



Business Technology
Management



Business Technology Management Accreditation Council

A joint venture between the
Canadian Information Processing Society (CIPS)
and the
Coalition for Tomorrow's ICT Skills (CCICT)

Accreditation Criteria for
Business Technology Management (BTM) Program

Table of Contents

1.0 Introduction	4
2.0 Method of Evaluation	5
3.0 Designation	6
4.0 Glossary.....	7
5.0 Objectives and Learning Outcomes	8
5.1 Quality Indicators.....	8
5.2 Evidence That Learning Outcomes Have Been Met.....	8
6.0 Faculty.....	10
7.0 Students	12
8.0 BTM Program Content	13
8.1 BTM Structure.....	13
8.2 Bloom’s Taxonomy.....	14
8.3 Competency Standards and Guidance Labelling.....	15
8.5 BTM Learning Outcomes & Competency Standards.....	16
I1 - Integrative.....	17
F1-Personal and Interpersonal.....	20
F2-Business	22
F3-Technology.....	23
C1-Technology in Business.....	29
C2-Processes, Projects and Change	31
8.6 Workplace Experiences and Industry Involvement	33
9.0 Resources.....	34
Appendix A: Details and background on Competency Standards	35
Defining competency standards vs. providing guidance	35
Overview of professional body models	35
Details of Professional Bodies’ Models use to Define Competency Standards	37
Skills Framework for the Information Age	37
Certified Management Consultants of Canada.....	37
Management Standards Centre.....	38
Appendix B Professional Competency Models in the BTM	39
CIPS Accreditation Secretariat	40



Abstract

These guidelines are written to provide assistance to faculty and administrators involved in the accreditation of Business Technology Management (BTM) undergraduate degree programs at Canadian universities. They specify the objectives of accreditation, the various steps in the process, and the essential and highly desirable qualities of accreditable programs. Questions and suggestions for improvements may be sent directly to the CIPS Accreditation Secretariat (accreditation@cips.ca), which will ensure that they are considered.

The Business Technology Management Accreditation Council (BTMAC) is a new initiative and elements of the accreditation criteria will evolve over the next few years as a result of the accreditation exercises and related consultation. In particular, the aspects related to practical experiences and industry involvement are startup activities for a number of institutions, and the need for flexibility in the early implementation of the BMT is recognized.

1.0 Introduction

The BTMAC is an autonomous body established jointly by the Canadian Information Processing Society (CIPS) and the Coalition for Tomorrow's ICT Skills (CCICT).

The Council has as its objectives:

1. To formulate and maintain high educational standards for Canadian universities offering BTM programs, and to assist those institutions in planning and carrying out educational programs.
2. To promote and advance all phases of Business Technology Management (BTM) education with the aim of promoting public welfare through the development of better business technology professionals.
3. To foster a cooperative approach to BTM education among students, employers, and educators to meet the changing needs of these and other stakeholders.

The purpose of accreditation is to recognize programs whose graduates will have received an outstanding undergraduate education in Business Technology Management – an education informed by state of the art knowledge and research, and the needs and applications of industry. These accreditation criteria incorporate principles of outcomes based accreditation.

OBJECTIVES

- MAINTAIN HIGH EDUCATIONAL STANDARDS
- PROMOTE AND ADVANCE BUSINESS TECHNOLOGY MANAGEMENT EDUCATION
- FOSTER COOPERATIVE APPROACHES

2.0 Method of Evaluation

Programs submitted for accreditation will be evaluated on the basis of data submitted by the institution in the form of a BTM questionnaire and other supporting documentation, together with the report of a Site Visit by a team representing the Council.

The BTM questionnaire (available from the [CIPS website](#)) follows a structured outline and involves answering a series of questions and completion of tables. During the process of completing the questionnaire, the institution should demonstrate to itself and to the Council that it can meet the accreditation criteria or, if not, it should demonstrate that it is aware of the shortcomings and has a concrete plan to rectify them. In particular, the report should demonstrate how all aspects of the program, including students, faculty, resources and curriculum together enable the achievement of a set of defined program objectives. The questionnaire and supporting documentation will be used as primary input for the analysis of the program by the on-site visiting team.

The purpose of the site visit is three-fold:

First, the site visit should assess factors beyond those described in the questionnaire. The intellectual atmosphere, the morale of the faculty and the students, and the calibre of the staff, the students, and the work performed are examples of intangible qualitative factors that are difficult to document in a written statement.

Second, the visiting team should help the institution assess its weak as well as its strong points.

Third, the team should examine in further detail the material compiled by the institution and relating to:

1. Control and organization of the institution.
2. Education programs offered and degrees conferred.
3. The basis of and requirements for admission of students.
4. Number of students enrolled:
 - a. in the college, faculty or division as a whole,
 - b. in the individual educational programs.
5. Teaching staff and teaching loads.
6. Commitment to and support for research.

7. Resources:

- a. financial: total budget, non-salary portion of budget and salary scales,
- b. physical: classrooms, laboratories, equipment and offices,
- c. support staff: administrative, clerical, laboratory, research and technical,
- d. library.

8. Curricular content of the program.

9. Actual course selections, as reflected by a sample of anonymous transcripts.

10. Innovative and special features of the program.

3.0 Designation

Universities that receive accreditation will gain the right to apply the term “CIPS/CCICT - Business Technology Management Accredited” to the applicable program. Students who graduate from an accredited program will gain the right to use the terms *BTM* or *BTM Practicum* after their names. *BTM* and *BTM Practicum* certificates are available from the CIPS or CCICT offices. The *BTM Practicum* is only available to graduates who have achieved both the program’s academic standards and its requirements for practical workplace experience.

4.0 Glossary

Learning Outcome

A learning outcome specifies what knowledge, skills, and aptitudes that the students will gain. A learning outcome begins with an action verb and describes something observable or measurable.

Competency Standard

A competency standard is a description of the employers' requirements for a BTM graduate's level of competency for a learning outcome.

Defining competency standards for each learning outcome has the following objectives and benefits:

- Students need to reach minimum levels of competency to:
 - Be qualified for and benefit from co-op and other work experience during the program
 - Be hireable upon graduation into full time positions
- Employers clearly understand the minimum level of competency BTM graduates will have in each learning outcome
- Educators clearly understand the level of competency that must be achieved
- CCICT can fulfill its mandate of growing the market of and for appropriately skilled ICT workers.

Outcome

Something that is measurable that allows you to determine that an objective has been met.

Quality Indicator

Qualitative or quantitative data used to help assess whether an objective has been met.

Rubric

A document describing how an exam, assignment or other student activity should be evaluated. It specifically identifies the learning objectives that should be assessed.

5.0 Objectives and Learning Outcomes

Each program must have a set of learning outcomes, describing what students should know and be capable of doing following graduation.

5.1 Quality Indicators

In order that the BTMAC can accredit programs, they need to examine evidence that what students actually know and are capable of doing following graduation correspond with the defined program-level objectives. This is achieved by quality indicators. These are qualitative and quantitative data gathered by the institution.

The institution should gather quality indicators in each of the following areas: Faculty (Section 6), Students (Section 7), Program (Section 8) and Resources (Section 9). Suggestions for quality indicators are provided in each corresponding section. The self-study and accreditation process largely involves studying and verifying the quality indicators to ensure that the outcomes, in terms of education of students, correspond to the defined objectives.

Evidence should be provided that the department seeks to meet the defined objectives by regularly reviewing learning outcomes and the quality indicators, and then taking actions that should lead to continuous improvement.

5.2 Evidence That Learning Outcomes Have Been Met

Central to self-evaluation and accreditation is demonstrating that the Learning Outcomes, as discussed in Section 8, have been met. Such evidence can include mappings from course-level objectives to BTM learning objectives, rubrics for assignments and tests indicating which learning outcomes are being assessed, and other quality indicators.

Learning objectives for each course should be presented. These objectives should be derived from the learning outcomes (Section 8.5) and should describe what students will have achieved by the end of each course. Each objective should be expressed as at least a sentence, with an active verb. Verbs implying deeper learning, such as 'calculate', 'design', 'evaluate', 'apply', 'solve', 'create', 'build', 'determine', 'develop', 'assess', 'use', 'lead' and 'present' are preferable to verbs implying more passive learning, such as 'know' and 'understand', although the latter would be appropriate for some types of knowledge.

Evidence should be presented that the objectives are actually applied in courses. Such evidence might include a written demonstration that elements such as course syllabi, textbooks, lecture notes, assignments and exams match the objectives. The use of rubrics for course activities is highly recommended. Rubrics describe what is to be expected of students in each course activity, and should indicate which learning objectives students would be demonstrating by successfully completing the activity.

Taken together, the objectives of the courses taken by each student, regardless of the path the student chooses, should satisfy the learning outcomes discussed in Section 8.5. To demonstrate this, the self-study report should contain a table for each required course (or course group) describing how the course contributes to each learning outcome.

For a first accreditation it might be the case that learning objectives are developed for courses retrospectively. However, in subsequent accreditations it should be clear to the visiting team that the course level learning objectives are maintained and applied on an ongoing basis.

6.0 Faculty

The heart of any educational program is the faculty. A competent, qualified, and forward-looking faculty gives an overall scholarly and professionally responsible atmosphere to the operation. An excellent faculty will usually identify and overcome problems in other areas and continue to provide a program worthy of accreditation, but no degree of excellence in other areas can continually offset the handicap presented by poor faculty quality or inadequate numbers of faculty. Thus, the first consideration for a program to be acceptable for accreditation is the presence and future assurance of a continuing critical mass of quality faculty. Educational institutions seeking BTMAC accreditation of programs must have allocated the resources necessary to achieve a critical mass of quality faculty who are committed to professionalism, and must be committed to maintaining the allocations required for its continuation.

The proper size of the faculty depends on the enrolment and objectives of the program(s) being accredited, as well as factors that go beyond undergraduate education such as the amount of new knowledge produced by the faculty (e.g. articles, books, and trade publications), continuing education activities, and involvement in professional and technical societies.

The number of faculty members must be large enough to provide a broad range of experience and capability and to provide meaningful interaction among the faculty members so as to support these interests. The faculty should for the most part occupy permanent positions to ensure continuity and stability. Institutions with limited enrolment and resources are encouraged to select and emphasize a smaller number of quality programs rather than to compromise standards by initiating or trying to maintain programs with inadequate faculty support.

To function effectively as teachers, faculty members must devote a significant amount of their time to seeking new understanding through research and scholarship, interaction with working professionals, instructional innovation, consulting, or other professional development activities. A significant common aspect of these activities is communication of ideas to other practicing professionals and subject matter experts outside the home institution.

Teaching loads must leave enough time for professional development of the faculty. Sabbatical leaves are important to faculty development, for they offer the individual an opportunity to develop professionally and allow for visiting faculty. Other evidence of institutional interest in faculty development, such as adequate resources for professional development, should be present.

Suitable quality indicators regarding faculty for the self-assessment and accreditation report include:

- The proportion of full-time faculty
- The teaching load (number of courses taught per year)
- Levels of research and research grants
- Some indication that recent hiring is leading to faculty renewal
- Gender distribution of faculty

- Job satisfaction of faculty as expressed in interviews or surveys
- Student satisfaction with faculty as expressed in evaluations

To evaluate the quality of the faculty, the visiting team will examine the data presenting the quality indicators in the self-study report, as well as the CVs of the faculty members and any collective agreement. It will also meet with groups of faculty members. The team will gather further insights from discussions with staff, students and administrators.

7.0 Students

An accredited program must have good students. Student selection and retention standards must be appropriate to the program. When students transfer from other institutions or from a branch campus, standards for evaluation and selection of these students should be clearly enunciated, and should show that these students are of similar quality and have substantially the same knowledge as those students who have taken all their work on the main campus. When courses are regularly taken on other campuses, the main campus faculty should be involved in the development and assessment of curricular content.

A student advisory system is an important component in any educational program. The advisory system should embrace course selection and similar matters, and it should also include career guidance. Various aspects of professionalism and ethics may be dealt with through the guidance system.

Curriculum and career guidance is best handled by well-informed faculty members who are given the time and administrative support for personal interaction with individual students. Both faculty members and advisors should be familiar with accreditation policies and guidelines, professionalism issues, professional certification (CIPS I.S.P. and ITCP, PMP etc.), ethical codes of conduct (e.g., CIPS Code of Ethics).

The level of guidance needed will be a function of the flexibility of the curriculum in a particular school. Care should be taken by advisors not to assume responsibility of choice, which should be exercised by the student.

Suitable quality indicators regarding students for the self-assessment and accreditation report include:

- Feedback from employers either assessed through questionnaires or interviews. Employers to be included might be those that have hired students in the past or members of the Advisory Boards that support the BTM program.
- Jobs offered for co-op and internship programs, and the proportion of students who find satisfactory employment following graduation
- Evidence of student involvement in university and extracurricular activities, as assessed through questionnaires and interviews.
- Student's satisfaction with their program and progress as assessed through questionnaires and interviews
- Attrition rates
- Admission averages
- Graduation averages

To assess the quality of students, the visiting team will interview or survey employers, students and alumni, study transcripts and samples of student work, and analyse data presented in the self-study report.

8.0 BTM Program Content

8.1 BTM Structure

The definition of the BTM learning outcomes and competency standards are very specific, but they do not prescribe curriculum, program flow, or pedagogy. We encourage each institution to distinguish its own unique approach to reaching these outcomes and standards.

BTM students will experience academic courses in combination with relevant extracurricular activities and work experiences. BTM graduates will have learned to analyze business processes, design appropriate technology-based solutions, and communicate these effectively. They will be able to lead work-based teams, participate effectively in projects and understand best practices of organizational change.

BTM graduates will be process and project-oriented as well as technology and business trained. The program places distinct emphasis on developing interpersonal communications, collaboration, and leadership skills. BTM graduates will be ready to fill entry-level roles in projects, sales, process analysis, consulting, customer and vendor management, and marketing support.

Note for Quebec Institutions: In Canadian provinces other than Quebec, a student typically obtains his or her degree after 16 years of study, including grades 1 through 12, plus four years of university. In Quebec, a student typically obtains his or her degree after 16 years: 11 years of primary and secondary school, 2 (general curriculum, pre-university) or 3 (technical curriculum leading to university) years of CEGEP, and 3 or 2 years of university. The criteria below (explained in terms of numbers of courses) are specified assuming a university program of four (4) years (40 courses). In order to satisfy the criteria, a program from Quebec may therefore include up to: 10 CEGEP courses for students who have obtained a (general curriculum) pre-university CEGEP diploma; 15 CEGEP courses for students who have obtained a technical CEGEP diploma (leading to a university program).

The BTM outcomes and competency standards are grouped in six areas, as follows:

1. Integrative. This knowledge area contains learning outcomes that integrate the competencies developed in the other five knowledge areas. Each produces a “deliverable” of direct relevance to employers.
2. Personal & interpersonal. The ability to make a meaningful contribution depends upon one’s self-knowledge and ability to have constructive, long term, interactions with others. Successful leaders have strong personal and interpersonal competencies.
3. Business. To be effective in the workplace one must have both the broad context of business – its role and place in society – and a working knowledge of how business operates.
4. Technology. BTM graduates must understand information and communications technologies, their current capabilities, and future trends.
5. Technology in business. This knowledge area is designed to synthesize the knowledge and competencies gained in the foundational knowledge areas and create an additional competency in understanding: the potential (economic, personal, societal), the risks of, and the governance, acquisition, and management of ICTs in and for business.

6. Processes, projects, and change. BTM graduates will gain the foundations that enable them to help create well designed business processes, deliver well managed projects, and support individuals and groups undergoing change.

BTM graduates must to demonstrate that 3 elements of learning have taken place: theories/best practices have been taught, students have received feedback, and students have reflected and improved.

BTM graduates will demonstrate competency in:

1. **Knowing.** For all learning outcomes students must be able to define, discuss, compare and use applicable concepts analytically.
2. **Doing.** For just under half the learning outcomes an additional level of competency is required: students must be able to demonstrate the ability to use their knowledge and skills in a practical way. Students demonstrate “doing” when they can use knowledge to create a practical artifact (e.g., business process model, project plan, data model, business case).

The BTM draws on existing competency models defined by recognized professional standards bodies and / or leading academics in the field of learning (See Appendix B).

For learning outcomes that only have *knowing* requirements, the competency standard uses a summarized version of Bloom’s taxonomy¹ of levels of learning. Outcomes that have a *doing* competency requirement draw on recognized professional standards.

8.2 Bloom’s Taxonomy

The revised Bloom’s Taxonomy includes the following:

1. **Remembering:** Retrieving, recognizing, and recalling relevant knowledge from long-term memory.
2. **Understanding:** Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.
3. **Applying:** Carrying out or using a procedure through executing, or implementing.
4. **Analyzing:** Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing.
5. **Evaluating:** Making judgments based on criteria and standards through checking and critiquing.
6. **Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing.

For the BTM, Bloom’s taxonomy has been simplified so it has 4 levels:

1. Bloom BTM #1 Remembering and #2 Understanding. Learning outcomes at this level start with “Exhibit an understanding of...”
2. Bloom BTM #3 Applying. Learning outcomes at this level start with “Be able to explain...”

¹ An introduction to Bloom’s original taxonomy can be found [here](#). A second reference, located [here](#), introduces the updates to Blooms original taxonomy proposed in the 1990’s

3. Bloom BTM #4 Analyzing and #5 Evaluating. Learning outcomes at this level start with “Demonstrate understanding of...” or “Describe...”
4. Bloom BTM #6 Creating. Learning outcomes at this level start with “Demonstrate the ability to...”

8.3 Competency Standards and Guidance Labelling

Where a competency standard is defined or guidance is provided for a learning outcome the format of the label is:

<Label> { “-” <Skill Reference Code> | <Guidance Reference> } { “=” <Required Competency Level Code> }

Where:

<Label> indicates which model is used to define the competency standard or provide guidance. In summary:

1. BLOM = Updated Bloom’s Taxonomy
2. SFIA = Skills Framework for the Information Age
3. PMI = Project Management Institute
4. IIBA = International Institute of Business Analysis
5. CMC = Certified Management Consultants of Canada, CMC Competency Profile and associated CMC Competency Framework Summary
6. MSC = Management Standards Centre, National Occupational Standard

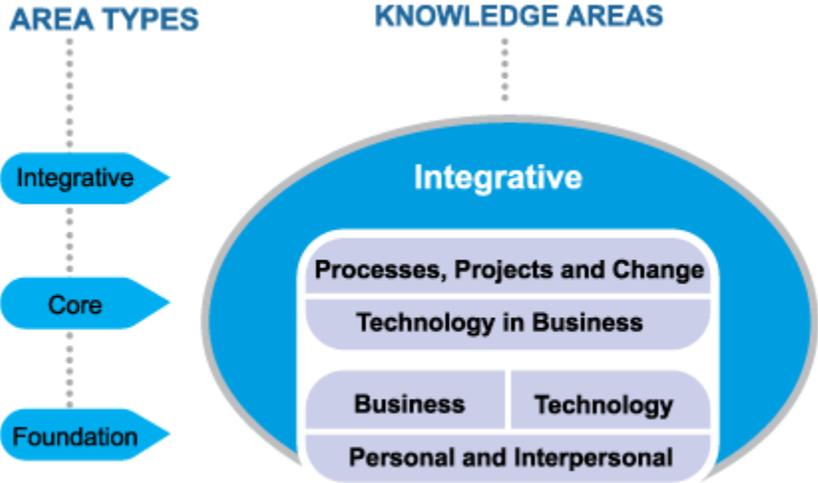
<Skill Reference Code>. Where a competency standard for a “doing” learning outcome is being set, a skill reference code is provided which provides a pointer to the specific description of the relevant skill in the selected competency model. The skill reference code is only required for doing competencies.

<Guidance Reference> Where guidance on the employers’ competency requirements for a “doing” learning outcome is being provided, the guidance source will indicate the applicable source document to be consulted.

Guidance is show in italics in this font.

<Required Competency Level Code> specifies the required competency level the student must achieve using competency level scale from the selected competency model. In cases where the competency standard is provided for guidance only, this element is omitted (see below for details).

8.5 BTM Learning Outcomes & Competency Standards



I1 - Integrative

Ref	Learning Outcome	Competency Standard
I1	Demonstrate the ability to effectively plan, manage and lead a business technology project.	<p>SFIA-PRMG=4 (Project Management)</p> <p>Introduction to this Skill: “The management of projects, typically (but not exclusively) involving the development and implementation of business processes to meet identified business needs, acquiring and utilising the necessary resources and skills, within agreed parameters of cost, timescales, and quality.”</p> <p>“Level 4 Skill Description: Defines, documents and carries out small projects (typically less than six months, with a small team, limited budget, no interdependency with other projects, and no significant strategic impact), actively participating in all phases. Identifies, assesses and manages risks to the success of the project. Prepares realistic project and quality plans and tracks activities against the plans, providing regular and accurate reports to stakeholders as appropriate. Monitors costs, timescales and resources used, and takes action where these deviate from agreed tolerances. Ensures that own projects are formally closed and, where appropriate, subsequently reviewed, and that lessons learned are recorded.”</p> <p>SFIA-PROF=4 (Programme and Project Support Office)</p> <p>Introduction to this Skill: “The provision of support and guidance on programme and project management processes, procedures, tools and techniques to programme and project managers and their teams. The use of project management software. The development, production and maintenance of time, resource, cost and exception plans. The tracking and reporting of progress and performance of projects (including those performed by third parties). The maintenance of programme and/or project files and the repository of lessons learned on previous projects and programmes. The servicing of programme/ project control boards, project assurance teams and quality review meetings. The analysis of performance and the maintenance of metric data and estimating models. The administration of project change control, including use of configuration management systems.”</p> <p>“Level 4 Skill Description: Takes responsibility for the provision of Project Office Services to a small project. Uses and recommends project control solutions for planning, scheduling and tracking projects. Sets up and provides detailed guidance on project management software, procedures, processes, tools and techniques. Supports programme or project control boards, project assurance teams and quality review meetings. Provides basic guidance on individual project proposals. May be involved in some aspects of supporting a programme by providing a cross programme view on risk, change, quality, finance or configuration management.”</p>

Ref	Learning Outcome	Competency Standard
12	Demonstrate the ability to understand and analyze a business problem - collect relevant information, describe and compare options and risks, and make recommendations. Demonstrate appropriate use of relevant techniques such as systems thinking and quantitative analysis.	BLOOM BTM = 4
13	Demonstrate the ability to analyze a business process, develop the "to-be" design, and then to create the implementation plan and the business change management plan to implement this design.	MSC-C5=FL (Facilitating Change – Plan Change – First Line Manager) Hyperlink
14	Demonstrate the ability to design and communicate a moderately complex technology-enabled solution to a business problem.	SFIA-SSUP=4 (Sales Support) Introduction to this Skill: “The provision of technical advice and assistance to the sales force, sales agents, reseller/distributor staff and existing or prospective customers, either in support of customer development or sales activity or in fulfilment of sales obligations.” ... “Level 4 Skill Description: Works closely with the sales team to help prospects to clarify their needs and requirements; devises solutions and assesses their feasibility and practicality. Demonstrates technical feasibility using physical or simulation models. Produces estimates of cost and risk and initial project plans to inform sales proposals. Resolves technical problems. “
5	Demonstrate understanding of how to analyze a business need, develop an RFX, evaluate the responses, and structure a contract with the successful vendor. Ability to evaluate the effectiveness, appropriateness and usability of an implemented information system	BLOOM BTM =3

Ref	Learning Outcome	Competency Standard
16	<p>Demonstrate the ability to examine a new technology, understand its strengths and weaknesses, evaluate its usefulness to solve business problems, and communicate the results.</p>	<p>SFIA-RSCH=3 (Research)</p> <p>Introduction to this Skill: “The advancement of knowledge in one or more fields of IT by innovation, experimentation, evaluation and dissemination, carried out in pursuit of a predetermined set of research goals. “</p> <p>...</p> <p>“Level 3 Skill Description: Within given research goals, builds on and refines appropriate outline ideas for research, i.e. evaluation, development, demonstration and implementation. Uses available resources to gain an up-to-date knowledge of any relevant IT field. Reports on work carried out and may contribute sections of material of publication quality. “</p>

F1-Personal and Interpersonal

Ref	Learning Outcome	Competency Standard
F1-1 I4, I6, I1, I2	Demonstrate self-awareness and self-management, including mastery of ethical reasoning, client relationship management, business courtesies and self-presentation	<p>MSC-A1=TL (Manage your own resources – Team Lead)</p> <p>Hyperlink</p> <p>MSC-D1=TL (Develop productive relationships with colleagues – Team Lead)</p> <p>Hyperlink</p>
F1-2 I4, I6, I2, I1	Demonstrate proficiency in listening, oral and written communications skills in a business context	<p>CMC-E (the Certified Management Consultant must be able to DEMONSTRATE INTERPERSONAL COMPETENCIES)</p> <p>Hyperlink</p>
F1-3 I1	Exhibit an understanding of the strengths of a diverse workplace (including ability, ethnicity, religion, gender, sexual orientation, age/generation).	BLOOM BTM =1
F1-4 I1	Demonstrate proficiency in working with individuals, including giving and receiving feedback and resolving differences using appropriate negotiation and conflict management skills.	<p>MSC-D1=TL (Develop productive relationships with colleagues – Team Lead)</p> <p>Hyperlink</p>

Ref	Learning Outcome	Competency Standard
F1-5 I1 F1-5.1 I1	Demonstrate proficiency in leading work-based teams (within or between organizations), including the ability to: <ul style="list-style-type: none"> • Persuade, influence, motivate and provide guidance 	MSC-B5=TL (Allocate and check work in your team – Team Lead) Hyperlink
F1-5.2 I1	<ul style="list-style-type: none"> • Facilitate a range of group innovation, analysis and decision making techniques 	MSC-C1=TL (Encourage innovation in your team – Team Lead) Hyperlink
F1-5.3 I1	<ul style="list-style-type: none"> • Engender and sustain trust 	MSC-D1=TL (Develop productive relationships with colleagues – Team Lead) Hyperlink
F1-5.4 I1	<ul style="list-style-type: none"> • Effectively use technologies to facilitate and support group activities and processes 	MSC-E14=TL (Support team and virtual working – Team Lead) Hyperlink

F2-Business

Ref	Learning Outcome	Competency Standard
F2-1 I3, I2	Exhibit an understanding of the history, current role and future trends (e.g. globalization, social responsibility) of business within society and the global economy	BLOOM BTM =1
F2-2 I3, I2	Demonstrate understanding of business design and business models (e.g. networked, supply chains, open innovation, collaborative ecosystems).	BLOOM BTM =3
F2-3 I2	Be able to explain the financial, operational, and reputational risk management. Articulate the implications for business decisions of cyclical and event-driven external risks (e.g. credit crunch, pandemics, global warming, peak oil).	BLOOM BTM =2
F2-4 I2	Exhibit an understanding of various kinds of organizations by industry sector, ownership, governance and size - their business models, key performance factors, dominant structures and processes.	BLOOM BTM =1
F2-5 I3	Demonstrate understanding of the role, processes and structure of support functions of a business (e.g. general management, marketing, finance, R&D, IT, human resources)	BLOOM BTM =3
F2-6 I3	Demonstrate understanding of the role, processes and structures of operational functions of a business (e.g. sales, manufacturing, distribution, customer support).	BLOOM BTM =3

F3-Technology

Ref	Learning Outcome	Competency Standard
F3-1 F3-1.1 I6	Be able to explain the current and future issues in the following topics: <ul style="list-style-type: none"> IT operations (e.g. delivery of service levels, change control, green IT) 	BLOOM BTM =2
F3-1.2 I6	<ul style="list-style-type: none"> Software development (e.g. methodologies, lifecycle, emerging techniques, usability, in-house vs. off the shelf / total cost of ownership) 	BLOOM BTM =2
F3-1.3 I6	<ul style="list-style-type: none"> Infrastructure lifecycle (networks, desktop and data centre hardware, operating systems, databases) 	BLOOM BTM =2
F3-1.4 I6	<ul style="list-style-type: none"> Overall application and technology landscape lifecycle (e.g. make technology choices that will ease the integration of unpredictable future technologies) 	BLOOM BTM =2

Ref	Learning Outcome	Competency Standard
F3-2	Able to meet business requirements by planning, designing, integrating into an existing landscape, implementing, and operating contemporary technologies in each of the following:	<p><i>The following competency standards apply to all parts of F3-2</i></p> <p><i>Requirements:</i></p> <p>SFIA-REQM=3 (Requirements definition and management)</p> <p>Introduction to this Skill: “The definition and management of the business goals and scope of change initiatives. The specification of business requirements to a level that enables effective delivery or agreed changes.”</p> <p>“Level 3 Skill Description: Defines scope and business priorities for small-scale changes and may assist in larger scale scoping exercises, Elicits and discovers requirements from operational management and other stakeholders. Selects appropriate techniques for the elicitation of detailed requirements taking into account the nature of the required changes, established practice and the characteristics and culture of those providing the requirements. Specifies and documents business requirements as directed, ensuring traceability back to source. Analyses them for adherence to business objectives and for consistency, challenging positively as appropriate. Works with stakeholders to prioritise requirements.”</p> <p>SFIA-UNAN=3 (Usability requirements Analysis)</p> <p>Introduction to this Skill: “The establishment, clarification and communication of non-functional requirements for usability (for example, screen design/layout/consistency, response times, capacity). The analysis of the characteristics of users and their tasks, and the technical, organizational and physical environment in which products or systems will operate.”</p> <p>“Level 3 Skill Description: Applies tools and methods to identify the non-functional requirements of users, their characteristics and tasks, and the technical, organizational and physical environment in which the product or system with operate.</p> <p><i>Design</i></p> <p>SFIA-DESN=3 (Systems design)</p> <p>Introduction to this Skill: “The specification and design of information systems and their components to meet defined business needs, retaining compatibility with enterprise and solution architecture.”</p>

		<p>“Level 3 Skill Description: Specifies user/system interfaces, and translates logical designs into physical designs taking account of target environment, performance requirements and existing systems. Produces detailed designs and documents all work using required standards, methods and tools, including prototyping tools where appropriate.”</p> <p><i>Implement</i></p> <p>SFIA-QUST=3 (Quality standards)</p> <p>Introduction to this Skill: “The development, maintenance, control and distribution of quality standards.”</p> <p>“Level 3 Skill Description: Controls, updates and distributes new and revised quality standards.”</p> <p>SFIA-QUAS=3 (Quality Assurance)</p> <p>“The process of ensuring that the agreed quality standards within an organization are adhered to and that best practice is promulgated throughout the organization.”</p> <p>“Level 3 Skill Description: Uses appropriate methods and tools in the development, maintenance, control and distribution of quality and environmental standards. Makes technical changes to quality and environmental standards according to documented procedures. Distributes new and revised standards.”</p> <p>SFIA-TEST=3 (Testing)</p> <p>Introduction to this Skill: “The concurrent lifecycle process of engineering, using and maintaining testware (test cases, test scripts, test reports, test plans, etc.) to measure and improve the quality of the software being tested. Testing embraces the planning, design, management, execution and reporting of tests, using appropriate testing tools and techniques and conforming to agreed standards (such as ISO29119), to ensure that new and amended systems, configurations, packages, or services, together with any interfaces, perform as specified.”</p>
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		<p>“Level 3 Skill Description: Reviews requirements and specifications, and defines test requirements for smaller projects. Creates simple test cases and test scripts. Interprets and executes moderately complex test scripts, mapping back to pre-determined criteria, recording and reporting outcomes. Provides specialist advise to support others. Analyses and reports test activities and results. Identifies and reports issues and risks.”</p> <p><i>Operate</i></p> <p>SFIA-SLMO=3 (Service level management)</p> <p>Introduction to this Skill: “The planning, implementation, control, review and audit of service provision, to meet customer business requirements. This includes negotiation, implementation and monitoring of service level agreements, and the ongoing management of operational facilities to provide the agreed levels of service, seeking continually and proactively to improve service delivery.”</p> <p>“Level 3 Skill Description: Monitors service delivery performance metrics and liaises with managers and customers to ensure the service level agreements are not breached without the stakeholders being given the opportunity of planning for a deterioration in service.”</p>
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Ref	Learning Outcome	Competency Standard
F3-2.1	<ul style="list-style-type: none"> A network and computing platform 	See above
F3-2.2	<ul style="list-style-type: none"> A custom software solution (implemented locally or in the cloud) 	See above plus SFIA-PROG=2 (Programming/software development) Introduction to this Skill: “The design, creation, testing and documenting of new and amended programs from supplied specifications in accordance with agreed standards.” “Level 2 Skill Description: Designs, codes, tests, corrects, and documents simple programs, and assists in the implementation of software which forms part of a properly engineered information or communications system.”
F3-2.3	<ul style="list-style-type: none"> A packaged software solution (implemented locally or in the cloud) 	See above
F3-3 I4, I2 F3-3.1 I4, I2	Demonstrate understanding of the role, management and uses of information, including: <ul style="list-style-type: none"> The role of information and data to support operations, decision making, planning and risk management 	BLOOM BTM =3
F3-3.2 I4	<ul style="list-style-type: none"> How to model, prepare, and structure data to support the creation and use of information and knowledge 	SFIA-DTAN=3 (Data analysis) Introduction to this Skill: “The investigation, evaluation, interpretation and classification of data, in order to define and clarify information structures which describe the relationships between real world entities. Such structures facilitate the development of software systems, links between systems or retrieval activities.” “Level 3_Skill Description: Applies data analysis, data modelling, and quality assurance techniques, based upon a detailed understanding of business processes, to establish, modify or maintain data structures and associated components (entity descriptions, relationship descriptions, attribute definitions). Advises database designers and other application development team members on the details of data structures and associated components.”

		<p>SFIA-DBDS=3 (Database/repository design)</p> <p>Introduction to this Skill: “The specification, design and maintenance of mechanisms for storage and access to both structured and unstructured information, in support of business information needs.”</p> <p>“Level 3 Skill Description: Develops specialist knowledge of database concepts, object and data modelling techniques and design principles. Translates object and data models into appropriate database schemas with design constraints. Interprets installation standards to meet project needs and produces database components as required. Evaluates potential solutions, demonstrating, installing and commissioning selected products.”</p>
<p>F3-3.3 14, 16</p>	<ul style="list-style-type: none"> Technologies for information management (e.g. reporting, analysis), knowledge management, collaboration management and content management. 	<p>BLOOM BTM =3</p>

C1-Technology in Business

Ref	Learning Outcome	Competency Standard
C1-1 I4,	Describe how to optimize the contributions of IT to competitive strategy, innovation, decision-making and operations in various sizes and types of organizations, industry sectors, processes and functions.	BLOOM BTM =3
C1-2 I4	Describe the impact of IT for individuals, groups, and communities, including culture, social and environmental issues	BLOOM BTM =3
C1-3 I4, I6	Describe the structure, business value, offerings, and dynamics of the Canadian and international IT industries. This includes the economics of ICTs and specific subsectors (e.g., ERP, open source, outsourcing, web, mobility).	BLOOM BTM =2
C1-4 I4	Be able to explain the economics and governance of IT and the IT function within organizations, including IT's role, structure, challenges and career paths.	BLOOM BTM =2
C1-5 I4, I6, I2	Demonstrate understanding of the risks and mitigation strategies to business operations inherent in the implementation of information and communications technologies (e.g. systems development, data security and privacy, business continuity, outsourcing, off-shoring and infrastructure).	<p>BLOOM BTM =3</p> <p>SFIA-CORE=3 (Compliance review)</p> <p>Introduction to this Skill: “The independent assessment of the conformity of an activity, process, deliverable, product or service to the criteria of specified standards, such as ISO 27001, local standards, best practice, or other documented requirements. May relate to, for example, asset management, network security tools, firewalls and internet security, real-time systems and application design.”</p> <p>“Level 3 Skill Description: Collects and collates evidence as part of a formally conducted and planned review of the activities, processes, products or services. Examines records as part of specified testing strategies for evidence of compliance with management directives, or the identification of abnormal occurrences.”</p>

Ref	Learning Outcome	Competency Standard
C1-6 15	Demonstrate understanding of and be able to evaluate the choices and activities in procurement and management of purchased IT products and services.	<p>BLOOM BTM =3</p> <p><i>SFIA-SURE=3 (Supplier relationship management)</i></p> <p>Introduction to this Skill: “On behalf of a client organization, the identification and management of external supplier to ensure successful delivery of products and services to achieve outcomes.”</p> <p>“Level 3 Skill Description Acts as the routine contact point between organization and supplier. Collects and reports on supplier performance data.</p>

C2-Processes, Projects and Change

Ref	Learning Outcome	Competency Standard
C2-1 I2	Be able to explain the overall organizational learning and innovation process / life-cycle, and its role in organizational success	BLOOM BTM =2
C2-2 I3	Business Process Analysis - demonstrate competence in process analysis using applicable knowledge areas from the International Institute of Business Analysis (IIBA) Business Analysis Body of Knowledge (BABOK) .	<p>SFIA-BUAN=3 (Business analysis)</p> <p>Introduction to this Skill: “The methodical investigation, analysis, review and documentation of all or part of a business in terms of business functions and processes, the information used and the data on which the information is based. The definition of requirements for improving any aspect of the processes and systems and the qualification of potential business benefits. The creation of viable specifications and acceptance criteria in preparation for the construction of information and communication systems.”</p> <p>“Level 3 Skill Description Investigates operational needs and problems, and opportunities, contributing to the recommendation of improvements in automated and non-automated components of new or changed processes and organization. Assists in defining acceptance tests for these recommendations.</p> <p>SFIA-BSMO=2 (Business modelling)</p> <p>Introduction to this Skill: “The production of abstract or distilled representations of real world/business situations to aid the communication and understanding of existing, conceptual or proposed scenarios. Predominantly focused around the representation of processes, data, organization and time. Models may be used to represent a subject at varying levels of detail/decomposition.”</p> <p>“Level 2 Skill Description: Understands the purpose and benefits of modelling. Uses established techniques as directed to model simple subject areas with clearly-defined boundaries. May assist in more complex modelling activities. Develops models with input from subject matter experts and communicates the results back to them for review and confirmation.”</p>

Ref	Learning Outcome	Competency Standard
C2-3 11	Project Management - demonstrate appropriate understanding of the Project Management Institute's Project Management Body of Knowledge (PMBOK)	<p>SFIA-PRMG=4 (Project management)</p> <p>“The management of projects, typically (but not exclusively) involving the development and implementation of business processes to meet identified business needs, acquiring and utilizing the necessary resources and skills, within agreed parameters of cost, timescales and quality.”</p> <p>“Level 4 Defines, documents and carries out small projects (typically less than six months, with a small team, limited budget, no interdependency with other projects, and no significant strategic impact, actively participating in all phases. Identifies, assesses and manages risks to the success of the project. Prepares realistic project and quality plans and tracks activities against the plans, providing regular and accurate reports to stakeholders as appropriate. Monitors costs, timescales and resources used, and takes action where these deviate from agreed tolerances. Ensures that own projects are formally closed and, where appropriate, subsequently reviewed, and that lessons learned are recorded.”</p> <p>SFIA-PROF=4 (Programme and Project Support Office)</p> <p>Introduction to this Skill: “The provision of support and guidance on programme and project management processes, procedures, tools and techniques to programme and project managers and their teams. The use of project management software. The development, production and maintenance of time, resource, cost and exception plans. The tracking and reporting of progress and performance of projects (including those performed by third parties). The maintenance of programme and/or project files and the repository of lessons learned on previous projects and programmes. The servicing of programme/ project control boards, project assurance teams and quality review meetings. The analysis of performance and the maintenance of metric data and estimating models. The administration of project change control, including use of configuration management systems.</p> <p>“Level 4 Skill Description: Takes responsibility for the provision of Project Office Services to a small project. Uses and recommends project control solutions for planning, scheduling and tracking projects. Sets up and provides detailed guidance on project management software, procedures, processes, tools and techniques. Supports programme or project control boards, project assurance teams and quality review meetings. Provides basic guidance on individual project proposals. May be involved in some aspects of supporting a programme by providing a cross programme view on risk, change, quality, finance or configuration management.”</p>

8.6 Workplace Experiences and Industry Involvement

The BTM places a premium on workplace experiences. Its learning outcome requirements are and will continue to be designed with significant employer input. Since employers prefer BTM graduates who have applicable experience, educators offering the BTM will need to work with employers in a variety of ways, for which they will require the time and organizational resources.

Specifically, an accredited BTM program will provide for the following:

- An Advisory Committee consisting of employer representatives from a variety of sectors
- Mechanisms to support students in finding relevant and appropriate business experiences
- Engagement with industry through networking events, “real life” case competitions, mentoring, employer lectures, and the like.

9.0 Resources

All the disciplines in an accredited program must have buildings, offices, laboratories, equipment, support staff, and fiscal resources that are appropriate for the characteristics of the program that is being undertaken. Evidence to this effect should be presented.

The availability of sufficient resources and support staff is of vital importance to the BTM aspect of the program. An appropriate variety of facilities must be readily accessible to all students and faculty, and access should be provided not only during scheduled laboratory class hours but also at other times.

The program must have competent administrative and technical support and services. Salary budgets must be consistent with the faculty size and student enrolment. Current expense budgets must allow reasonable amounts of travel and supplies. Computer budgets must allow students and faculty enough computer time that they use it as an effective learning aid.

There must be adequate access to electronic and other reference resources, such as digital libraries. The collections must be maintained and refreshed so as to remain current, and there must be a breadth of materials included. Electronic networking sufficient to provide students and faculty access to external resources is also important.

Suitable quality indicators for the self-assessment and accreditation report include the following, all assessed relative to the student population

- Budget for resources
- Computers and software in labs (if applicable)
- Numbers and levels of expertise of technical and support staff
- Satisfaction of students and faculty with the resources available
- Sufficiency of the resources to teach the courses discussed in the Curriculum section, and to meet the Learning Outcomes

To evaluate the quality of resources, the visiting team will inspect them while touring the facilities, and will interview students, staff and faculty. The team will also study budgets and policies in place for ensuring the resources are maintained and replaced as they become obsolete.

Appendix A: Details and background on Competency Standards

Defining competency standards vs. providing guidance

The definition of the BTM is forward looking, and these criteria are leveraging professional competency models as fully as possible to describe competency requirements.

However, some professional models are not yet mature enough to provide a competency standard whose achievement can be tested and measured.

The criteria are using less mature models to provide guidance – i.e. the model, in general terms, is directionally aligned with employer needs but lacks sufficient detail to be used to set a specific competency standard.

Later versions of the BTM learning outcomes and competency standards will use improved versions of the professional bodies' models as these become available.

Overview of professional body models

1. **SFIA**. Provides the largest number of “doing” competency standards, mostly in the Technology knowledge area.

A later version of the learning outcomes may use a Canadian equivalent² should one become available.

For specific learning outcomes, specific SFIA skills are referenced for guidance.

2. **PMI**. PMI competency models are not used to define specific competency standards for individual learning outcomes. This is because they are built from the perspective of a certified project manager (i.e. an individual holding the PMP designation) – above the expected maturity of competency of a BTM graduate.

The PMI does have a junior certification, the [Certified Associate in Project Management \(CAPM\)](#). The CAPM certification demonstrates an understanding of the fundamental knowledge, processes and terminology of project management (see PMBOK and PMBOK Guide) that are needed for effective project management performance. CAPM is a standard that BTM graduates can realistically attain.

² Three approaches to defining maturity of competency are currently taken by industry bodies:

- Skill by skill (e.g. the UK based – SFIA and MSC)
- Role by role (e.g. the Canadian based [Information and Communications Technology Council](#) - ICTC ICT [Competency Profiles Framework](#))
- Discipline by discipline (e.g. the UK based [e-skills](#) PROCOM. Built on IT professional National Occupational Standards, PROCOM defines knowledge, understanding and competencies for seven broad disciplines (and their sub-disciplines) at five levels of progression, incorporating technical, business and personal skills. [e-skills PROCOM Overview and Diagram](#))

The skill by skill approach has been found to be more flexible and maintainable by the professional bodies themselves, and most have plans to move in this direction, if they don't already take this approach. Further, from a BTM perspective, it is much easier to map skills, rather than the positions (aka rungs on the career ladders) to individual learning outcomes. For this reason skill by skill models from elsewhere are being used to define the competency standards at this time, even if a Canadian model exists covering the same professional domain.

We recommend that BTM students who have an interest in project management write the CAPM examination during their final year of study. This will illustrate their commitment to the project management to potential employers.

CAPM spans multiple learning outcomes in the Personal and Interpersonal, Process, Projects and Change and Integrative Knowledge areas. PMI-CAPM is indicated on the applicable learning outcomes.

The following PMI documents / sections of documents have been consulted for BTM learning outcomes and competency standards:

PMBOK and PMBOK Guide

- PMCDF (especially chapters 2 and 3 that define professional and personal competency requirements for project management)
- PMI PathPro Job Ladder Title Project Manager I (the most junior level)

These PMI documents span the same learning outcomes as CAPM. As guidance PMI-PMCDF, PMI-BABOK, and PMI-Project Manager I is indicated on the applicable learning outcomes.

3. **IIBA**. At this time the IIBA Career Ladder does not define specific competency standards.

However, the IIBA Business Analysis Body of Knowledge (BABOK) in general, the BABOK Chapter 8 - Underlying Competencies, and the definition of the Business Analysis role (the most junior) on the Business Analysis Career ladder have been consulted during the development of the learning outcome and competency standards.

We strongly recommended these be consulted for guidance on the meaning of, and competency requirements for the relevant learning outcomes.

As the IIBA Career Ladder and associated skills and competency models mature, subsequent versions of BTM learning outcomes will define competency standards based on these refined models.

4. **CMC**. At this time the CMC Competency Profile and CMC Competency Framework Summary is not used to define specific competency standards. This is because they are built from the perspective of a certified management consultant (CMC) – above the expected maturity of competency of a BTM graduate.

The CMC Common Body of Knowledge (CMCBOK) has been consulted during the development of the learning outcomes and competency standards, along with the CMC Competency Profile and CMC Competency Framework Summary.

We recommend these be consulted for guidance on the meaning of, and competency requirements for the relevant learning outcomes.

Should the CMC extend their models to include “junior” management consultants (or perhaps a management consultant equivalent to the PMI CAPM), applicable parts of this model will be used in subsequent versions of the learning outcomes to define competency standards.

5. **MSC**. Used to define “doing” competency standards in the Personal and Interpersonal and Integrative knowledge areas.

A later version of the learning outcomes may use a Canadian equivalent should one become available.

The National Occupational Standards (NOS) for Management and Leadership has been consulted during the development of the learning outcomes and competency standards. We recommended this be consulted for guidance on the meaning of, and competency requirements for the relevant learning outcomes.

Details of Professional Bodies' Models use to Define Competency Standards

The following describes, for those professional bodies whose models are used to define competency standards (not guidance), how each model is specifically used.

Skills Framework for the Information Age

The SFIA model defines 7 skill levels and provides detailed descriptions of the applicable skill levels for each of approximately 100 skills grouped into 6 categories. 20 of these skills, from all 6 of the categories, are used to define competency standards.

The skill level selected to define the competency standard varies by skill – but is always towards the junior end of the 7 levels (e.g. 2 – assist, 3 – apply, 4 – enable).

For a learning outcome with a SFIA related competency standard the SFIA 4 character skill code (e.g. DTAN for Data Analysis, PROG for Programming) is quoted along with the required skill level number.

For example SFIA-BSMO=3 should be taken to mean that competence in a learning outcome can be demonstrated by achieving level 3 (Apply) of the SFIA framework in Business Modelling (BSMO).

In future versions of the learning outcomes and competency standards it may be possible to provide for student specialization within the overall BTM framework³

Certified Management Consultants of Canada

The CMC Competency Profile and associated CMC Competency Framework Summary model defines 43 skills grouped into 6 aspects, at a single skill level (Certified Management Consultant). The CMC competency model provides guidance for one learning outcome.

³ In the UK ITMB Learning Outcomes and Competency Standards the following is used to create the requirement for student specialization. We welcome feedback from employers and educators on the need for and doability of a similar requirement in the BTM learning outcomes and competency requirements
Have acquired competence in two chosen fields, in any SFIA category, in the Business, Technology and Project themes, up to Level 4 (ENABLE) of the seven level SFIA framework.

The following SFIA fields are applicable:

- Strategy and Architecture – IRMG, SCTY, UNAN, ICPM, RSCH, COPL, METL
- Business Change – PRMG, BUAN, BPTS, BSMO
- Solution Development and Implementation – DTAN, REQM, DESN, DBDS, PROG, SFEN, INCA, TEST, HCECV, UNAN, USEV, SINT, PORT, HSIN
- Service Management – FMIT, CPMG, AVMT, SLMG, CFMG, CHMG, RELM, SYSP, SCAD, RFEN, ASUP, ITOP, NTOP, DBAD, NTAS, PBMG, USUP
- Procurement and Management Support – SURE, QUAS, QUST, CORE, TAUD, PROF, ASMG, TMCR, ETDL
- Client Interface – MKTG, SALE, SSUP

For this learning outcome the relevant CMC Competency Profile Aspect (i.e. E – Demonstrating Interpersonal Competencies) is quoted.

CMC-E should be taken to mean that guidance on the competence requirement may be found in Aspect 6, Demonstrating Interpersonal Competencies, of the CMC Competency Profile and associated CMC Competency Framework Summary.

Management Standards Centre

The MSC National Occupational Standards (NOS) model defines 6 broad skill sets (from junior to senior) and provides detailed descriptions of the applicable skill sets for each of approximately 74 skills (known as units). 5 of these skills are used to define competency standards.

The skill level selected to define the BTM competency standard varies – but is always towards the junior end of the 6 broad skills sets (e.g. 1 – Team Leader or 2 – First Line Manager).

For a learning outcome with a MSC NOS related competency standard the NOS 2 character skill code (e.g. A1 for Manage Your Own Resources) is quoted along with the required skill set (e.g. TL for Team leader, or FL for First Line Manager).

For example MSC-A1=TL should be taken to mean that competence in a learning outcome can be demonstrated by achieving Team Leader of the MSC NOS skill Manage Your Own Resources (A1).

Appendix B Professional Competency Models in the BTM

The BTM draws on competency standards from 5 recognized professional bodies.

1. [Skills Framework for Information Age Version 4](#) (SFIA) published by the SFIA Foundation (publicly available)
2. [Project Management Institute \(PMI\) Career Framework for Organizations \(Version at \[www.pmi.org\]\(http://www.pmi.org\) as of July 2009\)](#) which includes: the [Project Manager Competency Development Framework \(PMCDF\) Second Edition](#), and [PMI PathPro Job Ladders](#). The [Project Management Body of Knowledge 4th Edition](#) (PMBOK[®]) is referenced extensively in these documents. [A Guide to the Project Management Body of Knowledge 4th Edition \(PMBOK[®] Guide\)](#) is also a useful reference.
3. [International Institute of Business Analysis \(IIBA\). The Business Analysis Body of Knowledge version 2.0 \(BABOK[®]\)](#) is referenced in this document.
4. [Certified Management Consultants of Canada \(CMC-Canada\) CMC Competency Profile and CMC Competency Framework Summary. The CMC Common Body of Knowledge 2000 Edition \(CMCBOK[®]\)](#) is referenced in these documents.
5. [Management Standards Centre \(MSC\)⁴](#), (part of the [Chartered Management Institute](#)) [National Occupational Standards \(NOS\) for Management and Leadership 2008 Edition](#) (publicly available, printed copy available for purchase)

⁴ “The Standards Setting Body for Management and Leadership”

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