different FIT Certificates are there?

To achieve one of five (5) FIT certificates from ICTC, a student must take a specific set of courses at the secondary level. This "Pathway" is identified and approved by the school administration prior to the commencement of the course of study. The specific pathway will vary by province but generally, Communications courses, Technology courses and Business courses satisfy the FIT criteria. A normal FIT-approved program requires one or more semesters or about two years to complete as the student completes his/her high school graduation requirements. The five (5) FIT certificates are as follows:

1. The original FIT certificate where the student has met the FIT criteria by passing the courses in the selected Pathway.

2. The above certificate with an endorsement (gold seal) showing that the student completed a "work experience" or Coop course.

3. The original certificate but with an endorsement showing that the student has achieved an industry standard such as A+.

4. The original certificate with both endorsements

5. A unique FIT+ certificate indicating that the student has achieved the criteria, taken approximately 200 hours of work experience (or the time determined by each province for co-op education) and completed and passed two or more industry standards.

The criteria being achieved through the FIT program are essential 21st century skills[2]. The criteria include, for example, an understanding of appropriate ICT terminology, and how working as a team and understanding both the importance of teamwork and the skills necessary to maintain the team are essential.


Figure 2 - This is an example of an ICTC certificate endorsement or "Gold Seal".

[2] Trilling, Bernie & Charles Fadel; "21st Century Skills, Leaning for Life in Our Times", John Wiley & Sons, San Francisco, CA, ISBN 978-0-470-47538-6

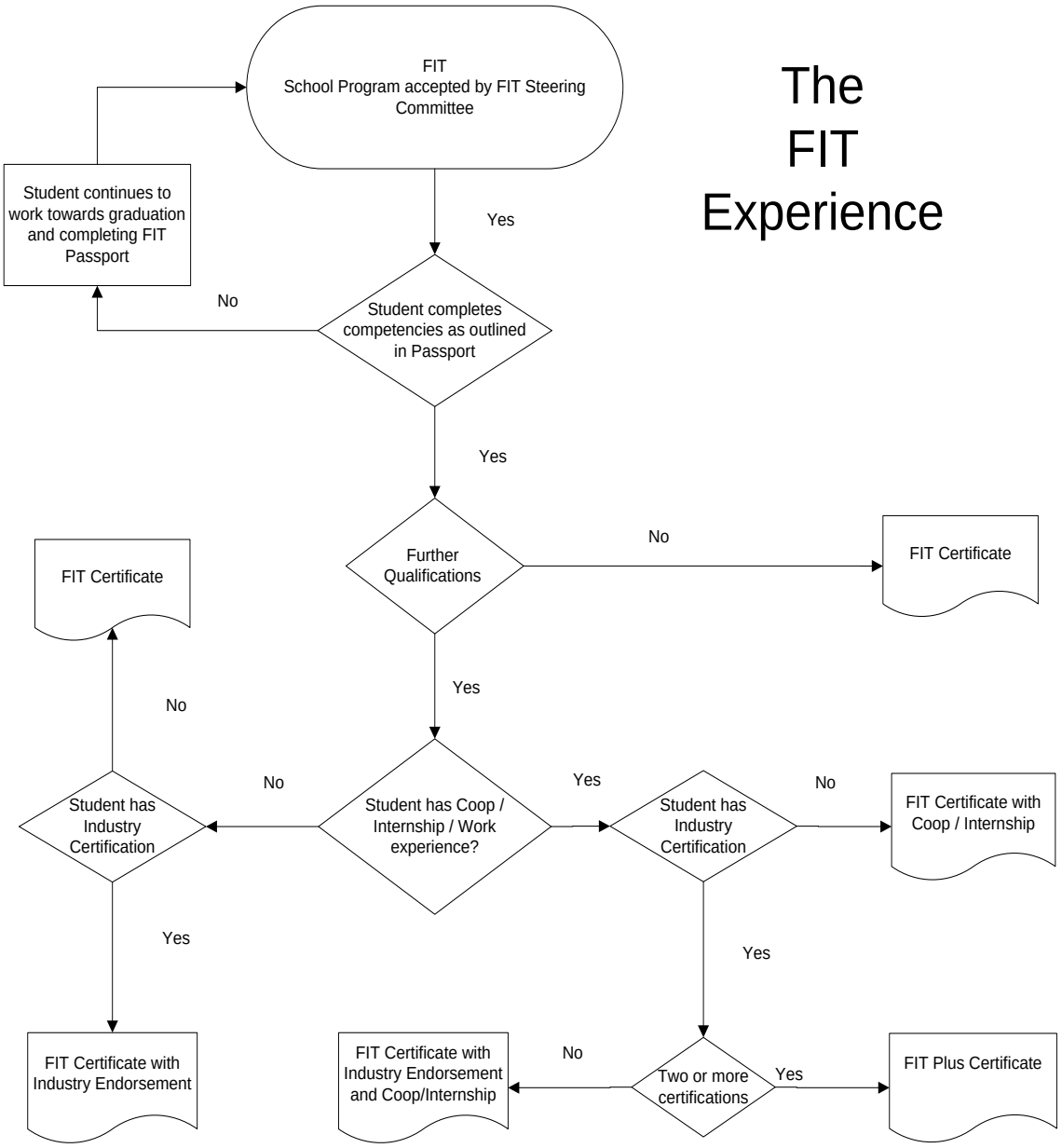



Figure 3 - Fit Certificate Decision Flowchart

## The Role of Post-secondary Institutions

If, due to illness, competitive sports or for other reasons a student cannot finish the FIT certificate at the secondary school level, the FIT certificate can be completed at a local college or university. Finishing the program in this way has several benefits to both the post-secondary institution and the student.

- Secondary students are often concerned that their selection of a post-secondary institution wasn't the best choice. They feel that they might not have all the information needed to make this important decision. A college or university that agrees to offer students the option of completing a FIT certificate will be seen by students as a preferred location for their post-secondary studies because it is flexible and progressive minded.

- A post-secondary institution that has agreed to offer students the option of completing FIT certificates is also a location that has probably agreed to carry out "Reach-Ahead Opportunities for Students" which makes students more at home with the institution and more likely to attend their campus.

- Dual-credit classes – are collaborative courses designed by colleges, universities, and high schools that allow a student to achieve two credits for one course completion; one credit is given at the secondary level and another is given at the post-secondary level.

- These courses are recognized by the Ministry of Education and all costs may be covered by the Ministry. ICTC strongly supports this articulation option.

## What is a Reach-Ahead Opportunity?

To achieve a FIT certificate a student must understand the important role technology plays in a business and industry setting. Colleges and universities play an important role in a student's academic career by bringing technology to life.

Local post-secondary institutions invite teachers and students to their campuses for "acclimatization" activities with the intent of making students more aware of what an academic life may hold for them. A Reach-Ahead Opportunity goes one step farther by not just offering a brief tour of the facilities but actively connecting professors with the secondary students through hands-on activities and challenges. Professors enjoy this interaction as it keeps them aware of the needs of first-year students while allowing them to highlight how important it is to stay up to date with technology. Students have fun, professors demonstrate their curriculum and often encourage students to take courses that they might otherwise not have known about or even understood.

The college or university meets their needs of encouraging students to attend their institution and the individual program departments get to demonstrate why their courses are challenging, interesting and often fun.

It benefits colleges and universities to take part in the FIT community because:

- It allows them to work with their future clientele.

- It allows students to experience a variety of technology careers making their final career decision simpler.
- It allows students to be better informed about technology and the future which indirectly brings needed information to their parents and peers (influencers)
- It offers the college or university a direct link to the community that it serves allowing them to better understand and meet the needs of this important group.
- Students having achieved a FIT certificate are better prepared for a post-secondary academic life. They are more aware of business practices and have experienced on several occasions what it would be like to pursue a degree or diploma at a college or university.

Example: Workshop Descriptions from a Reach-Ahead Opportunity

**Note:** that the first three workshops will run three times at 10AM, 11AM and 1PM. Workshop (4) will be offered only once at 1PM. All workshops are hands-on.

(1) Computer Networking (Room A4088) – this workshop will introduce participants to the main characteristics of computer networks, including network security and remote terminal access.

(2) Instrumentation (Room A4070) – a variety of instruments commonly used in Electronics measurement and characterization will be combined through a computer interface to enable measurement and remote interaction.

(3) Visual Programming and Control (Room B1028) – participants will use a Visual Basic programming IDE to allow computerized control of temperature in a small environmental chamber.

(4) Computer Hardware (Room A4060) – participants will obtain practical insight into the components that make up a modern computer, learning to identify key features and investigating the function of various common parts inside the computer.

(5) Media and Design (RoomA4145) – participants will participate in a newscast using a green screen.

**The Role of Industry and Community Partners**

The FIT program focuses on the needs of students and teachers with the intent of increasing the number of applicants considering careers in ICT. To stay current so that students making these life-altering career decisions have all the knowledge they need to make the right decision, ICTC has enlisted the help of many outside community members. These include local businesses and leading community members.

Known as an Industry Partnership Network (IPN), ICTC facilitates the establishment of groups of like-minded individuals who help local secondary and post-secondary schools with resources, speakers, tours and the guidance necessary to make the FIT program a truly community-based experience for the students.

Depending on the identified needs of the students, an IPN can be working directly with an individual school or with an entire Board. In many Canadian provinces, for example, there are IPN groups devoted to their local community who offer Coop placements, encouragement and support to the students of Adult Learning Centres. There are also IPN members who work on a much larger scale that is more community oriented.

**An Industry Partnership Network does the following:**

- Arranges for local business partners to speak at schools. These speakers offer encouragement, tell stories about their successes and the people that influenced them into a career in ICT.
- Arranges the distribution of older technology from their companies to schools that wish to have students disassemble equipment and learn as experientially as possible. Some schools create refurbishing centres that give students the skills necessary to take older equipment and, after repair, distribute them to local community members that would otherwise not have access to technology in their daily lives.
- Arrange for company tours so that students can appreciate how technology meets the needs of local business. These tours often conflict with how students have viewed the technology sector. They find vibrant activities where they had expected conditions to be less than exciting. A career in a technology related industry can be exciting, challenging and fun in ways that students cannot imagine without these tours.
- Offer specific in-service for teachers so that they can stay current and up to date. Often teachers' business experience is lacking or based on experiences they had long before they entered education. Their concepts can be out of date and the IPN members can play a major part in demonstrating to teachers the changes that have been implemented in the last few years.
- When possible, the IPN arranges for Work Experience opportunities for students. By offering a student the opportunity to work in industry for several weeks or months, the student gains the vocabulary and work-related skills necessary to become a positive member in a technology field. If a full Coop or work experience is not possible, the IPN members can arrange for job shadowing experiences for students. Shadowing requires that a student follow and assist a permanent employee about their activities for a specific length of time. Although not as valuable as a full Coop position, students still gain valuable information about the technology sector by participating in these activities.
- Job shadowing, twinning and other experiential activities are also extremely valuable for teachers and IPN members enjoy sharing their expertise with teachers. Without a firm understanding of the workforce needs of industry, a teacher of technology cannot properly inform their students about future careers in ICT.

**Added ICTC Support for the Focus on IT Program**

ICTC is committed to supporting FIT in the future. Therefore, when a school or School Board joins the FIT community, they receive a variety of resources and opportunities that encourage and excite students towards a career in ICT.

They receive:

- **Newsletters** with valuable information regarding all aspects of ICT in Canada. Examples include:
    - ICTC's HR Quarterly/ La Trimestrielle RH du CTIC
    - ICTC Immigration Initiatives Monthly Newsletter / Nouvelles mensuelles des initiatives enLabour
- **Labour Market Intelligence (LMI)** – An analysis of what lies in the future based on current statistics and surveys. This valuable resource helps students, parents and teachers better understand the career possibilities that may be available in the future. Examples include:
    - NEW - Labour Force Survey (LFS) data for Diversity is a competitive advantage in an increasingly global marketplace
    - Impact of Immigration on ICT in Canada
    - Sub-Sector Study Reveals Key Human Resource Issues Facing Canadian Digital Media Companies.
- **Internationally Educated Professionals** (IEP) - This is similar to the LMI but focuses on how the career pool will be affected by immigration and what ICTC is doing to maintain a strong ICT workforce in Canada which includes the valuable contribution of IEPs.
- Information on potential **ICTC Guest Speakers** who are delighted to speak to students at both the secondary and post-secondary levels. The topics vary but are usually designed to supply students and parents with information essential to making a career decision in favour of ICT.
- **Discounts on Industry Standard exams –** ICTC has arranged for CompTia and Cisco exams to be discounted in price for each student and teacher trying to achieve an industry standard. Other suppliers like Adobe and Microsoft are being approached to arrange similar discounts for their certifications.
- Whenever possible, ICTC facilitates meetings between school districts and post-secondary institutions to arrange "advanced placement" or articulation agreements favouring FIT graduates.
- By working directly with Industry and doing cyclical reviews of the FIT criteria, ICTC helps students, teachers and curriculum developers stay current with regard to today's technology trends.

***In summary***, this is an exciting and challenging time to be an educator. Unless we transform our schools in substantive, dynamic and meaningful ways, we run the risk of limiting the possible futures for our students. We must prepare our students to succeed in the world through active, hands-on and creative curriculum. The FIT program will encourage students to develop the kind of complex problem-solving skills that are required in today's world. By becoming fluent in the use of information and communication technologies, they will learn to use the essential tools of the 21st century and by gaining meaningful experience, they will learn how to be responsible local and global citizens.

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