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Learning Management Systems: A Case Study of the Implementation of a Web-based Competency and Training Management Program at Bell Canada

Cécile Jobert-Egou

A Thesis

in

The Department

of

Education

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ABSTRACT

Learning Management Systems: A Case Study of the Implementation of a Web-based Competency and Training Management Program at Bell Canada

Cecile Jobert-Egou

Systemic models of essential roles, processes, products and factors involved in implementations of web-based competency and training management programs are important guidance tools to organizations integrating learning management systems (LMS) to support human performance improvement goals. In order to leverage the potential of LMS, strategies to use a LMS to align e-learning and classroom-based training with competency requirements need to be delineated.

This thesis applies the grounded theory (Strauss & Corbin, 1990) approach to develop a holistic understanding of the implementation of a web-based competency and training management program at Bell Canada, and generate a descriptive, systemic model of the steps performed.

The findings suggest that the process of implementing a web-based competency and training management program involves different phases, and success is highly dependent on the change management approach, the level of granularity of competency definitions, the types of competencies models used and the instructional design strategy employed for content development. A set of recommendations for the evolution of research on effective management of competency and training systems technology is made.

DEDICATION

This thesis is dedicated, with love, to the memory of my sister Rachel Egou. It is also dedicated to my beloved fiancé, Guy Perreault.

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CHAPTER 1

INTRODUCTION TO THE STUDY

Introduction

In recent years, increased attention has been given to corporate strategies aimed at aligning e-learning programs with organizations' core competencies requirements. The issue of delivering "the right training to the right person at the right time" is not new, however. Since the end of World War II and as training became widespread in the workplace, organizations have wrestled with the challenge to tie their training activities to skill shortages. Many have adopted competency-based approaches to manage their training requirements, yet with mixed results. While competency-based approaches provide a means for articulating standards of excellent performance against which precise training recommendations can be made (Lucia & Lepsinger, 2000; Riehl, 1998; Wagner, 2000; Wilson, Callaghan & Honore, 2000, "Profiling or Competency Systems" section, para. 1), their full benefit can only be accrued by keeping competency directories current. In today's rapidly changing business and technological environment, failure to constantly update an organization's directory of competency requirements can lead to workforce skills being obsolete and out of line with emerging market's demands (Schippmann, 1999).

With the recent growth of learning management systems (LMS) that automate the administration of training and competencies, namely for skills gap analyses, course registrations, pre- and post testing or score tracking, organizations are now provided with valuable tools that not only reduce traditionally manual updating efforts, but also allow for enhanced personalized training through e-learning courses (Hodgins, 2000). Indeed,

the powerful management features of web-based learning management systems (LMS), have given rise to new expectations for dynamic mappings between training offerings and employees' skills gaps, flexibility through "just-in-time" training and customization through "just-enough" training, (Learnframe, 2000; Murray, 2001; WR Hambrecht + Co., 2000). According to a survey of organizations implementing LMS, Hall (2001) concludes that the majority of participants have adopted competency management strategies as a fundamental element and key driver of their e-learning systems. Yet, as exemplified by the famous computer axiom "garbage in, garbage out", learning and competency management systems are only as reliable as the information they hold. Organizations still need to carefully model and reference the components of a LMS, notably essential competencies and learning resources, as well as plan the crucial strategies needed to successfully implement a LMS aimed at aligning training activities with competency gaps.

Problem Statement

The process of integrating a learning management system to support the alignment between e-learning and classroom-based solutions and competency gaps is not without challenges. Little in the way of systematic, empirical research has been conducted on the topic until now, partly because the field of LMS and e-learning is evolving rapidly and constant changes are difficult to capture by conventional research. However, a number of articles from the practitioner literature exploring the issue of LMS point to the fact that organizations lack formal frameworks to implement e-learning training programs tied to their core competency needs (Hall, 2001; KnowledgePlanet, 1999; PNC Bank, 1998). These authors have attempted to develop decision frameworks

for alignment strategies, but most of the models appear to emphasize some aspects of the process, for instance skill gap analysis or job profiling, while ignoring others.

A comprehensive model describing the complex phenomenon of using a LMS to align e-learning and classroom-based training with competency gaps is needed.

Research Objectives

The purpose of the research is to develop a holistic understanding of the complex process of utilizing a LMS to align e-learning and classroom-based training with competency gaps. An exploratory case study of one organization with demonstrated success in using competency and learning management technology to match e-learning and classroom-based activities with competency needs provided an opportunity to investigate and model strategies and important factors in such a process.

Summarized below are the general objective and specific objectives.

General objective:

Develop a holistic understanding of the complex process of utilizing a LMS to align e-learning and classroom-based training with competency gaps.

Specific objectives:

- Describe the strategies, resources, results, and important facilitating and impeding factors in the complex process of utilizing a learning management system to establish and revise associations between e-learning and classroom-based curricula, and competency gaps.
- Develop a descriptive, systemic model of the process of using a learning management system to tie e-learning and classroom-based offerings to competency needs.

Research Questions

Based on the above research objectives, the study sought answers to the following research question and sub questions:

What organizational strategies, resources, results, criteria and factors are necessary to successfully utilize a learning management system (LMS) to align e-learning and classroom-based training with competency gaps?

To elicit answers to the above main question, the following sub questions needed to be answered first:

- What organizational strategies, resources, results, criteria and factors are involved in the definition, referencing and management of a competency directory housed in a LMS?
- What organizational strategies, resources, results, criteria and factors are involved in the identification of gaps between the competencies required to achieve business goals and actual competencies held by employees?
- What organizational strategies, resources, results, criteria and factors are involved in the definition, referencing and management of a catalogue of e-learning and classroom-based training housed in a LMS?
- What organizational strategies, resources, results, criteria and factors are involved in the process of linking together a competency dictionary and an e-learning and classroom-based training catalogue housed in a LMS?

Significance of the Study

The study-generated descriptive, systemic model of the strategies, resources, results, criteria and factors involved in utilizing a LMS to tie e-learning and classroom-based training to competency requirements offers organizations a logical and systematic framework for decision-making and implementation of procedures aimed at leveraging LMS for optimal performance management. Being a graphical representation of relationships between inputs, activities and outputs, the model can also serve as a communication tool to facilitate discussion among implementers. Furthermore, the model is a useful evaluation tool for establishing appropriate assessment measures and success metrics. Finally, the findings from the exploratory analysis contribute to the development of theory on effective management of learning and competency systems technology and of behavioural constructs and hypotheses for subsequent empirical testing.

Assumptions

- E-learning is not considered as a substitute for traditional classroom training (Murray, 2001, p. 1); rather e-learning is widely implemented alongside instructor-led training, an approach commonly known as "blended learning".
- Organizations structures and needs are so widely varied that a "one solution fits all" answer for universal acceptance is not realistic (Murray, 2001, p. 1). However, there are general corporate issues of technology implementation and competency mapping that could be captured within a heuristic framework.
- Learning management systems allow organizations to define, customize and contribute to training applications according to a set structure, but also permit learners the

flexibility to configure, adapt and generate learning objects related to a specific learning goal (Bannan-Ritland, Dabbagh & Murphy, 2000).

Scope and Limitations

The vast literature on organizational strategies for technology implementation combined with competency modelling encompasses a wide range of traditional and new bodies of knowledge such as change/process management, information technology (IT) design and programming, human resources management, strategic selection planning, skill gap analysis, organizational development (OD), and organizational performance among others. It was not within the scope of this study to examine in depth integrating and facilitating mechanisms for employee adoption of technology innovations within corporate environments, nor did it investigate what sets of competencies are best indicative of particular jobs (i.e., what competencies best fit what jobs) or propose a model of system infrastructure for learning management systems.

Secondly, the study did attempt to test a preliminary model. Instead, it focused on the task of building a descriptive, systemic model of organizational strategies for aligning e-learning and classroom-based training with competency gaps within a web-based competency and learning management system.

Definitions of Terms Used

E-learning is "...the delivery of content via all electronic media, including the Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM" excluding text-based learning and courses (WR Hambrecht + Co., 2000, p. 8).

A competency model represents "Those competencies that are required for satisfactory or exemplary job performance within the context of a person's job roles, responsibilities and relationships in an organization and its internal and external environments" (Dubois, 1993, p. 9).

Competency management "... is used to identify skills, knowledge and performance within an organization. Such a system lets an organization spot gaps and introduce appropriate training, compensation and recruiting programs based on current or future needs" (Hall, 2000, p. 532).

Core competencies represent an area of specialized expertise that is the result of harmonizing complex streams of technology and work activity. According to Prahalad and Hamel (1990), core competencies have three characteristics: (a) "a core competence provides potential access to a wide variety of markets", [(b)] a core competence should make a significant contribution to the perceived customer benefits of the end product, [and (c)] a core competence should be difficult to imitate" (p. 83-84).

A learning content management system is a "...system that is used to create, store, assemble, and deliver personalized e-learning content in the form of learning objects, also known as knowledge objects" (Brennan, Funke & Anderson, 2001, p.4).

Skills gap analysis "compares a person's skills to the skills required for the job to which they have been, or will be, assigned. A simple skill gap analysis consists of a list of skills required along with a rating of the employee's level for each skill. Ratings below a predetermined level identify a skill gap" (Kaplan-Leiserson, n.d., "E" section).

Skill acquisition tied to learning is the "tight integration between skills management and learning management. Allow users to see the skills needed and very simply find the appropriate learning to facilitate skill acquisition" (Balog, 2001).

Best practices "...describe the optimum ways to perform a business process. They are the means by which leading organizations have achieved top performance. They also serve as goals for other organizations striving for excellence" (Arthur Andersen Inc., n.d., as cited in Guisinger (2000), "Annex 2: Arthur Andersen Best Practices" section, para. 1).

Change management "...is the process of aligning an organization's people and culture with changes in business strategy, structure and systems" (Davis, 1998).

Structure of the Report

This thesis is divided into five chapters including this present chapter where the rationale, objectives, research questions and approach for the study were presented. In chapter 2, background literature on the notions of competency modelling, e-learning and learning management systems is presented together with examples of case studies on web-based competency management program implementations. Chapter 2 also presents the preliminary model derived from the arguments presented in the review of the above-mentioned case studies. Chapter 3 discusses the research approach, namely the grounded theory, data collection and data analysis techniques used in this study, and the rationale underlying this choice of research methodology. Chapter 4 is devoted to the presentation of the results of the study according to the five phases identified through data analysis. For each phase, the findings are reported in the following structure: flowchart of the activities of the phase, goals, inputs, roles, activities, outputs, success criteria and factors

involved in the phase. In chapter 5, findings are summarized, and a number of implications of the research for organizations using a web-based LMS for competency management are discussed.

CHAPTER 2

COMPETENCY MODELLING AND E-LEARNING TRAINING WITH LEARNING MANAGEMENT SYSTEMS IN THE LITERATURE

Introduction

This chapter examines previous research and background information on the process of utilizing a LMS to align e-learning and classroom-based training with competency gaps to provide a theoretical basis for the research and evidence for the preliminary model that guided data collection in this study. The first section addresses the broad arena of competency modelling, the second section considers the influence of e-learning in organizational settings, the third section provides a detailed review on learning content management systems and the last section identifies selected empirical examples of approaches to web-based competency and training management.

Competency Models

Research in the field of competency modelling began with the work of David McClelland in the late 1960s to solve a problem of bias and low correlation of personality to job performance in traditional academic aptitude, knowledge and personality tests (see McClelland's (1973) paper on "Testing for competence rather than intelligence" for more details on this question). The focal point of McClelland's approach was to determine a competence based on two crucial principles for research: (a) Use of criterion samples to compare superior performers with average performers in order to ascertain "successful performance", and (b) identification of the causal relationship between the characteristics and behaviours of the top performer and his successful performance.

Definition of Competency

Building on the work of McClelland, Boyatzis (1982) proposed that a "competency is an underlying characteristic of a person in that it may be a motive, trait, aspect of one's self-image or social role, or a body of knowledge which he or she uses" (p. 21). For Boyatzis, a competency is defined in terms of characteristics like generic knowledge, skills, intention, self-esteem, etc. and describes a person's behaviour and intentions on the job rather than the characteristics of a job *per se* (Iversen, 2000). Based on that definition, Boyatzis (1982) differentiates between:

- "Threshold competencies" which are essential to perform a job with competence.
- "Superior competencies" only required for advanced job performance.

Boyatzis' definition has been met with some criticism by Woodruffe (1991) who concluded that it was overly broad and may have "helped create the situation today where almost 'anything goes'" (as cited in Kierstead, 1998, "Why the confusion about competencies?" section, para. 2).

Some 10 years later, Spencer and Spencer analyzed both the works of McClelland and Boyatzis and with a similar viewpoint, offered the following definition of competency: "A competency is an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation" (Spencer & Spencer, 1993). Echoing Boyatzis' competencies categories, they distinguished between two classes of competencies:

- "Threshold competencies" common to both average and star performers.
- "Differentiating competencies" demonstrated by star performers only.

This definition builds on Boyatzis' definition of competency, but reduces the confusion around the nature of a competency by emphasizing the need to validate competencies through the identification of causal relationships between behaviour patterns and work outcomes. Also, inherent in this definition is the basic assumption that personal characteristics and aptitudes are preponderant factors of skill and knowledge demonstration because they assume that behaviour is always motivated by an intention (Spencer & Spencer, 1993).

Parry (1998) cautions against confusing competencies with personality traits, values or with simple skills. He contends that personality traits cannot be the basis for competency identification because being "formed in early life...they resist change – that is training is unlikely to alter them much" (p. 59). Derived from the comments of hundreds of experts in human resources development, he suggests that a competency is "a cluster of related knowledge, skills, and attitudes that affects a major part of one's job (a role or responsibility), that correlates with performance on the job, that can be measured against well-accepted standards, and that can be improved via training and development" (p. 58).

Beyond the divergence over whether both innate and acquired characteristics should be considered to delineate a competency, a second confusion has been found to be at the source of redundancy in competency profiles devised both by individuals who view a competency as primarily a facet of the job or task and individuals who see it as primarily an attribute of the person. Mentioning the Public Service's competency profile "La Relève", Kierstead (1998) notes that "Visioning" is a job-related competency since it is associated with the subtask "explains how the vision incorporates the public service culture and values". Yet, La Relève also includes other person-related competencies such

as self-confidence, creativity and cognitive quality which, in the author's view, are redundant with Visioning.

This proposition is not supported by Parry (1998) who claims that there is evidence that valid competency models feature the same competencies repeatedly, especially in the case of core competencies.

An interesting work by McLagan (1997) portrays these two different interpretations of competencies in five categories depending on which aspect of the work environment is the focus of the definition:

The *task perspective* focuses on the characteristics of the task, results and outputs involved in the work:

- Task-based competencies consist of job descriptions detailed to the smallest observable, measurable activities.
- Result-based competencies are not very common. A result describes the goal of an action and is often used with the term ability (e.g., ability to produce profits).
- Output-based competencies describe an ability to produce an end-product (e.g., ability to deliver a training program). Figure 1 below illustrates the task perspective.

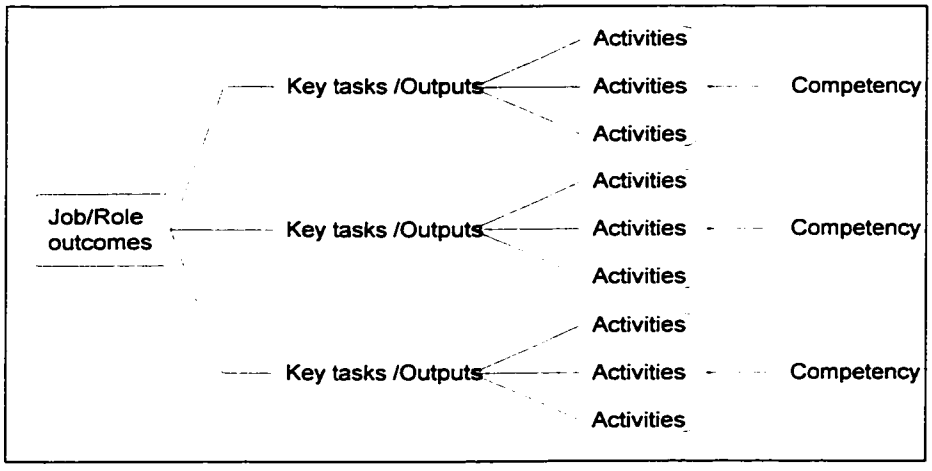


Figure 1 Competencies derived from tasks

The *people perspective* targets the knowledge, skills and attitudes required to perform the work:

- Knowledge, skills and attitudes-based competencies (KSAs) describe the human capabilities underlying performance. Knowledge is the result of transformation of information into a personal, meaningful abstraction (Setzer, 2001, para. 4) and is required to perform a task effectively. Skill refers to the capacity to execute a task with a given goal in a real setting. Attitudes correspond to personal values and motivations to accomplish a task.

- Knowledge, skills and attitudes differentiators-based competencies identify the human capabilities underlying superior performance. This approach is often used for selection and succession purposes. Figure 2 below represents the people perspective.

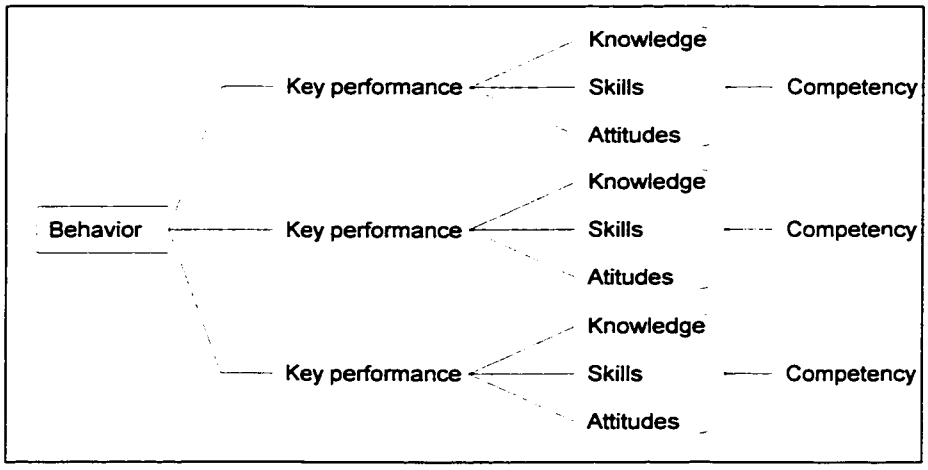


Figure 2 Competencies derived from behaviours

The *hybrid perspective* encompasses two types of definitions, either knowledge, skills and attitudes or, tasks, results and outputs together. This type of category is useful for job behaviours not easily labelled as solely knowledge, skills, attitudes, tasks, results

or outputs. For instance, problem solving is a higher cognitive process that involves both knowledge and skills.

While mentioning that the most common type of competencies in use are the task-based competency and the superior-performer differentiator competency, McLagan (1997) differs with Kierstead and argues that the most valuable competency model should include both the task and the people perspective, especially the outputs and the KSAs. McLagan notes that outputs are more durable than job or task-focused competencies because the latter are either reviewed for improvement – especially within a total quality environment – or called to disappear whereas the former are bound to customers' demands for deliverables, only likely to change in quality and features. KSAs, being the foundational basis of behaviours leading to outputs production, are also essential.

It is reasonable to say that both perspectives on the nature of competency are valuable and indeed may complement one another since one might argue that person-based competencies underlie or support task-based competencies. The ultimate focal point though, might be that before devising a competency model, practitioners need to agree on a definition of competency and use a consistent language.

Definition of Competency Models

Prior to defining a competency model, we need to describe the nature of a model. Baker and Baker (1992) suggest that a model is "a way of looking at reality, usually for the purpose of abstracting and simplifying it to make it understandable in a particular context" (p. 273).

Different types of models can be created depending on the degree of abstraction. Stark and Nicholls (1972) list three common types of models, from the least to the most abstract:

1. *Iconic models*: physical replications of reality, either scaled down or up, for example, small cars, planes or cities.

2. *Analog models*: description of reality, usually in two dimensions, using one set of properties for another; for instance, the analogy of a fluid flowing in a pipe to model the phenomenon of electricity, but also organizational charts, blueprints and maps.

3. *Mathematical models*: abstract description of reality based on numbers and mathematical relations and using variable relationships to simulate the real physical system. The payback period and the rate of return are mathematical models used to support decision-making in cost benefit analyses and project selection. Examples of mathematical models are stochastic or probabilistic, deterministic, discrete, continuous, object-oriented and heuristic models.

Competency models belong to the second category (i.e., analog models) because they translate and organize behaviours, knowledge and attitudes into a comprehensible scheme portraying the relationships among the elements.

Dubois (1993) defines a competency model as a framework to capture

> those competencies that are required for satisfactory or exemplary job performance within the context of a person's job roles, responsibilities, and relationships in an organization and its internal and external environments (....) [and is] generally very detailed and might include, for example, a description of the job setting, the job tasks and activities, the job outputs, the employee competencies that are required for the job tasks, and the quality standards for outputs (. . .) the contents of the competency model (models) are then converted, in a highly systematic manner, to a curriculum plan. (p. 9)

Some authors provide definitions that encompass both the nature and the function of competency models. For instance, according to Lucia and Lepsinger (1999) "a competency model describes the particular combination of knowledge, skills, and characteristics needed to effectively perform a role in an organization and is used as a human resource tool for selection, training and development, appraisal, and succession planning" (p.5). It is worth noting that these five purposes are widely recognized as principal uses and benefits of competency modelling.

Types of Competency Models

Competency models can be categorized according to the object of their primary focus. An examination of the vast competency literature by Luce and Lynch (1998) at the Public Service Commission of Canada (PSC), led to a classification of competency models identifying five broad categories.

"Highest level" Models

These models focus on the larger governance system and competencies for government institutions. Based on the works of Dror (1997) and Raven (1992), Luce and Lynch (1998) note that at the center of these models is the issue that a successful governance system is based on not only the individual competencies of public servants, but also on the interface of public servants' competencies with those of politicians and citizens.

"Organizational level" Models

These models focus on the competencies of organizations and the assumption that workers' individual competencies cannot be achieved without an alignment with organizational structure, goals and strategies. Such concepts are derived from Jaques'

(1976) normative model of effective hierarchical organizations and Senge's (1994) notion of the "learning organization" (Luce & Lynch, 1998).

"Human resources level" Models

These models focus on the HR department and the belief that successful organizational performance is directly linked to HR management based on competency improvement through training and development strategies. Citing Dubois' (1993) approach to competency modelling and Miles and Snow's (1984) contingency model, Luce and Lynch (1998) remark that competency-based HR systems should be justified by organizational needs.

"Team level" Models

These models focus on teams of workers and originate from Campion's (1995) notion of complementary competencies (Luce & Lynch, 1998). Inherent in these models is the premise that groups of individuals with complementary competencies are more effective than teams composed of members with equivalent competencies, more so for complex tasks than routine work.

"Individual level" Models

These models focus on the employee and his specific job or role. One type of individual model, the "person-job match" model assumes that employees have specific jobs that can be standardized while another type, the "strategy-based" model supposes that employees hold roles defining flexible tasks (Luce & Lynch, 1998).

This person-job match sub model is the most widely used in organizational settings because it encompasses two approaches to competency definition: the task (job) and the people (employees) perspectives respectively. As discussed earlier, task-based

competencies and superior-performer differentiator competencies are the most common types of competencies in use (McLagan, 1997). As a result, the following section concentrates on person-job match competency models, particularly those that integrate a perspective on outputs and KSAs, seen by McLagan as the most valuable competency models ("Definition of competency" section, para. 9).

Types of "person-job match" Competency Models

Person-job match competency models emanate essentially from two major orientations to competency modelling: the standards approach and the behavioural approach.

The standards approach. Originated in England with the work of the Council for Management Education and Development, the standards approach is primarily concerned with the job output, or outcome of the work process, rather than the employee's behaviour on the job. The goal is to ensure that the individual's performance meet minimum quality standards. Through a process called functional analysis, key functions and tasks in a job are first identified, then acceptable levels of performance are described and, finally, competencies necessary to meet the minimum levels are defined (Iversen, 2000).

This approach, mainly used in the UK, led to the introduction in 1986 of the National Vocational Qualification (NVQ) system, a framework of "national occupational standards which reflect the best working practices in a particular industry or occupational sector" (NTO National Council, 2000, p.2). An NVQ addresses a particular area of work at a given level and is composed of units which define the standards that must be attained. A unit of competence is made up of elements of competence. NVQs are further

hierarchized into five levels indicating the degree of mastery of skills and knowledge required to perform a job effectively (see Figure 3 below).

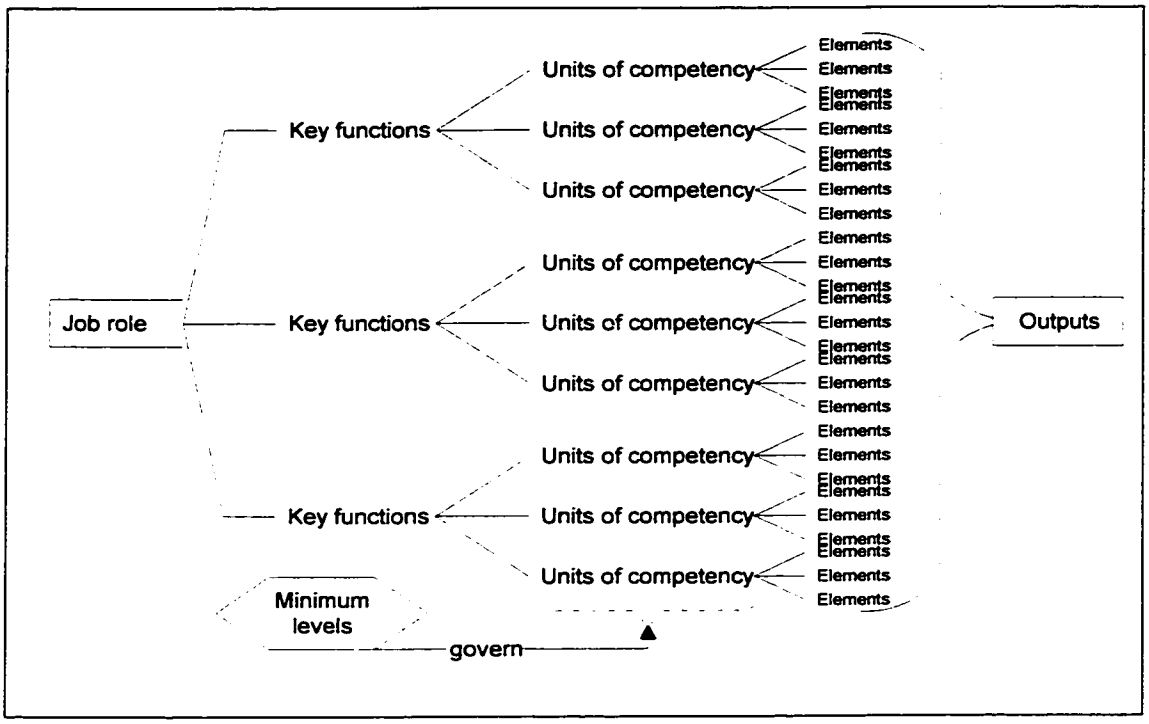


Figure 3 The Standards model

Australia uses a similar modular or unit-based approach to competency modelling. Born in the late 1900s, the Australian Vocational Education and Training (VET) system is a framework of nationally endorsed standards that "define the competencies required for effective performance in the workplace" (Australian National Training Authority (ANTA), 2001, p. 3). A Vocational Education and Training (VET) is comprised of standards, themselves composed of units of competency, the "smallest competency achievement that can be nationally recognized and recorded" (ANTA, 2001, p. 2). A unit of competency has seven mandatory components: (a) unit code, (b) unit title, (c) unit descriptor, (d) elements of competency, (e) performance criteria, (f) range

statement, and (g) evidence guide. VETs are also classified according to a tiered system of six levels ranking from simple to complex mastery of competence.

The standards model has undoubtedly contributed to the field of competency research, particularly by emphasizing the need to use work outputs as criteria for competencies. However, the model has also met with extensive criticism, especially the NVQs, by numerous researchers who argue that outcome competencies ignore underpinning knowledge and process skills. In response to similar criticisms, Australia is transforming the VET model to ensure it focuses " 'on the needs of the student, trainee or client' rather than on a "predetermined occupational role or classification level for teachers and trainers' " (as cited in Nelson, 1998, "Competency Models" section, para. 6). A second criticism points to the fact that the national standards are threshold competencies, not superior competencies and therefore accredit individuals for actual rather than optimal competence (Iversen, 2000).

The behavioural approach. By contrast with the standards approach, the focal point of the behavioural approach is the behaviour of an individual on the job and the goal is to identify criteria of excellence in outstanding performance, not solely minimum standards of quality (see Figure 4 on p. 22). From this vantage point, the process of deriving competencies involves identifying the specific behaviour related to superior performance and average performance before articulating relevant competencies (Iversen, 2000). According to Iversen, this approach parallels that of McClelland (1973), Boyatzis (1982) and, Spencer and Spencer (1993) whose collective work may be said to have pioneered the behavioural approach.

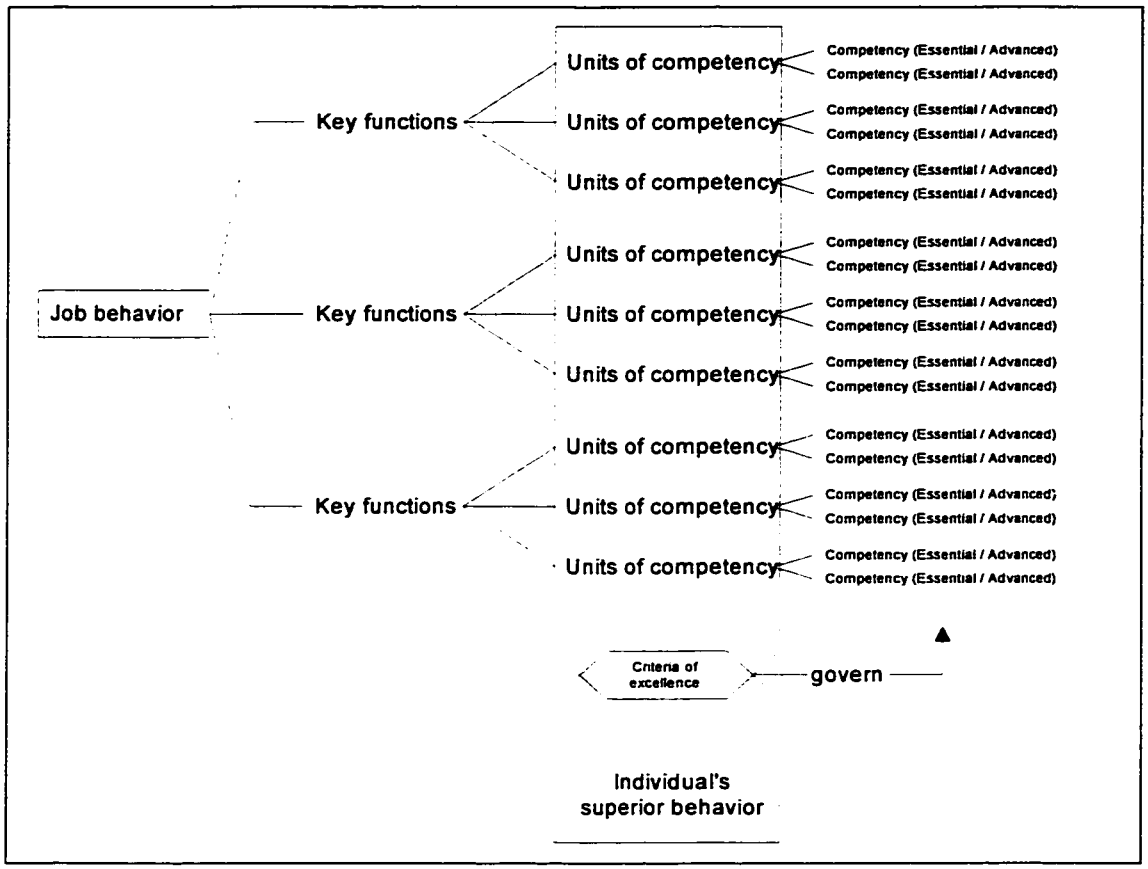


Figure 4 The Behavioural model

The International Board of Standards for Training, Performance and Instruction's (ibstpi) standpoint on competency modelling embodies the principles of the behavioural approach. Its competency models for instructional designers, instructors and training managers are based on a job role definition approach where specific job behaviours provide the major input into the identification of the knowledge, skills and attitudes required to perform a job role. Typically, the job role is described in terms of job behaviours, accepted standards, values and ethics and a vision of the future behaviours. The ibstpi's framework for competencies is composed of three elements: domains of performance representing large areas of activity within the field of instructional design, for instance the analysis or the development phases of the ADDIE model (Rothwell &

Kazanas, 1992), competency statements reflecting general descriptions of complex effort (e.g., "Apply current research and theory to the practice of instructional design" (Richey et al., 2001) and performance statements, both further specified as essential or advanced, which provide additional explanative details to the competency statement.

The Ontario Society for Training and Development's (OSTD) competency model for trainers is another application of the principles of the behavioural approach. Called the Training Competency Architecture (TCA), the model is articulated around detailed descriptions of performance demonstrated by competent trainers. Training competencies are determined by key observable behaviours and by descriptions of outputs and quality criteria that provide tangible evidence of competent performance.

Five categories of competencies form the basis of the TCA:

1. Analyzing Performance/Training Needs.
2. Designing Training.
3. Instructing/Facilitating Training.
4. Evaluating Training.
5. Coaching the Application of Training.

For each category, core competencies are listed, and within each core competency, contributing competencies are further delineated. Moreover, the knowledge and skills required to perform each contributing competencies are also defined.

The behavioural approach has led to numerous models of competence by researchers (e.g., Boyatzis, 1982; Schroder, 1989; Spencer & Spencer, 1993) who used different methods for measuring competence and performance, yet with similar findings regarding the competencies they identified. It may be said that the behavioural approach

is well grounded in research because the different methods served as validation triangulation for the models. Nonetheless, the behavioural approach has been found to be too general and to ignore the contextual influence of the job demands which are generally believed to impact the kind of competence necessary for effective performance (Iversen, 2000). Furthermore, the ibstpi's "Instructor Competencies (The Competencies)" were criticized for the lack of validity in the underlying methodology used to derive the competencies. Pointing to flawed sampling and data collection techniques, Butler (2001) warns that the model has no content validity and could not be used for certification purposes.

In conclusion, evidence exists to support the claim of differences between the standards and the behavioural approaches:

> In the United Kingdom, for instance, competencies are viewed as outputs: employees display competencies in the degree to which their work meets or exceeds prescribed work standards. In the United States, competencies are seen mainly as inputs: they consist of clusters of knowledge, skills, and attitudes that affect an individual's ability to perform. (Parry, 1996, p. 48)

Given that competency models are based on the chosen definition for competency, the differences between the two approaches compare with those found between the two perspectives of competency definition discussed earlier. However, paralleling McLagan's conclusion on the two perspectives on competency definition, they may be regarded as complementary and mitigating each other's weaknesses given that the standards and the behavioural approaches to competency modelling focus on different aspects of the work environment, the job requirements, and the superior behaviour (i.e., skills and knowledge) underpinning these job demands respectively. Table 1 on p. 25 below is a visual summary of the main aspects of each modelling approach.

Table 1
Summary chart of approaches to competency modelling

	Standards	Behavioural
Goal	Describe minimum standards for performance	Describe average and excellent standards for performance
Focus	Job output or outcome of the work process	Individual's behaviour on the job
Data collection methods	Functional analysis of the job and its comprising key functions	Analysis of specific behaviour underlying superior and average performance

E-learning

Competency models offer the potential to articulate training interventions. The standards of performance become the foundation for determining those training resources, for instance classroom-based courses, web-based courses, videos, CD-ROM training or books, that will help the employee acquire targeted knowledge and skills (Lucia & Lepsinger, 1999; Wagner, 2000). Electronic learning, also called e-learning, is a novel concept encompassing a number of the training resources above mentioned and purported to allow precise training recommendations when used in combination with competency models. In the following section, the current state of the field of e-learning, including benefits and challenges are examined.

Definition of E-learning

ASTD's Learning Circuit columnist Eva Kaplan-Leiserson (n.d.) proposes that e-learning is "a wide set of applications and processes such as Web-based learning, computer-based learning (CBL), virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet (LAN/WAN), audio and videotape, satellite broadcast, interactive TV, and CD-ROM" ("E" section, para. 2). Similarly, the

recent classification of learning technologies developed by ASTD's Piskurish and Sanders (1998) distinguishes two main attributes of e-learning, namely the method of presentation of the message (e.g., an email note, CBL, teleconferencing) and the method of distribution or delivery supporting the transmission of the message (e.g., Internet, CD-ROM, satellite broadcast).

WR Hambrecht + Co. (2000) offer another definition of e-learning by differentiating between distance learning, e-learning, online learning and computer-based learning. In their opinion, e-learning is "the delivery of content via all electronic media, including the Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM" excluding text-based learning and courses (p. 8). The latter are thought to pertain to distance learning of which e-learning is a subset (see Figure 5 below).

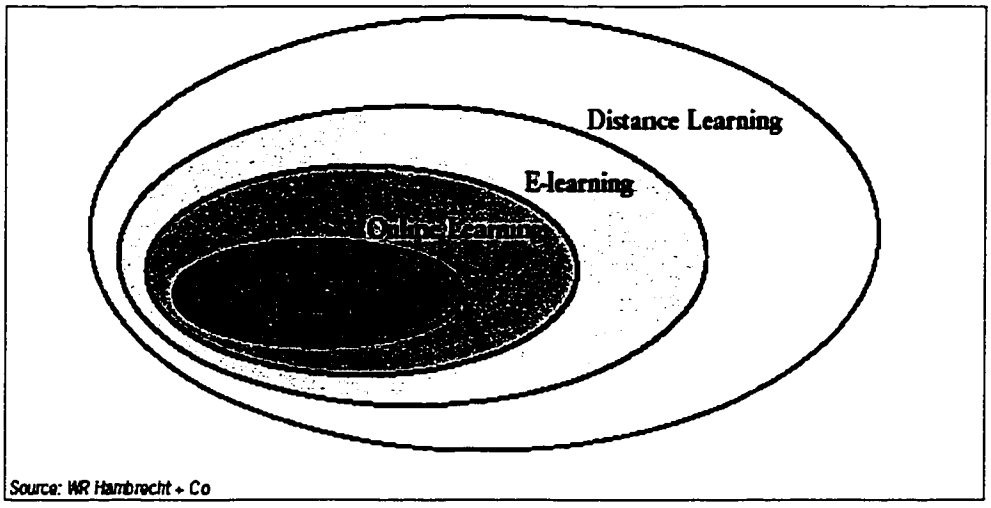


Figure 5 Representation of the subsets of distance learning
Note. From *Corporate e-learning: Exploring a new frontier* by T. A. Urdan and C. C. Weggen, 2000, WR Hambrecht + Co., p. 9. Copyright 2000 by WR Hambrecht + Co.

Online learning is considered a subset of e-learning because it refers strictly to learning via Internet, intranet, and extranet. Computer-based learning is yet another

subset of online learning because it describes learning delivered to computers not connected to a network, primarily via CD-ROM and floppy disk. This definition adds another level of detail to the ASTD category of distribution methods and helps to refine the differences and commonalities among very similar terms like e-learning, online learning and distance learning. However, the definition appears flawed because "computer-based learning" defined as "computers not connected" cannot logically be included in the category of "online learning" since it strictly refers to "connected computers". Consequently, one might propose that "computer-based learning" and "online learning" are mutually exclusive categories, both subsets of e-learning as illustrated in Figure 6 below.

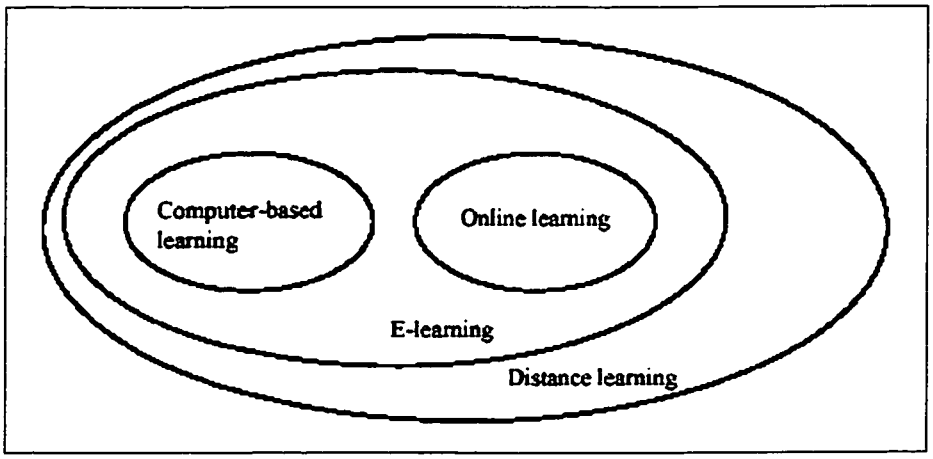


Figure 6 Revised representation of the subsets of distance learning

This confusion is avoided in WR Hambrecht + Co's (2000) second classification which suggests that e-learning can be further defined along a temporal axe. Accordingly, e-learning entails two categories of delivery methods: synchronous delivery where learning events and interactions occur in real time, and asynchronous delivery where learning events and interactions take place over elapsed time. A similar typology of e-learning characteristics, presented in the latest Conference Board's report, "E-learning for

the workplace", differentiates between one-way and two-way forms of content delivery. Through this lens, e-learning "uses information and communication technologies (ICTs) to deliver content (learning, knowledge and skills) on a one-way or two-way basis" (Murray, 2001, p. 3). One-way (i.e., asynchronous) technologies include: broadcast television, audiovisual aids, film, video, digital video disk (DVD), computers, CD-ROMs, e-mail, Internet/intranet/extranet networks and wireless technologies. Two-way (i.e., synchronous) technologies are comprised of ICQ/IRC interactive conferencing and chat rooms, teleconferencing, Internet/intranet networks, web conferencing and wireless technologies. Definitions of e-learning based on the synchronous and asynchronous classification are helpful because they emphasize the concept of interactivity afforded by e-learning.

Key Drivers of E-learning

Economic Drivers

Profitability. Spurred on by goals of cost-effectiveness and competitiveness, today's organizations look at e-learning as a means of reducing costs associated with traditional training especially travel and lodging expenses. Based on results from a survey on e-learning, WR Hambrecht + Co. (2000) suggest that two thirds of training budgets are allocated to travelling costs alone. Both the lack of productivity caused by employees being away from their workplace and travelling costs represent areas for improvement of the efficiency of training.

Globalization. The widening of the free trade market movement is stimulating the international expansion of organizations leading to larger, more complex corporations employing vastly distributed workforces across the globe. Attempting to deliver training

to their geographically remote and culturally diverse workforce, organizations are using e-learning to deploy time and cost efficient as well as adaptive training solutions. A survey conducted under the aegis of Corporate University Xchange in 1999, estimates that the proportion of instructor-led training will decline from 80% to 60% by 2003, while e-learning will double from 20% to 40% in the same timeframe (as cited in WR Hambrecht + Co., p. 14, 2000).

Technological Drivers

Ubiquity of ICTs. The burgeoning growth of e-learning is not only related to economic factors but to access too. According to the Conference Board, Canada is ranked second in the world behind the U.S. for its "connectedness" (Murray, 2001, p. 12), that is the number of homes and enterprises connected to the Internet. By 2003, International Data Corporation (IDC) predicts that the number of Internet users worldwide will expand to approximately 502 millions, up from 87 millions in 1997, representing a compound annual growth rate (CAGR) of 34% (as cited in WR Hambrecht + Co., 2000, p. 5). The increasing availability of ICTs in the workplace and at home together with better technology infrastructure, especially for bandwidth, fuels the adoption of e-learning as a vector for training and education.

IT skills and knowledge shortage. As organizations shift to more sophisticated technology like enterprise resource planning (ERP) systems for business processes ranging from administration, financing, manufacturing, R&D to marketing, products and services are churned out at an accelerated pace, and the skills and knowledge required to generate them need to be constantly updated. An estimated 30% of Canadian employers say their employees do not have currently needed skills of which many are associated

with ICTs (Murray, 2001). Higher penetration of ICTs in the workplace exposes a chasm between high demands in computer literacy, also known as e-literacy, and huge knowledge gaps in the workforce, a situation that organizations are attempting to address with increased training and the creation of corporate universities. Statistics Canada's 1999 workplace and employee survey reveals that acquisition of computer technology is related to higher levels of computer-related training. The results indicate that 51% of workplaces that implemented computer technology also provided formal or informal computer-related training (Statistics Canada, 2001). As a result of the growing adoption of technology and the collateral emphasis on training, corporate executives are investing more and more in e-learning as a fast training strategy.

Social Drivers

Human capital development. A paradigm shift is at work as we move into the information age. In the industrial era, organizations' primary form of capital were physical and financial assets, but today's corporate values are increasingly defined through human, intellectual capital (Marsick & Watkins, 1999; Edvinnson & Malone, 1997). More organizations are now aspiring to become "learning organizations" (Senge, 1994) where employees are given more power to make decisions and kept on the cutting edge of education and training in order to better contribute to organizational goals. Empowerment and up-to-date knowledge are becoming key factors in the quest for sustained growth of performance because individuals' commitment and creativity increases when they (i.e., workers or employees) are closely involved in the decision making process and knowledgeable enough to make substantive assessments (Daft, 2000). As a result of this trend, organizations are implementing various training programs

(e-learning and classroom-based) not only to prompt migrations towards an institutionalized participative culture, but also to support continuous development of learning.

Lifelong learning. In parallel with the change of organizational paradigm, demographic evolutions steer the need for new approaches to learning. The US Department of Education's statistics on attendance to higher education institutions suggest that students aged 18 to 20 account for less than 20% compared with students 25 years old and more who have become the fastest growing group (U.S. Department of Education, 1999). These older, working, part-time students, who are seeking education primarily to further their career and augment their salaries, have to juggle with time and location constraints and demand flexible access to learning. This situation is echoed in many countries, including Canada, the United Kingdom and economic bodies such as the European Union who have recognized along with the Organization for Economic Co-operation and Development (OECD), "the urgent need to implement effective strategies for lifelong learning for all, to strengthen the capacity of individuals to adapt and acquire new skills and competences [sic]" (OECD, 1998, p. 9). E-learning with its potential for course delivery at home and in the workplace is poised to accommodate a growing number of lifelong learners and thereby help shape a better-skilled workforce.

Challenges to E-learning

Cost

While delivery costs of e-learning are significantly reduced compared to costs associated with classroom learning (i.e., c-learning) delivery, especially when large numbers of learners are involved (Rumble, 2001), initial development and purchase of e-

learning products represents a major barrier to the adoption of e-learning training within organizations. This claim is substantiated by evidence from a survey conducted for the Office of Learning Technologies (OLT) in Canada, which found that cost was the single most important factor preventing employers from investing in e-learning (Dugas, Green & Leckie, 1999, p. 45). Arizona Learning Systems (1998) cite results from a study that indicate that development costs can range between US $6,000 and US $1 million for a three unit internet course, depending on the nature of the materials used. For instance, with animations and interactive programs, the cost can surge up to US $120,000 for a web-based course involving audio and video, US $250,000 for one with simulations and US $1 million for a course with virtual reality. In any case, businesses must weigh the initial costs of developing e-learning against savings accrued from economies of scale at delivery time.

Lack of Time

Lack of time as an obstructing factor comes second, after the cost barrier. Long development cycles prohibit many enterprises from engaging in production of custom e-learning training. Lengthy time-to-market is especially true for small companies who have limited capacities to produce complex, media-rich, highly interactive and customized solutions. As a result, an increasing number of companies are starting to outsource their e-learning activities to an application service provider (ASP) (WR Hambrecht + Co., 2000, p.11). The trend toward the ASP model is still very slow mainly because organizations have proprietary content, highly confidential in nature, which they want to protect.

Content Incompatibility and Penury

Locating appropriate off-the-shelf e-learning material or converting custom c-learning (i.e., classroom-based) material for use on an e-learning platform proves a major challenge for corporations. The difficulty resides primarily in the lack of interoperability between content materials purchased outside the company on the one hand, and both proprietary content and in-house applications. Additionally, content interoperability is also an issue when converting custom, in-house training products into online products due to technical incompatibilities (see section "Learning Content Management Systems" p. 36 for further details). In consequence, the shortage of high-quality content, especially for the soft skills area, is hindering the adoption of e-learning by corporations who still rely on c-learning as a short-term solution.

Human Resistance

Enthusiasm for e-learning technologies is limited for those who either do not have the skills to use the technology, think it is more cumbersome than traditional tools or simply prefer the human interaction provided in instructor-led training. Considerable evidence of the prevalence of c-learning in the workplace was gathered in surveys by IDC who found that 70% of respondents preferred instructor-led seminars and training (as cited in Learnframe, 2000, p. 77).

Consistent with these results, 88% of learners and 91% of managers expressed the desire to have a trainer assigned to an e-learning experience (Masie, 2000, para.1). These statistics seem to indicate that e-learning solutions are blending with traditional delivery methods rather than supplanting them, a trend reflected in the growth of "surrounds" or online meeting places offering supplemental materials and communication space for

learners as a way of extending the instructor-led classroom. Blended learning, a mix of e-learning and c-learning may serve as a transition step to allay fears and build learner acceptance of e-learning (WR Hambrecht + Co., 2000, p.14).

Technological Barriers

Severe limitations of technology infrastructure also serve to hamper enthusiasm and the widespread use of e-learning technologies. These restrictions range from inadequate network speed and bandwidth capacity to incompatibility across different platforms (e.g., between turnkey and custom systems) and between different content materials (e.g., between off-the-shelf and custom content). Bandwidth refers to the capacity of a communication channel to carry information (e.g., text, graphics, audio and videos) (Institute of Electrical and Electronics Engineers, n.d., "Bandwidth" section, para. 1). Insufficient bandwidth was rated as the most significant barrier in a survey where 65% of those surveyed indicated that increased transfer speed would result in increased usage for them ("A report on the Internet," 1999). On a positive note, software, hardware incompatibility and low bandwidth are poised to improve rapidly as standards for interoperability are being developed (see section "Learning Content Management Systems" p. 36 for additional details).

Key Benefits of E-learning

Cost-effectiveness

As noted earlier, e-learning allows substantial savings at delivery time through the elimination of instructor and student costs such as salaries, travel costs, lost productivity costs from being away from the job and facilities costs such as classroom rental. Rumble (2001) observes that "online training courses are less expensive than face-to-face ones

provided the development costs are spread across sufficient numbers of students (possibly over several years), and provided that one takes into account both savings on travel and accommodation costs, and the fact that less of an employee's productive time is lost" (p. 84). His claim is supported by findings reported in Training Magazine which indicate that companies replacing c-learning with e-learning save between 50 and 70% on training costs (as cited in WR Hambrecht + Co., 2000, p. 9). Rumble (2001) adds, however, that significant savings can only be achieved with over 40 students per class per year.

Just-in-time Training

Costs savings are paralleled with time savings when e-learning activities are delivered to the employee's computer instead of the employee to the training facility. A number of authors note that e-learning provide a means for reducing travel time to training premises (Phelps, Wells, Ashworth Jr. & Hahn, 1991; Whalen & Wright, 2000).

Not only is e-learning an effective means to save time, but it also affords much flexibility to employees who can train in their own time, at their own pace and apply their new knowledge more rapidly since access to training occurs on an "as needed" basis. According to employers surveyed by the Conference Board, just-in-time training is the most valuable feature of e-learning (Murray, 2001, p. 20).

Quality with Individualized Learning

E-learning is thought to enhance the learning experience and retention of content through higher learner control. The Research Institute of America found that the average content retention rate for c-learning class is only 58% whereas the e-learning class augments the retention rate by 25 – 60% (as cited in Bowsher, 1998). Consistent with

these findings, the Conference Board report identifies several factors responsible for the longer lasting effect of e-learning instruction: high-quality, realistic simulations, consistent message, opportunity for unlimited repetition of concepts, adaptive and customizable content according to different prior knowledge and learning styles, flexible access and higher motivation of the learner. Moreover, broadband transmission, video and voice technology allow for richer e-learning interactivity (Learnframe, 2000, p. 30). However, these claims should be weighed against the lack of conclusive evidence from studies that compare different types of media to examine the advantages of one over the other (Clark, 1983; Kozma, 1991). Indeed, it can be argued that many topics (e.g., human relation skills) do not lend themselves to online teaching, and that classroom-based teaching still provides the human touch, the face-to-face interaction required in order for learners to acquire and transfer those skills (ASTD, 2001). As mentioned above in the discussion on human resistance, the appropriate solution might be to provide a combination of e-learning and classroom-based learning, in other words, blended learning.

Learning Content Management Systems and Learning Management Systems

The growth of e-learning in organizations has strongly influenced the evolution of computer-based training architectures such as learning management systems and learning content management systems, in response to demands for better administration of training with personalized developmental paths, up to date records on training activities and rapid deployment to geographically distributed workforces.

Definition of LCMS

International Data Corporation (IDC)'s white paper "Learning Content Management Systems: Comparative Analysis of Emerging Technologies" defines a learning content management system (LCMS) as a "system that is used to create, store, assemble, and deliver personalized e-learning content in the form of learning objects, also known as knowledge objects" (Brennan, Funke & Anderson, 2001, p.4).

According to the authors, a learning object is a single entity that encapsulates four components:

1. Learning objectives: general and specific learning goals for a lesson plan, scenario or course module.

2. Pre-assessment element: the learner is tested prior to teaching and a learner's personalized learning plan is generated as a result of the pre-test.

3. Learning content: the subject matter to be taught, in various formats: text, audio, graphics, videos and animation.

4. Post-assessment: following instruction, the learner is tested to assess its mastery of the content as delineated by the objectives.

A fifth component of a learning object is the metadata or a label providing information on the content of the learning object in order to catalogue, access and utilize it. Metadata usually supplies details about duration of instruction, the target audience or any prerequisite knowledge.

In essence, a learning object is the smallest entity in a LCMS and can be aggregated in various ways to form simple to complex learning scenarios (see Figure 7 below). According to Ellis (2001) "learning objects, which are reusable, media-

independent chunks of information organized by a metadata classification system, (...) are the modular building blocks of e-learning content" (para. 6).

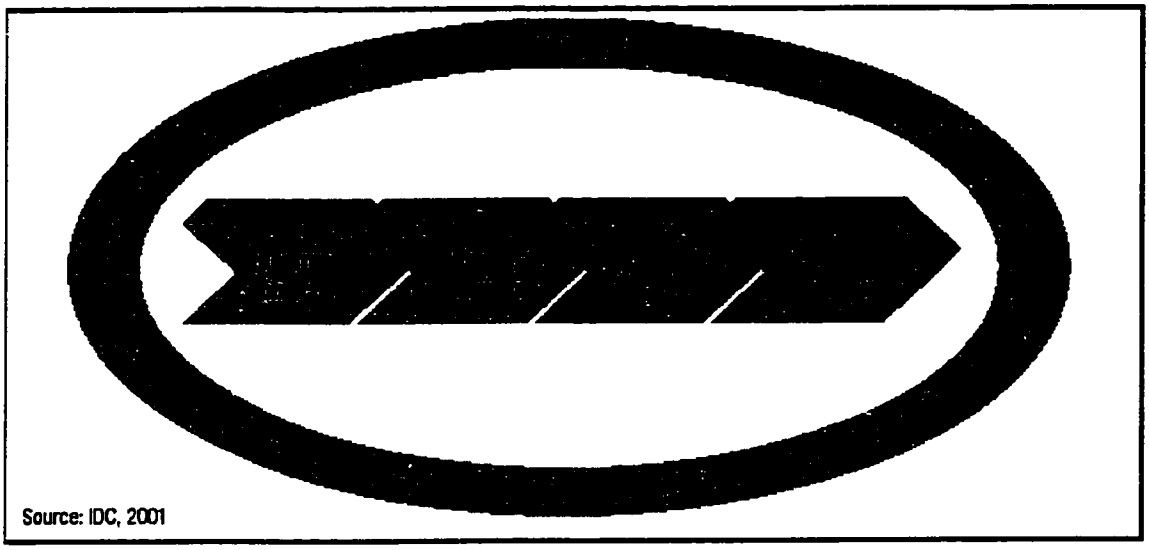


Figure 7 Components of a learning object
Note. From *The learning content management system: A new e-learning market segment emerges* by M. Brennan, S. Funke and C. Anderson, 2001, International Data Corporation (IDC), p. 3. Copyright 2000 by International Data Corporation (IDC).

Characteristics of LCMS

Generic Components

Brennan, Funke and Anderson (2001) identify four main components of a LCMS:

1. A learning object repository: learning objects are stored in a data repository where they can be accessed and used either as a single entity or as sets of aggregated entities toward the design of learning modules or complete courses. Being media-independent, the end product may be deployed in a variety of formats, on the Web, CD-ROM or through print materials, without content distortion. The integrity of content together with the media versatility of learning objects is made possible by the programming language XML which separates content from the programming code.

2. An automated authoring application: instructional design templates with lists of choices for learning objectives, type of media preferred, characteristics of the target audience and existing learning objects related to the subject matter, allow authors whether instructional designers or subject matter experts (SME) to rapidly assemble courses or even convert an organization's content into reusable learning objects. The application also enables online collaborative authoring among geographically dispersed authors.

3. A dynamic delivery interface: based on pre-test results or simple search queries, the tool delivers the content captured in learning objects via a user-friendly interface which can be customized to reflect an organization's logo and theme colors. The application may include additional capabilities such as user tracking, information links tracing and assessment with feedback.

4. An administration application: the tool can manage learner profiles, course catalogues, track and report learner's progress or send the information to another system with more powerful administrative capability like a learning management system (LMS). Although the acronyms are often used interchangeably, a LMS and a LCMS have slightly different features and strengths, the latter which are documented and explained below.

Specific Features of LCMS and LMS

A LMS' power lies in its efficient, training administration capabilities. LMS, also known as training management systems, training administration systems, integrated learning systems, can register students for online or offline courses, launch online courses and assign the appropriate learning resources (e.g., providing access to lab equipment for e-learning experiments), track students' progress and modify report test scores and

overall manage the communities of users. With the help of integrated collaboration tools including email, discussion forums and chat rooms, a LMS can allow users to engage in joint work and learning. Some LMS have a special functionality for competency mapping and use skills assessment to establish a competency profile, a (curriculum) training plan to bridge the competency gap with the corresponding training resources, and an evaluation of the impact on performance.

Some LCMS incorporate basic registration and indexing functionalities, but these are not powerful as those of a LMS and usually limited to e-learning content. A LCMS' strength resides in its content management, delivery and storage abilities. Sometimes described as providers of adaptive learning, LCMS can assist learners in selecting adequate combination of learning resources, generate personalized instruction plans by assembling different "chunks" of content, closely track the user interaction with the learning material to adjust the delivery instruction (update the content of the learning path) accordingly and can provide comprehensive reports on tests results. "...a LCMS allows an organization to do more extensive tracking of learners' interaction with its content than the top-level tracking allowed by a LMS (...) where tracking is generally restricted to course completion and rudimentary test results" (Brennan, Funke & Anderson, 2001, p. 9).

The distinctive features of LCMS and LMS are seen as being complementary in the literature on the topic. Tight integration between a LCMS and a LMS can greatly enhance their mutual performance. For instance, user data such as information on usage of programs, learner's progress, test scores monitored by the LCMS can be fed into the LMS for reporting purposes or the LMS can point multiple users to appropriate learning

resources and enable them to launch the required learning objects stored and manipulated by the LCMS. Figure 8 below illustrates the integration of a LMS and a LCMS.

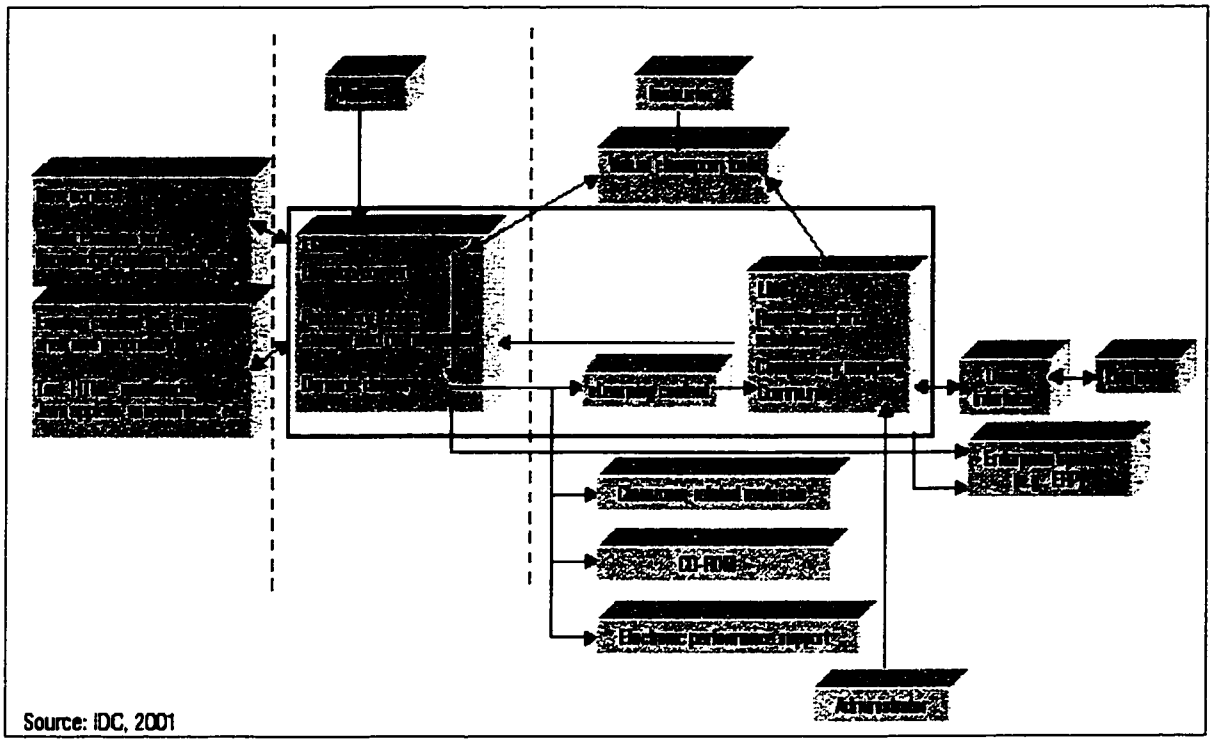


Figure 8 LCMS and LMS integrated
Note. From *The learning content management system: A new e-learning market segment emerges* (p. 10) by M. Brennan, S. Funke and C. Anderson, 2001, Knowledge Mechanics Web site. Copyright 2000 by International Data Corporation (IDC).

Advantages of LCMS/LMS

Aside from the direct advantages derived from their functionalities, LCMS/LMS can yield some substantial benefits to an organization performance.

Just-in-time, Personalized Training

Based on the learner's skills and knowledge assessment, the system delivers the educational content on a "per request" and timely basis, thereby ensuring effective training and efficient use of the learner's productivity time. The LCMS' capacity to convert, aggregate and modularize content on demand provides an employee training

tailored to his needs and compatible with both personal time and location constraints. The Conference Board notes that "LT (learning technologies) solutions enable facilitators in one location to link to participants in multiple locations simultaneously" (Murray & Bloom, 2000, p.11) and recognizes the potential for decentralized learning as one key benefit of learning technologies. Similarly, citing a recent study by the OECD, the authors add that the key benefits to employers are "reduced costs and increased flexibility." because content can be designed and delivered as in the case of just-in-time training (Murray & Bloom, 2000, p.9).

Reusability and Portability of Educational Content

Using a LCMS, an organization can manipulate content including Word files, Excel spreadsheets, PowerPoint presentations, Flash animations to create and deliver a myriad of different courses targeted to disparate audiences and greatly enhance its efficiency in course production. With XML, much of the learning objects need only be developed once and a single learning object may be used in an instructor-led course to teach accountants about, say breakeven analysis, and in a print manual designed for in-house consultants providing advice to customers. Just as important, XML-based learning objects are independent of delivery methods and suited to reutilization with any future new medium brought on the market.

User-friendly Programming Language

A clear benefit of XML for an organization is the efficient authoring of courses by individuals who do not need to know how to write complex programming code. The use of templates provided in LCMS leverage courses authoring and updating among a wider population of employees by enabling them to participate in the growth of educational

products for the company. "These next generation tools allow rapid creation of instructionally sound content without the need for scarce and expensive programming skills. Templates abbreviate the need for programming while ensuring the content is instructionally sound" (Koolen, 2001, p.7).

Consistency of Message

Storing and managing knowledge and information from a central repository of metatagged learning objects benefits the consistency, accuracy and efficiency of communications spread around an organization. For instance, horizontal coordination among departments involved in designing a prototype both from the engineering and marketing perspective can be enhanced if part of their mandate is to get training on the product specifications. In this case, the development of training content might have led to separate efforts from marketing and engineering, in spite of the multiple video elements common to both. A central repository eliminates duplication of efforts while ensuring the quality of the learning experience.

Best Practices and Tacit Knowledge

The system potential for content conversion can be applied to proprietary and exemplary practices content which cannot be offered in "off-the-shelf" courses because it is confidential. In the long run, classroom-based proprietary courses becomes less cost-effective than e-learning courses that can be developed and disseminated to large audiences, thus allowing economies of scale for the company. Concurrently, exemplary practices sometimes become unavailable when the originators leave the company, but LCMS can help retain these valuable practices and benefit the productivity of the organization. Brennan, Funke and Anderson (2001) argue that "LCMS not only allow

current members of the enterprise to share best practices, but they may lengthen the shelf life of proprietary best practices created by former members" (p. 9).

Issues about Integration of LCMS/LMS in an Organization

Several key variables have been identified by researchers studying the conditions necessary to leverage the full benefits of LCMS/LMS within organizations. These include:

Interoperability

This term refers to seamless integration of the LMS with other third party content, management and authoring tools, databases such as ERP systems and off-the-shelf training products. In implementing a LMS, an organization needs to ensure that it can utilize the functionalities of the LMS platform with other software and courseware it already owns. Brookwood Media Arts (n.d.) caution that many LMS only offer tracking with their specific, often limited authoring tools. These LMS fail to integrate with widely used authoring applications, be it Macromedia Authorware, Dreamweaver with Course Builder or Flash, and do not accommodate either custom courseware or off-the-shelf, low-cost courseware from companies like Element K and LearnKey (para. 10). In this case, an organization's potential to leverage online learning deployment is severely restricted.

Standards

The current absence of a single standard for content interoperability as well as for metadata tagging, and data tracking leads to informal coalitions of vendors that pledge product compatibility among themselves (Connolly, 2001). To offset the uncertainty surrounding standards, four recognized regulating bodies are currently developing

industry-wide standards. A first project on standards for web-based course management is run by the Aviation Industry CBT (Computer-Based Training) Committee (AICC) which has certified a number of products for the past three years. The second LMS standard called SCORM (Sharable Content Object Reference Model) piloted by the Department of Defense's ADL (Advanced Distributed Learning), draws together the efforts of the AICC, Institute of Electronic & Electrical Engineering (IEEE), and the Instructional Management Systems Global Learning Consortium (IMS). Connolly (2001) observes, however, that "the difference between claiming AICC compliance, which is tested by the vendor, and AICC certification, which is tested by a third party for AICC" ("Up in the air" section, para. 6) is currently a source of confusion for potential LMS buyers. Until all LMS support both standards, organizations should thoroughly examine the degree of compliance of the relevant LMS with the current industry draft standards and specifications.

System Longevity

A major challenge for organizations is selecting a LMS which will afford it a reasonable length of usage. In claims similar to those made by Daft (2001) with his model of ecological change, Barron (2000) notes that in the upcoming two years, a market consolidation of LMS vendors is likely to reduce their approximate current number of 100, to a small portion of that figure. This trend, in part due to the rapid technological advances typical of the emerging LMS sector in which yesterday's innovation becomes obsolete the next day, leads to dominant vendors establishing alliances to output best-of-breed products where the LMS is the integration pivot for the other "turnkey systems". From the vendors' standpoint, these fully integrated learning

systems serve as best guarantee against future innovations in the current absence of strong interoperable standards. In response to this issue of system longevity, a new model has emerged where vendors jostle to offer "turnkey hosted services" to organizations. In the ASP model, an organization can rent a LMS rather than buy it and thus continually update its information technology (IT) architecture.

Scalability

The ability to deploy enterprise-wide learning solutions and to accommodate various sizes of learner population is critical, especially for global, very large or fast growing organizations. Since e-learning, including multimedia and online training, is costly to develop, economies of scale become crucial for the LMS to be a profitable strategy. In their study of e-learning, WR Hambrecht + Co. (2000) comment that organizations will target high return on investment through the deployment of course delivery platforms capable of supporting millions of users and utilizing multiple and effective distribution channels. Organizations seeking a LMS able to address immediate issues of large volume transactions while allowing for future growth, must look for systems with an enterprise wide perspective.

Organizational Strategies for Web-based Competency and Learning Management

Trends in the arenas of e-learning, learning management systems, web-based competency management and knowledge management have led "learning organizations" (Senge, 1994) to seek approaches to implement process and technology-based solutions to support their vision and goals of human capital development. Yet, scant evidence of relevant comprehensive frameworks is available both in the academic and the practitioner literature.

> With the advent of a variety of Learning Management Systems (LMS), Knowledge Management Systems (KMS), Electronic Performance Support Systems (EPSS) and various other attempts to automate the learning process through technology, one key element is still missing; a systematic framework into which all of the managed knowledge, learning objects, and performance support systems can be integrated. (Kapp, 2001, "Introduction" section, para. 1)

Kapp's claims are echoed in "The new corporate university review", which cites that "only a handful have a framework, let alone a procedure for translating their organization's vision and strategy into a unified, coherent set of training programs" ("Using strategies," 2000, p. 1).

The following section presents empirical results from four case studies that highlight unique efforts to implement a web-based competency and training management program intended to align training initiatives with competency needs. A last example, from a LMS vendor, of a systematic model for using a LMS to training interventions to competencies gaps is discussed.

Microsoft

An examination of Microsoft's practices for competency management by Davenport (1996) suggests a five-step approach for the implementation of an online competency management project for its experienced IT staff. The project named SpuD (Skills Planning und Development) was launched in 1996 with the overall goal of identifying and maintaining mission-critical competencies.

1. *Develop a framework of competency categories and levels.* Entry-level or basic skills (e.g., project management and communications skills) were outlined and labelled "foundation knowledge". Next, advanced skills (e.g., fault diagnosis for local area network) that apply to a particular job type were labelled "local or unique", skills

requested of all employees within a given function (e.g., skills in IT architectures and systems analysis for employees of the IT function) were labelled "global" and skills required of all employees within the company (e.g., knowledge of the Microsoft's products and services) were labelled "universal". Figure 9 below summarizes the hierarchy of the four categories of competencies, ranking from the numerically smallest at the top.

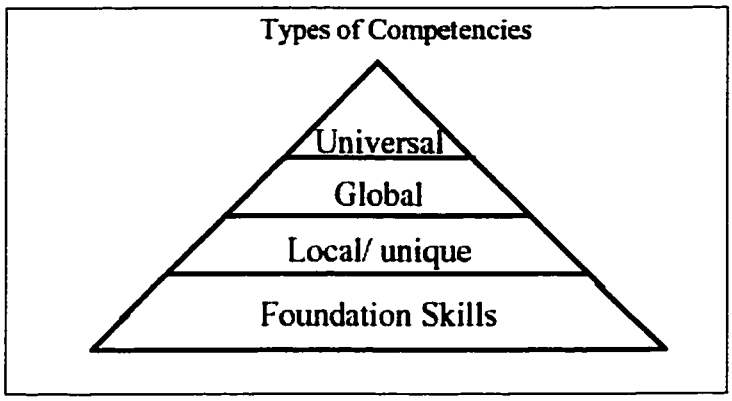
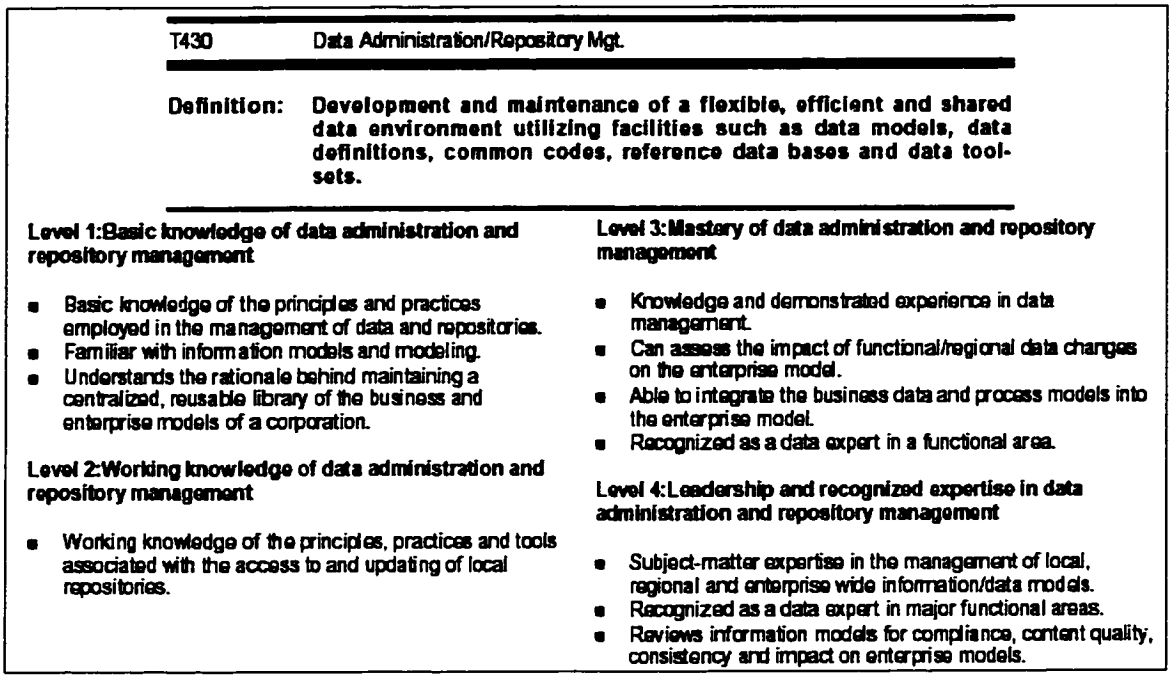


Figure 9 Hierarchy of competencies categories
Note. From *Managing knowledge competencies at Microsoft* (p. 3) by T. Davenport, 1996, Center for Business Innovation Web site. Copyright 1996 by Ernst & Young LLP.

Each of the four categories is further divided into implicit competencies and explicit competencies, the former designating more abstract, generally stable reasoning skills (e.g., Can assess the functional data changes on the enterprise model) while the latter refers to knowledge of and experience with specific tools and methods (e.g., Working knowledge of the principles, practices and tools associated with the updating of local repositories) generally subject to frequent changes. The last level of categorization consists in four proficiency levels (e.g., basic, working, leadership and expert) found in each of the four categories of competencies. Such a detailed degree of aggregation is

deemed necessary to avoid ambiguity in rating jobs and employees. A sample competency description for data administration is illustrated in Figure 10 below.



T430	Data Administration/Repository Mgt.
Definition:	**Development and maintenance of a flexible, efficient and shared data environment utilizing facilities such as data models, data definitions, common codes, reference data bases and data tool-sets.**

Level 1: Basic knowledge of data administration and repository management

- Basic knowledge of the principles and practices employed in the management of data and repositories.
- Familiar with information models and modeling.
- Understands the rationale behind maintaining a centralized, reusable library of the business and enterprise models of a corporation.

Level 2: Working knowledge of data administration and repository management

- Working knowledge of the principles, practices and tools associated with the access to and updating of local repositories.

Level 3: Mastery of data administration and repository management

- Knowledge and demonstrated experience in data management.
- Can assess the impact of functional/regional data changes on the enterprise model.
- Able to integrate the business data and process models into the enterprise model.
- Recognized as a data expert in a functional area.

Level 4: Leadership and recognized expertise in data administration and repository management

- Subject-matter expertise in the management of local, regional and enterprise wide information/data models.
- Recognized as a data expert in major functional areas.
- Reviews information models for compliance, content quality, consistency and impact on enterprise models.

Figure 10 Sample competency description
Note. From *Managing knowledge competencies at Microsoft* (p. 5) by T. Davenport, 1996, Center for Business Innovation Web site. Copyright 1996 by Ernst & Young LLP.

2. *Define the competencies required for particular jobs.* Each job in Microsoft IT was associated with the relevant competencies and proficiency levels and led to a job template encompassing 40 to 60 competencies on average of which 10 represented key competencies. The template was supplemented with a "measurement model" presenting brief explanations on how to rate competencies. In some cases, competency templates were also developed for team roles.

3. *Rate employees on job competencies.* Rating is conducted separately by the employee and by the supervisor before both meet to discuss the rating and agree on a final one for the employee. The purpose of the rating is seen as an occasion for discussion

and a step towards building a worldwide intranet-based repository of IT competencies for geographically distributed managers in search of candidates with particular skills.

4. *Build an online competency system.* An online competency management system was built to host the competency hierarchy, the set of job-related competency profiles and the employees' personal competency and proficiency levels ratings. The competency hierarchy and job-related competency profiles were managed centrally while employee data resided locally in the group/country of origin and was duplicated in the central database.

5. *Link competency profiles to educational resources.* Former linkages between competency profiles and specific course opportunities inside and outside Microsoft had already been created and were transferred into the online competency system. The ultimate goal was to improve the automatic recommendation and establish linkages at a finer level of specificity where modules and even lessons within a course would target specific proficiency levels. With that perspective, all courses from internal brown bag seminars to external courses would be evaluated and described according to the competencies and proficiency levels they aim to develop.

6. *Implement the competency model.* The SPuD project was first piloted among 80 people in the Operational Business Systems group and then fully implemented group by group and job family by job family in the Microsoft IT organization. The result of the initiative was threefold: critical training needs arising out of the rapidly changing work demands were quickly identified, employees became better consumers of educational offerings because they had a better understanding of the competencies required for their job, and matching of employees to jobs and work teams became more accurate.

IBM Canada

A comparative analysis of large organizations based in Canada, conducted in 1998 by the Treasury Board of Canada Secretariat, highlighted state of the art practices in career development, among which is IBM's skills development program presented in Figure 11 below.

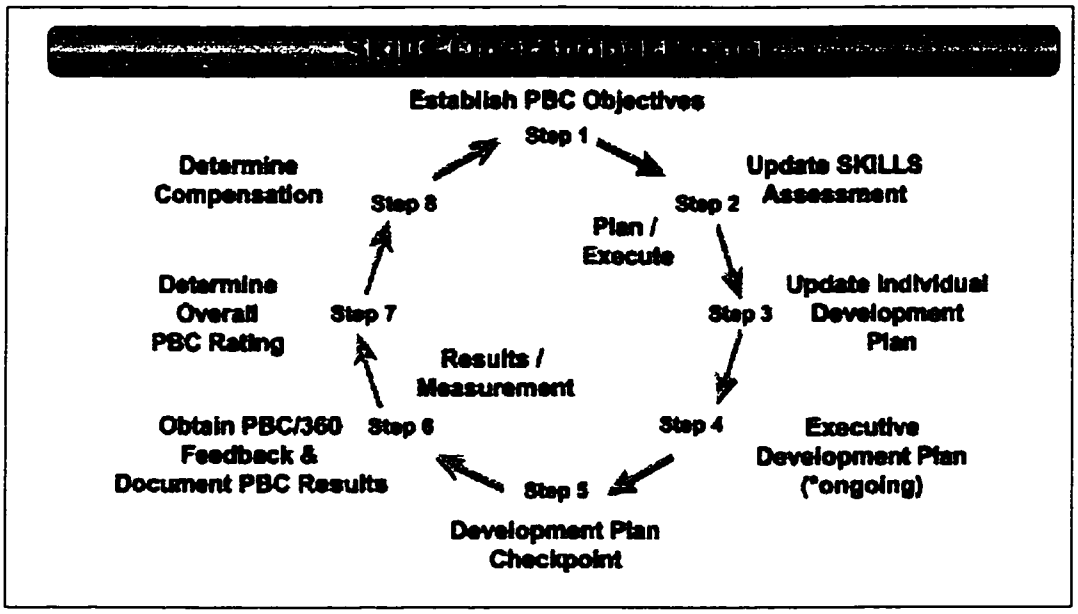


Figure 11 IBM's skill development program model
Note. From *Career Development in the Federal Public Service - Building a World-Class Workforce* (p. 158) by L. Duxbury, L. Dyke & N. Lam, 1999, Treasury Board of Canada Secretariat Web site.

Skills management at IBM is a phased approach which consists of four major components: PLAN, ASSESS and ACQUIRE, DEVELOP and DEPLOY, and eight steps within the phase DEVELOP.

1. PLAN. The organization determines the market niche it wishes to exploit, the associated customer requirements, and relevant products and services it wants to propose.

2. ASSESS and ACQUIRE. A needs analysis is conducted among customers to identify their requirements from IBM in terms of skills and capabilities. Next, based on

customers' requirements, job roles and associated necessary skills are developed collaboratively between managers and employees. Each job role leads to the development of one template for skills assessment (a total of 2,000 templates have been developed) in order to measure the discrepancy between employees' competencies and customer requirements.

3. DEVELOP. This phase encompasses a comprehensive 5-step process called the Skill development process.

3.1 *Establish PBC objectives.* Annually, each employee identifies two kinds of objectives: personal business commitment (PBC) objectives for skills development in the three main commitment areas for IBM: commitment to WIN, commitment to EXECUTE, and commitment to contribute to the TEAM, and personal skills development objectives, both of which are tied to business unit plans and used to measure the employee performance.

3.2 *Update individual skills plan (ISP).* Using the online SKILL tool, each employee completes a skills assessment to measure the gaps between his/her actual skills, proficiency levels and (a) skills needed for IBM's success as defined by customers and business plans, and (b) skills required to reach his/her goals and aspirations. Given that job roles are derived from groups of profession with very detailed career paths, employees can not only assess their current competency gaps, but also those measured against positions further up a particular career path. This skills gap analysis includes the updating of each employee's resume, a document available for consultation by internal or external customers who enquire

about the skills of employees providing services. In the final output, the ISP, the skills requirements for IBM's success are prioritized jointly with the employee and his/her supervisor once a year, and according to the employee's PBC objectives. More flexibility is afforded to the skills requirements for the personal success of the employee, yet they are also the subject of discussion with his/her supervisor during the year.

3.3 *Update individual development plan (IDP).* Through Global Campus, IBM's learning management tool, each employee selects "gap closure activities" ranging from formal education, readings, project assignments, "internship" on projects, attendance at conferences, mentoring etc. according to criteria such as learning style, duration and costs for the activities. The output is an updated IDP which is then discussed with the employee's supervisor for approval on a recommended average of three to five skills to develop.

3.4 *Execute individual development plan.* The employee registers and attends to development activities throughout the year. During that time, he/she is expected to engage in checkpoints to document his/her skills gap closure endeavors, obtain feedback from his/her peers, customers and supervisors and update his/her individual skills plan.

3.5 *Determine overall PBC rating and compensation.* At the end of the year, each employee seeks 360° feedback on his/her PBC and determines the overall rating jointly with his/her supervisor. At the beginning of the

following year, the employee's supervisor determines compensation increases based on the overall PBC rating.

4. DEPLOY. As gaps are being closed through the skill development process described above, new skills are consulted on the company's intranet and deployed strategically where needed with the help of resources managers.

Royal Bank of Canada (RBC)

A case study by Murray (2001) of RBC's implementation of a competency-based, learning management system (LMS) called Personal Learning Network (PLN) and a report by the Treasury Board of Canada documenting RBC's Performance Planning, Review & Development (PPRD) process, offer valuable insights into one organization's approach to career development. In 1998, ASTD gave RBC an Excellence in Practice award for the PLN. In 2001, RBC Financial Group was one of the three winners of the Learning Technologies in the workplace Awards granted by The Conference Board with funding from the Human Resources Development Canada's Office of Learning Technologies (OLT).

The PPRD process has been specifically designed to tie individual goals and activities to RBC's business goals and strategies to bridge competency gaps via personal development plans (Duxbury, Dyke & Lam, 1999). The PPRD, supported by the intranet-based PLN, is comprised of five steps:

1. *Assess competencies*. Once a year, the employee fills out a "Competency Model/Assessment Questionnaire" (CMQ/CAQ) for his/her job position. The outputs of the assessment are competency ratings which the employee transfers to the Competencies Assessment Summary in the PPRD.

2. *Set up development plan.* From PLN-based online "Learning Maps" which are tied to competencies and provide information on developmental opportunities (e.g., videos, books, mentors, external courses, assignments and projects) and on content evaluation, the employee selects relevant activities in order to set up his/her Competencies Development Planner. The PLN interfaces with the RBC's human resources information system (HRIS) to allow the bi-weekly importation of HR data such as employees numbers, roles and competencies. A host of data is available to employees and supervisors through the PLN, for instance, courses usage by job type, courses usage by region or courses usage by unit.

3. *Approve development plan.* The Competencies Development Planner is jointly approved by the employee and his/her supervisor and is to be completed during the year. At the bank, emphasis is placed on the coaching role of the supervisor who provides input on competencies required for both current and future positions, and development strategies and programs.

4. *Implement development plan.* The employee participates in all recommended activities and can monitor his/her progress by consulting his scores and learning map through the PLN. Test scores are reported as "incomplete or complete" to the supervisor while the actual score is sent to the employee. The employee's learning history is preserved throughout his/her career at RBC and serves as input for supervisors' guidance in learning and career development.

5. *Review quarterly.* During quarterly meetings, the employee and his/her supervisor evaluate performance progress against the action plan (i.e., the Competencies Development Planner) and included target completion dates. On the basis of the

employee's improvements and the unit's results for the previous quarter, activities listed on the Competencies Development Planner are revised.

Imperial Oil Limited

According to Kitigawa and Watt (1999), Imperial Oil Limited realized that "the real business driver – the link connecting its strategic objectives with its training and development plans – is managing and developing employees competencies to achieve flawless execution of business fundamentals. Their approach to web-based competency management takes the form of a capability development program that spans six steps supported by an intranet-based Capability Development Toolkit.

1. *Develop competency requirements and update profiles*. Once a year, department heads update competency profiles by defining competency requirements in three categories: (a) core competencies which refers to basic knowledge and skills that all employees must possess to work at any job at Imperial Oil Limited, (b) job-family competencies which are technical knowledge and skills specific to a given job family or discipline, and (c) management competencies which apply to employees responsible for the work of others.

2. *Measure employees' competency levels against requirements*. Following competency definition, employees conduct an annual self-assessment of their current competency and levels of proficiency in each of the three competency categories using an online form and input from supervisors and peers. Next, competency gaps are prioritized in collaboration with supervisors.

3. *Prepare departmental competency development plans.* Department heads aggregate employees' competency gaps data and prepare departmental competency development plans.

4. *Finalize individual competency development plans.* From a suite of learning options (e.g., classroom-based training, online self-study, on-the-job training) employees and supervisors jointly select appropriate training activities to address critical competency gaps based on duration, costs and learning preferences. Selected activities are then transferred to the employee's individual competency development plan.

5. *Implement individual competency development plans.* Employees execute their development plan with the support of their supervisors who provide regular constructive feedback on the employees' progress as well as resources to facilitate successful completion.

6. *Steward execution of departmental competency development plans.* Department heads are accountable for the optimal execution of departmental plans.

The Knowledge Transfer System Model

KnowledgePlanet.com, formerly KnowledgeSoft, a leading LMS vendor and service provider proposes an integrated model (see Figure 12 on p. 58) called the "knowledge transfer system" to illustrate the steps necessary in developing an effective learning plan that leverage an organization's human resources or "people power" (KnowledgePlanet, 1999).

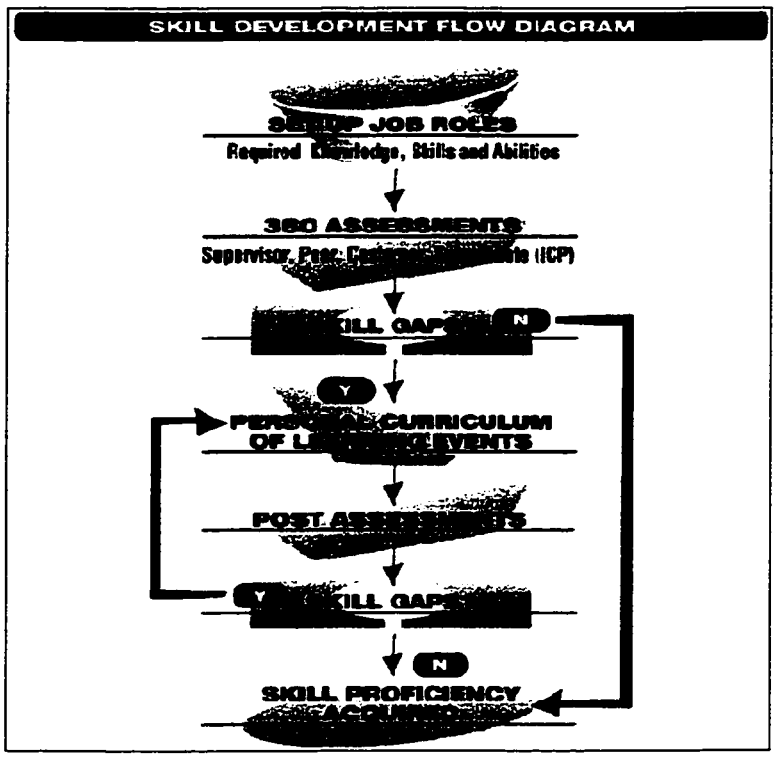


Figure 12 KnowledgePlanet.com's skills development model
Note. From *Knowledge: The Priceless Corporate Asset... When Managed Systematically* ("The Model" section, para. 1), Online Learning Center Web site. Copyright 1997, 1998, 1999 by KnowledgeSoft, Inc.

The model consists of eight sequential steps:

1. *Model the organization structure*. The elements of an organizational structure are the company's name, its divisions, departments, job families, and core job roles. The input for this step is the organizational chart and the output is an "organization tree" of which the last level, the job role, is a link between the organization tree and the competency tree. An example of organization hierarchy might be:

COMPANY: ABC Healthcare Company
DIVISION: Corporate Human Resources
DEPARTMENT: Training Department
JOB FAMILY: Instructors
JOB ROLE: Technical Instructor

2. *Identify required competencies and underlying skills and knowledge.* Competencies required to achieve overall business goals are derived from the company's short term (present) and long term (future) goals, the latter which are the input for this step; the output of this step is a "competency tree" or a list of competencies tied to the company business direction.

3. *Refine the competencies by linking job roles to required competencies.* In other words, multiple skills are bundled into competencies and multiple competencies into job roles. The inputs for this step are the strategic goals-aligned competencies and the output is a list of job roles defined by ideal composites of competencies.

4. *Establish proficiency levels for each skill.* Depending on their jobs and positions, all employees should demonstrate a certain degree of expertise for each skill. The input for this step is the list of job roles and related competencies and the output is a list of proficiency levels as follows:

Level 1: Basic understanding of subject matter
Level 2: Hands-on experience; limited scope of specific environment
Level 3: Extensive experience in diverse environments
Level 4: Leadership, subject matter depth and breadth

5. *Assign employees within the hierarchy.* Employees are linked to appropriate levels knowing that each employee cannot belong to two similar levels (e.g., two different divisions or departments). Once assigned, employees inherit all the job's roles, competencies and skills. The inputs for this step are the employees' names and the organization tree and the output is the picture of optimal competencies employees should possess.

6. *Conduct skill gap analysis.* Employees' current and required skills, and skill proficiency levels are evaluated through customized assessments. The inputs for this step

are assessment instruments and 360° evaluation, and the output is a skill inventory highlighting the differences between actual and optimal competence levels for individuals or groups of employees. The skill gap analysis document is a tool to recommend appropriate training solutions.

7. *Generate personalized career development plans.* Individual development plans are developed to close skill gaps and allow employees to excel at their current jobs and/or move laterally or vertically through future positions within the organization. The input for this step is a course catalogue comprising learning objects and the skill gap analysis and the output is a logical progression of learning events, also known as custom curriculum, integrating various learning forms (e.g., c-learning or e-learning). "A curriculum is typically determined in advance by a team of job experts and instructors who decide what path of training is required to develop the appropriate skills for the job" ("CMS, AMS, TMS", 1998). When skills are linked to learning resources in advance, learning paths recommended to fill the gaps can be created automatically by the software (LMS).

8. *Assess skill acquisition after training.* A post-training assessment is conducted to determine if employees demonstrate the required skills for a certain job roles, and if skill gaps are closed. The input for this step are post-training assessment instruments and 360° evaluation, and the output is a skill inventory highlighting the closed gap between actual and optimal competence levels for individuals or groups of employees.

The empirical and conceptual information gathered from reviewing the case studies and model described above, served to construct a preliminary model from which a series of interview questions could be derived. The role of the preliminary model in

developing the data collection instruments is discussed in the next chapter on research design and methodology. Table 2 below presents a comparative chart of the preliminary model and organizational models for web-based competency and training development programs from KnowledgePlanet.com, Microsoft, IBM, Royal Bank of Canada and Imperial Oil Limited.

Table 2
Comparative chart of organizational models for web-based competency and training development

Preliminary model	KnowledgePlanet	Microsoft	IBM	Royal Bank of Canada	Imperial Oil Limited
Communicate with stakeholders			Enlistment of executives	Acceptance of the concept	
Model the organization-job roles structure	Organization tree	Develop a framework of competency categories and levels	Establish PBC objectives		
Model the business goals-aligned core competencies	Competency tree	Define the competencies required for particular jobs			
Link the organization's model to the core competencies' model with the job roles	Job roles based on skill bundles				Develop competency requirements and update profiles
Define expertise levels for skills	Proficiency levels				
Link employees to job roles	Employees assigned within hierarchy				
Conduct skill gap analysis	Skill gap analysis	Rate employees on job competencies	Update Individual Skills Plan	Assess competencies	Measure employees' competency levels against requirements
Create learning paths and link them to skills			Update Individual Development Plan		
Prescribe learning paths to close skill gaps	Career development paths tied to gaps		Execute Individual Development Plan	Set up development plan Approve development plan Implement development plan	Prepare departmental competency development plans Finalize individual competency development plans Implement individual competency development plans Steward execution of departmental competency development plans
Conduct post training assessment	Skill acquisition assessment after training		Determine overall PBC rating and compensation	Review quarterly	
		Build an online competency system			
		Link competency profiles to educational resources			
		Implement the competency model			

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

Introduction

Taking as a point of departure the conclusion of the previous chapter which highlighted a critical need for a comprehensive framework for guiding the process of utilizing a competency management system to tie e-learning and classroom-based training to competency gaps, this chapter addresses the overall methodology followed in the study. First, the rationale underlying the choice of the case-study strategy is laid out, then the research design (e.g., unit of analysis employed, definition of the case company and sampling method used) is described, and the researcher's activities of data collection and data analysis are detailed. Finally, issues of validity and trustworthiness are discussed.

The Research Design

Rationale for an Exploratory Case Study

In Chapter 2, it was argued that the area of e-learning and LMS is a relatively recent field of research, characterized by constant technological change, and that consequently very few studies have been conducted up to this day. In his classic book on case study research, Yin (1994) states that exploratory studies are suitable when the available literature or existing knowledge base is poor and when relevant theory is unclear or not sufficiently well developed to test hypotheses explicitly. Stating that all research strategies might be used for an exploratory purpose, Yin suggests that it is less

the purpose of the research than three specific conditions that determine when to use a research strategy. According to the same author, case study research is favored when (a) the form of the research question is "exploratory what", "how" and "why", (b) the investigator has little control over the behavioural events, and (c) the focus of the study is on contemporary events. Application of these three criteria is discussed below.

Leading researchers in the field of organizational behaviour research and business strategy advocate the use of case study research to investigate topics such as implementation processes, organizational change or success factors in strategic planning, etc. (Eisenhardt 1989; Benbasat, Goldstein & Mead, 1987; Myers, 1997; Yin, 1993). Bensabat, Goldstein and Mead note: "with the rapid pace of change in the information systems field, many new topics emerge each year for which valuable insights can be gained through the use of case research" (p. 371). The form and substance of the research questions as posed in section "Research Questions" on p. 4 lend themselves to case study research given that they are "what" and "how" questions aimed at exploring factors and operational links underlying effective ways of aligning e-learning/classroom training with competency gaps through a LMS. Furthermore, the case study method is useful in building theory when there is no available theory to offer an adequate or appropriate explanation (Merriam, 1998).

Second, given that the study involves probing rather than manipulating behavioural strategies of organizations within their respective context, the researcher does not have control over the events; a case study is deemed an appropriate strategy.

Thirdly, since the study examines a contemporary event – the current strategies used by organizations to tie e-learning and classroom-based training with competency needs through a LMS – a case study is chosen as the preferred method of study.

Rationale for a Single Case Study

Based on Yin's (1994) typology (see Table 3 on p. 65) of case study designs, the study employs an embedded design, that is, multiple levels of analysis within a single case. Single case study research is appropriate when the case is either critical for testing a well-formulated theory, rare or previously inaccessible to scientific inquiry, or when the case will serve an exploratory study or pilot study (Bensabat, Goldstein & Mead, 1987; Yin 1994), the latter being the condition which applies to the present research.

> There are other situations in which the single-case study may be conducted as a prelude to further study, such as the use of case studies as exploratory devices or such as the conduct of a pilot study that is the first of a multiple-case study. However, in these latter instances, the single-case study cannot be regarded as a complete study on its own. (Yin, 1994, p. 40-41)

Nevertheless, Yin (1994) also acknowledges that the choice of single case design may also be dictated by practical constraints stemming from costs (e.g., a single investigator) and time (e.g., limited timeframe), two factors that characterize the present study. In support of the latter argument, Wolcott (1992) argues that the study of multiple cases lessens the attention the researcher is able to give to any one of them and may weaken rather than strengthen the case study. Nonetheless, single-case designs require careful investigation to reduce misrepresentations and to augment the investigator's access to the evidence. Consistent with Yin's (1994) criteria for methodological rigor as regards the single case research, operational definitions of the unit and subunits of

analysis, presented in the next section, have been specified to amplify the potential for insights into the case.

Table 3
Yin's designs for case study research

	Single-case design	**Multiple-case design**
Holistic (single unit of analysis)	Type 1	Type 3
Embedded case (multiple units of analysis)	Type 2	Type 4

Note. From *Case study research: Design and methods by* R.K. Yin, 1994, p. 39. Copyright 1994 by Sage Publications. Adapted without permission.

Unit of Analysis

The first step in case study research is to establish a clear research focus by selecting a unit of analysis. The second step entails determining the system and the people to whom analysis will apply (McLagan, 1989). The unit of analysis, a critical factor in the case study, is closely related to the research questions and describes in concrete terms what will be investigated. A unit of analysis is one system of action rather than an individual or group of individuals (Tellis, 1997), but it can be related to an individual's system of actions. A single unit of analysis may have subunits such as an organization and all of its component divisions or even each of its members. Definition of the unit of analysis involves making a distinction between the phenomenon and the context of the study. The phenomenon is the concept or theoretical construct to be studied while the context is a temporal, spatial, or structural boundary around the phenomenon (Westgren & Zering, 1998).

Phenomenon

In the present study and as delineated by the research questions, the primary unit of analysis is the following phenomenon: the process of using a LMS to align e-learning and classroom-based activities with competency needs. This system of actions or main unit of analysis is broken down into subunits, operationally defined as: the roles, strategies, resources and criteria used by individuals involved in using the LMS to develop and manage competency profiles, learning resources, conduct skill gap analyses and establish linkages between e-learning and classroom-based courses, and competency gaps. Figure 13 below illustrates the embedded units.

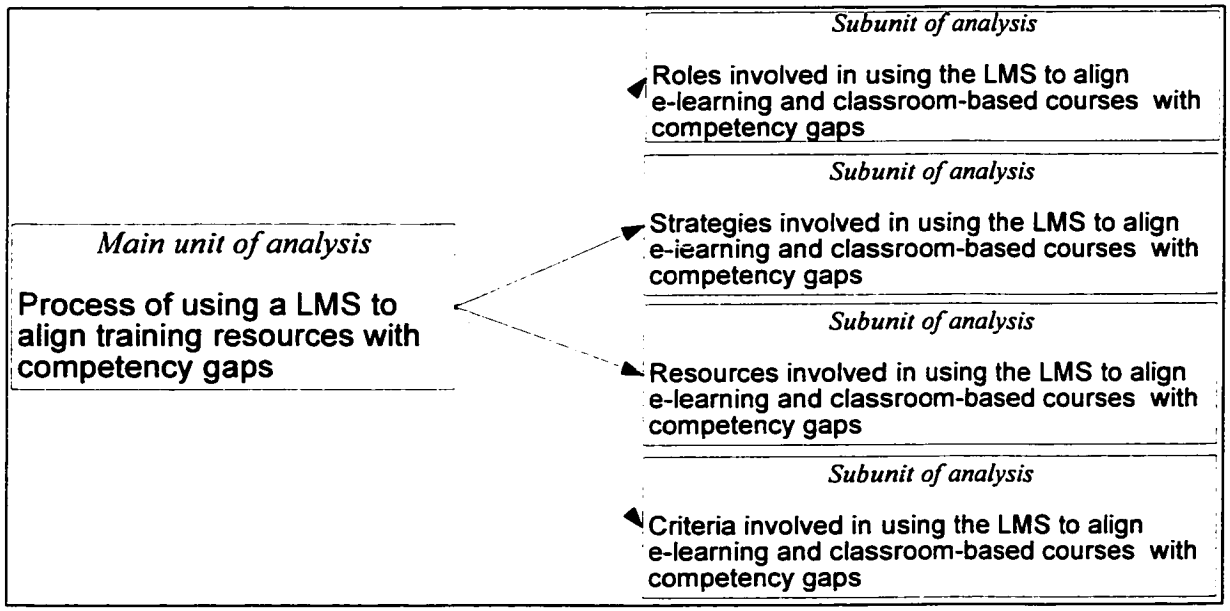


Figure 13 Operational definitions of embedded units of analysis

Such operational definitions of the unit of analysis are derived from the literature review to enhance the construct validity of the findings obtained through data collection instruments that reflect adequate measures of the phenomenon (Emory & Cooper, 1991;

Yin, 1994). Operationally defined units of analysis also facilitate comparison of the findings of the study with those of previous research (Yin, 1994).

Context

The temporal context for the phenomenon studied (i.e., the process of using a LMS to align e-learning and classroom-based activities with competency needs) is the period during September 2000 and October 2002 while its structural context is the organization Bell Canada. Bell Canada is part of BCE, Inc., Canada's largest communications company. Bell Canada provides a range of communications services, including local and long distance telephone services, Internet access, high-speed data services and directories ("Bell Quick Facts and Divisions", para. 2) to a population mostly located in Ontario and Québec. Bell Canada is owned by BCE Inc. of Montreal (80%) and by SBC Communications Inc. of San Antonio, Texas (20%). The economic context of organizations like Bell Canada, is a highly competitive market due to the deregulation which transformed the telecommunications market from a few telephone monopolies to a multitude of new, smaller players such as long distance carriers and Internet service providers. Results gathered through the study show that these contextual factors play a role in the choice of management decisions and strategies undertaken by Bell Canada. As noted by Whalen and Wright (2000) fierce competition in the telecommunications industry have led organizations to address the many challenges through training. These authors also state that a map of the "competencies required by an organization, including the existing competencies, is the first step in providing training that makes a real impact on organizational performance" (p. 84).

Definition and Boundaries of the Case

As discussed earlier, once the unit of analysis has been defined, the bounded system, people to whom analysis applies must be identified. A case is commonly regarded in some sense as a "bounded system", perhaps "a single actor, a single classroom, a single institution or a single enterprise" (Stake, 1988). Boundaries that encompass the case have to be explicitly defined to help contextualize the findings (Pettigrew, 1997). In the present investigation, the main case is Bell Québec, a division of Bell Canada employing 6,000 workers (See Figure 14 p. 69) Bell Québec provides a range of communications services to its customers in its Québec operating territory. The case company, Bell Québec, was found to be a significant one because it satisfied three theoretically relevant selection criteria (Eisenhardt, 1989) established during research design. These criteria relate to the research questions and define the attributes most likely to yield relevant data (Merriam, 1998; Winegardner, n.d.):

- A minimum of two years of experience using a competency and learning management system to align training offerings and competency needs.
- An e-learning strategy and evidence of implementation of e-learning training.
- Recognition by other organizations and independent researchers and professionals for its expertise in using a competency and learning management system.

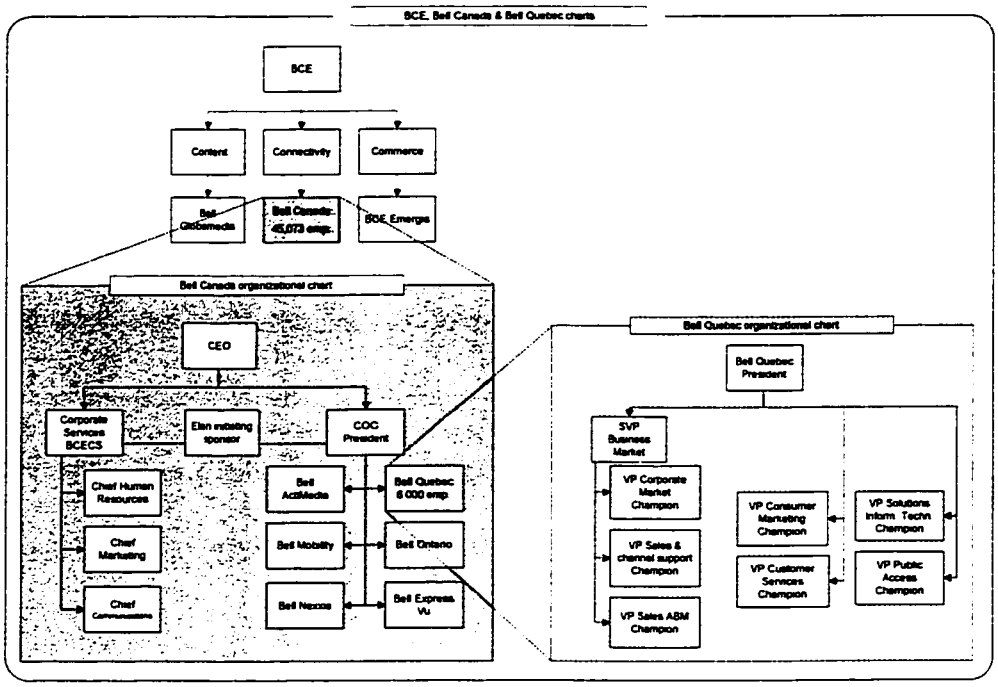


Figure 14 Organizational charts of Bell Canada and Bell Québec

Theoretical Sampling

Pivotal to qualitative research is purposive (Lincoln & Guba, 1985), theoretical (Glaser & Strauss, 1967) sampling, or replication logic (Yin, 1994). Whether it is called purposive, theoretical sampling or replication logic, the concept means that sample selection is usually nonrandom, purposeful, and small based on "the assumption that the investigator wants to discover, understand and gain insight and therefore must select a sample from which most can be learned" (Merriam, 1998, p. 61). Random sampling or sampling logic (Yin, 1994) implies that all potential members of the sample have an equal opportunity to be selected by chance and the probability that any one of them will be selected can be calculated. Random samples are generally used when the researcher aims to generalize the findings to the entire population from which the sample deemed to

be representative was selected. Yin warns that "Any application of this sampling logic to case studies would be misplaced (...) [because] case studies should not be used to assess the incidence of phenomena" (Yin, 1994, p.48) or the frequency of results. By contrast, theoretical sampling, popularized by Glaser and Strauss, involves selecting specific sites, events or people precisely because they contain particular characteristics "which the researcher wishes to understand in depth, not to find out is generally true of the many" (Merriam, 1998, p.208). (See section "Transferability" on p. 94 for more discussion on generalizibility).

Theoretical sampling translates in practical terms in two events: first, the initial sample is selected on the basis on its relevance to the research problem and potential to yield information desired. Secondly, guided by emergent patterns derived from analysis of the first sample, additional samples are selected according to the type of coding (open, axial, or selective) performed by the researcher at the time of sampling. Briefly, during open coding, "open sampling" serves the need to extend the emerging categories of concepts and it is "open to those persons, places, and situations that will provide the greatest opportunity for discovery" (Strauss & Corbin, 1998, p. 206). During axial coding, "variational sampling" aims to extend the dimensional variation of categories of concepts and might involve deliberate search for polar types or disconfirming "instances or variations" (Miles & Huberman, 1994, p.29 as cited in Merriam, 1998). Finally, during selective coding, discriminate coding is directed by the goal of comparative analysis where categories of concepts are compared among themselves to establish similarities, differences and relationships. Hence, to refine theoretical constructs until saturation is reached. (See section "Data Analysis" on p. 80 for application of the method).

Following Glaser and Strauss's (1967) notion of theoretical sampling, the researcher selected a sample of three individuals, members of the project team, called Élan, who implemented the web-based competency and training management program at Bell Québec. The Élan team consists of members of three subgroups: Operations, Corporate and IT consultants. In the first group are line managers and training professionals organized across seven different business units at Bell Québec: (a) Corporate Market, (b) Sales and channel support, (c) Sales ABM, (d) Consumer Marketing, (e) Customer Services, (f) Solutions IT, and (g) Public Access. In the second group are human resources (HR) and executives working at the corporate level at Bell Canada and BCE respectively, and in the third group are information technology (IT) consultants working for the LMS provider, Technomedia, which Bell Canada partially owns.

The initial sample, comprising four participants from the Customer Services, the Consumer Marketing and the HR, was deemed particularly interesting for the following three reasons:

- The Customer Services and Consumer Marketing units are polar opposites in terms of size, the latter having 80 employees while the second has 5000 employees, 80% of Bell Québec's employees. The other units have similar number of employees as the Consumer Marketing unit.
- The HR has a global vision of Bell Québec since it works closely with top-management and takes corporate decisions about the whole of Bell Québec.
- The sample is a portion of the project team, the latter which maps onto the organizational structure of the case company, Bell Québec. Each business unit at Bell

Québec was represented by one champion in the project team. Additionally, the project team includes actors, outside the boundaries of the case, but within its contextual limits, who have considerable impact on the actions and processes taken at Bell Québec. For instance, the subgroup Corporate represents the corporate services at Bell Canada, also called BCECS for Bell Canada Enterprises Corporate Services, who are mandated to take all strategic decisions involving all Bell Canada's subdivisions (see Figure 14 on p. 69).

Subsequent sampling was directed by the results of data analysis, in an iterative manner as explained further in the "Data analysis" section. In short, based upon analysis of the data from the first interviews, participants were chosen from BCECS, the Technomedia group as well as among employees from the Consumer Marketing unit.

In conclusion, in spite of its relative small size, the sample offered enough diversity of size and covered enough major organizational levels (i.e., corporate, operational and individual), to increase the conceptual density and applicability of the findings. Results grounded in even "a small sample of great diversity" yields "important shared patterns that cut across cases and derive their significance from having emerged from out of heterogeneity" (Patton, 1990, p.172).

Data Collection Methods

Data collection implies crafting instruments for gathering relevant data for the purpose of the research and managing data after collection. In order to enhance rigor and quality in case study research, Yin (1994) specifies three principles of data collection:

1. Use multiple sources of data.
2. Create a case study database.
3. Maintain a chain of evidence.

This section addresses the researcher's activities of data gathering and managing according to the above three principles.

Multiple data collection methods are typical of qualitative, inductive research and a major strength of case study research according to Yin (1994). The author identified six sources of evidence (archival records, direct observations, participant observations, physical artifacts, interviews and documentation) of which interviews are considered to be the most important source of evidence for case study investigation because most case studies involve human affairs (Yin, 1994). The rationale for gathering data using a range of different sources, a process known as triangulation, is that multiple data collection methods provide stronger substantiation of concepts and hypotheses and subsequently enhance construct validity and methodological rigor (Yin 1994; Eisenhardt, 1989).

The study employed four techniques to collect data:

- Semi-structured interviews.
- Direct observation.
- Documentary analysis.
- Focus group.

Semi-structured Interviews

Interviews imply obtaining information through a purposeful conversation between the researcher and the participant. Three types of interviews can be conducted: (a) highly structured, predetermined questions, (b) semi-structured questions, and (c) open-ended, exploratory questions. One-to-one, semi-structured interviews were chosen as the main source of primary data because of the depth of details through follow-up questioning, flexibility and closeness to the respondent they afford. Patton (1990)

describes such interviews as a "general interview guide approach" by contrast with the "informal conversational interview" and the "standardized open–ended interview" (p. 280).

The interview guide was designed based on the preliminary model for strategic alignment between training solutions and competency gaps constructed from the literature review on best practices for web-based competency management programs in organizational settings. It should be noted that the preliminary model supported the exploratory intentions by guiding rather than prescribing data collection and analysis. Miles and Huberman (1994) propose that a model can serve as a sensitizing framework for the study. Thus, the preliminary model was used to generate a set of opened-form questions for the interview protocol that served to guide, but not constrict, data collection with the chosen representatives. In other words, the interview instrument reflected "empty" categories of elements of the phenomenon, but did not address the content of these categories (e.g., "Roles: who does what?"). Two samples of the interview guide are available in Appendix A.

As a way of guiding the researcher in the process of data collection and augmenting the reliability of the case study, Yin (1994) advocates the design of a case study protocol. A case study protocol comprises both the data collection instruments and the procedures to be followed during data gathering. As pertains to the study, the case study protocol contained the following components:

- An interview checklist listing general rules to be observed before, during and after the interview.

- An overview of the research project with its objectives, significance for the case organization, methodology and projected schedule.
- A copy of the consent form to participate in research with details about respect for confidentiality and ethics regarding participants.
- A copy of the interview guide.
- A copy of the analysis plan.
- A database of contact information (names, telephone and emails) of initial participants. The database was continually updated as fieldwork proceeded.
- A research journal keeping track of dates participant were interviewed, names of referees and researcher's notes on the overall interview process.
- An outline of the final report which reflected the main sections of the preliminary model.

Prior to commencing data collection, the researcher conducted preliminary interviews with several performance specialists and training professionals with knowledge and experience with LMS. These preliminary interviews served two goals, (a) to test the interview guide to uncover potential flaws, and (b) to gain additional insights on the topic of the use of LMS for competency and learning management. Using feedback from the interviewees, the instrument guide was refined.

Primary data, defined as collected by the researcher, were collected through (a) semi-structured interviews involving eight participants altogether, (b) observation of one participant using the LMS, and (c) a focus group to review inconsistencies in the data and validate the study-generated model. Interview information was gathered using audiotape and field notes in the form a graphic representation (see Appendix A, Figure A1) of the

interview questions. Most interviews lasted approximately 90 to 120 minutes and resulted in transcripts averaging 5 to 15 single spaced pages.

Direct Observations

Observation as a data gathering technique involves a first-hand encounter with the phenomenon in its natural setting (Merriam, 1998).

Direct observation in this study involved two activities on the part of the researcher:

1. Observation of one participant using and demonstrating the web-based environment of the LMS with the different modules (i.e., competency management module, course catalogue) and features (i.e., skill gap analysis, competency profiling, course registration, etc.) during an interview.

2. Observation of the champions gathered for their monthly meeting on the Élan project. The meeting was an opportunity for the researcher to build on tacit knowledge shared by the Élan team members, to triangulate data collected during interviews and to gain insights on interaction patterns among the team.

Documentary Analysis

Documentary analysis involves "mining data" (Merriam, 1998, p. 112) from such materials as administrative documents, annual reports, minutes of meetings, memoranda, etc. Documentation can be used in conjunction with other sources of evidence in order to "corroborate and augment evidence from other sources" (Yin, 1994, p. 81).

Primary data was supplemented with secondary data – defined as data already available because collected formerly for another purpose than the present problem – by collecting different materials: organization charts for Bell Canada, an annual report, the company newsletters, financial reports, PowerPoint presentations and change

management procedures produced by the project team, and printouts of the course catalogue and competency dictionary housed in the LMS.

Focus Group

Since exploratory case study research aimed at theory-building leaves the option to include additional means of data collection to reach theoretical saturation (Eisenhardt, 1989; Yin, 1994), a focus group was performed at the very end of the data collection and data analysis activities to present participants with the findings and the model derived from the research. The focus group took place during a regular monthly meeting of the Élan team and gathered not only participants formerly interviewed by the researcher but also line managers filling the role of champion for their respective business units. The researcher presented the model and invited participants to validate or invalidate the findings and fill any missing information relevant to the research.

Data Management Methods

Data management includes the activities of data organizing, storing, displaying and retrieval (Huberman & Miles, 1994) and relates to Yin's second principle of data collection: the case study database. A case study database is a repository of the evidence gathered for each case, such as handwritten or electronic interview transcripts, audiotapes, tabular materials, investigator's field notes, etc. A case study database enhances reliability based on the fact that it holds evidence which can be directly reviewed by other researchers.

For the purpose of the present investigation, record-keeping of collected data was supported through the use of a computer-assisted qualitative data analysis software (CAQDAS), Nvivo, a software developed out of an earlier program, NUD*IST

(Nonnumerical, Unstructured Data, Indexing, Searching, and Theorizing). CAQDAS takes over the clerical tasks associated with writing codes in margins, cutting and pasting together chunks of text related to codes, and adding memos to specific points in text. The benefit of CAQDAS lies less in the conceptual logic of coding which needs to be developed by the researcher, than in the speed and comprehensiveness of searches it can affords. "...the computer does not search the data file until it comes up with the first example that will 'do' to illustrate an argument, nor will it stop after it has found just one or a couple of apposite quotes or vignettes" (Coffey, Holbrook & Atkinson, 1996, "Ethnographic Data Analysis and The Computing Moment" section, para. 2). Additionally, the authors have commented on the close connection between the processes of coding and Nvivo which has been developed around the aim of incorporating many of the key tasks of the grounded theory. Although this offers researchers with a clear and transparent process of data analysis, there are concerns "that aspects of grounded theory have been over-emphasized in the development and use of qualitative data analysis software, while other approaches have been neglected in comparison" (Lonkila, 1995).

Prior to formal analysis of data, each audio taped interview was first transferred from the digital recorder to the hard drive of the computer and stored as an audio file. The audio file was then transcribed using a voice recognition software Via Voice (IBM) for verbatim accuracy, and the word-processed transcript (Word files) was imported into Nvivo. Thus, the main case study database (see Figure B1 in Appendix B) contained a separate folder (see Figure B2 in Appendix B) for each interview, the latter which contained:

- The interview audio file.

- The word-processed transcript.
- Any electronic documentation provided by the participant.
- The transcript of interview data (with added codes and memos after data analysis).
- The case report synthesizing findings which was added after data analysis).

Figure 15 below illustrates a flowchart of the data collection and management used in this study.

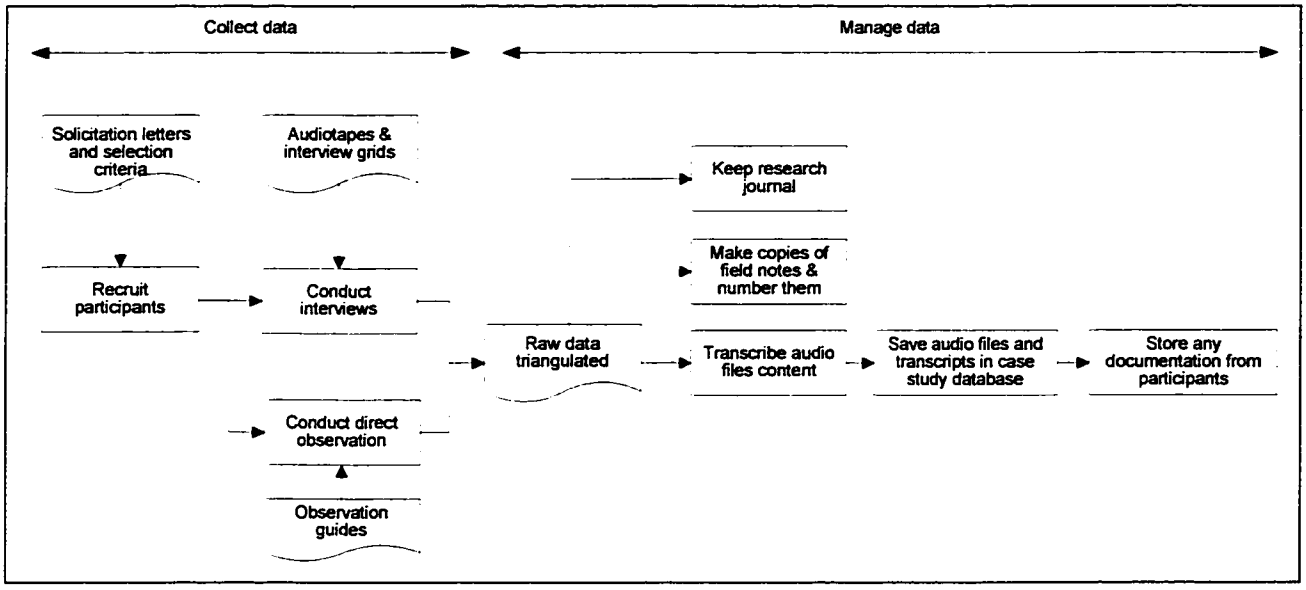


Figure 15 Flowchart of the data collection and management plan

A full discussion of the activities of coding and analysis using Nvivo is provided in the next section on data analysis.

Finally, as pertains to Yin's (1994) third principle of data collection, namely maintaining a chain of evidence, field notes served to draw meaningful links between the research questions, raw data, and findings in order to provide sufficient details for an outsider to trace the research process backward from the conclusion to the initial research question. Establishing a chain of evidence ensures reliability of the information and that

the data collected is consistent with the specific procedures and questions outlined in the study.

Data Analysis

Special consideration must be given to data analysis in case study research because of the typically overwhelming volume of data involved (Eisenhardt, 1989). In theory-building research, data analysis generally occurs simultaneously with data collection. Analysis of case study data is an inductive, iterative process that begins with the first piece of datum collected, and the emerging insights and tentative inferences direct the next phase of data collection (Strauss & Corbin, 1998). This leads to the refinement of questions, collection of more data, which leads to more insights and themes, and so the process continues.

The constant comparative method developed by Glaser and Strauss (1967) to support "grounded theory", provides for a systematic flow between data gathering and data analysis. Consistent with the tenets of "grounded theory" methodology, the researcher analysed the data according to the process of coding, a process which "represents the operations by which data are broken down, conceptualised, and put back together in new ways. It is the central process by which theories are built from data" (Strauss & Corbin, 1990, p. 57). Coding implies three distinct processes: open coding, axial coding and selective coding.

Open Coding

Open coding refers to the process of fragmenting, asking questions of the data, comparing them for similarities and differences, attaching conceptual labels to events, ideas, actions and objects in the data, and subsuming the concepts under more abstract

categories. (Strauss & Corbin, 1998). The outputs of coding are categories of concepts together with their properties and dimensions. As pertains to the present investigation, the researcher scanned through the first transcribed interview data to get a first overall impression of the phenomenon, but without taking any notes. A second reading on the basis of "whole sentence or by paragraph analysis" (Strauss & Corbin, 1998, p.120) was conducted in order to discover and label significant events such as "validating behavioural competencies" or "setting up change awareness sessions". As an example, the event from the sentence excerpt "there was a validation of behavioural competencies" was labelled "Validation Behavioural ". Subsequent occurrences of events conceptually similar to the labelled event "there was a validation of behavioural competencies", for instance "so not only to validate the competencies, but we were also involved for the required levels", would be labelled with the same code, also called node within Nvivo (see Figure C1 and C2 in Appendix C for two samples of an interview transcript coded with Nvivo).

Examples of the process "validating behavioural competencies" which varied in form and content, (e.g., "there has been two validations, one for the champions (...) and one for the marketing people and sales people for the behavioural competencies") were given a different code (e.g., "Validation Behavioural Champions", a child node, connected to its parent through a tree like structure. Happenings or actions which could not be connected (e.g., "Profiling structure examples") were coded using free nodes (see Figure C3 in Appendix C). As concepts began to accumulate, they were classified according to the properties they shared in common. For example, events conceptualized as "Adaptation Behavioural", "Validation Behavioural", "Validation Technical",

"Profiling Technical Competencies" were grouped under a higher order concept or category called "Competency Profiling" because they all support the same goal, that is the development of competencies profiles, and include similar actions: analyzing the content of competency definitions in order to verify their adequate reflection of the job requirements and analyzing the wording of competency definitions in order to assess their compliance with standards of accurate competency statements. As shown in Figure 16 below, other categories included "Skill gap analysis", "Development plans", "Challenges", etc.

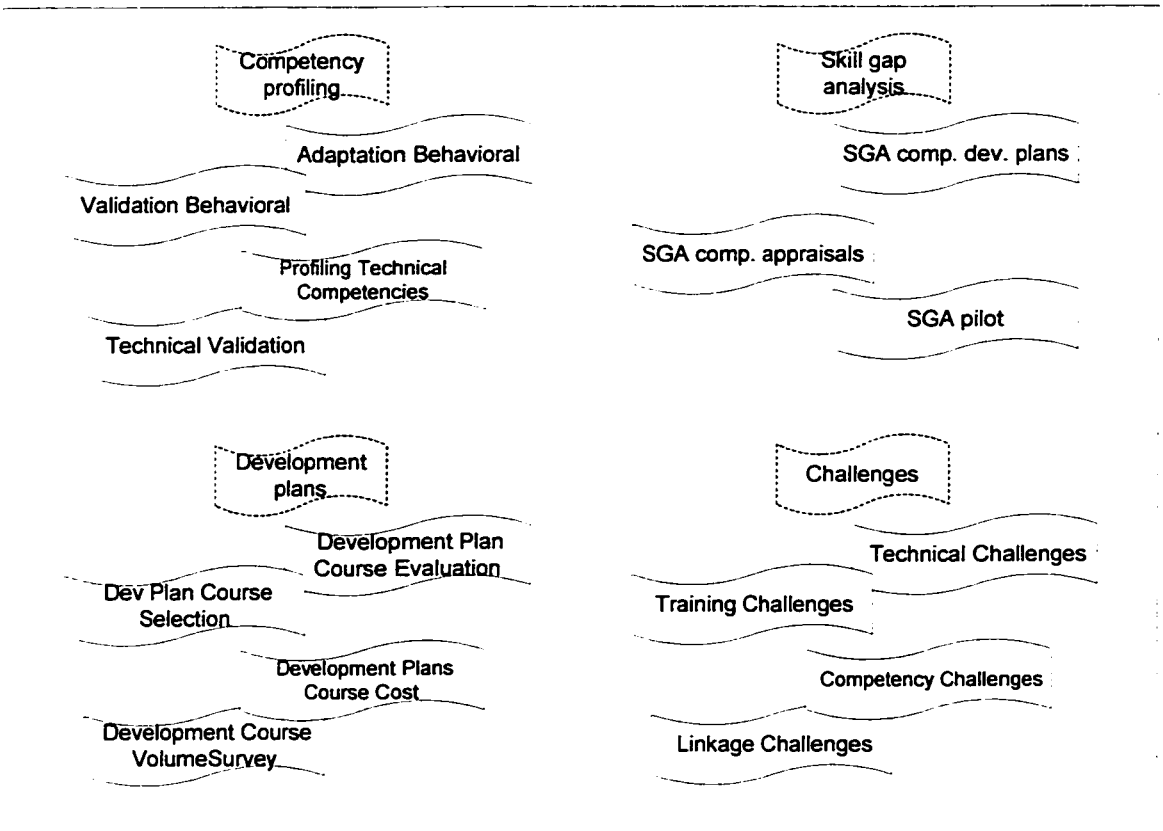


Figure 16 Examples of coded concepts grouped in categories during open coding

In addition to the codes, the researcher created memos for each new code as reminders of the signification of the labels used as codes and rationalization of

connections made between the data and the researcher's conceptualization. For instance, the memo attached to the code "Validation Behavioural " read: "Refers to the process of validating the Beha. comp. with the Vice Presidencies" (see Figure C4 in Appendix C). Once the transcript had been fully coded, the researcher reviewed all codes to identify any superfluous duplication and any inadequate linkage within the structure of trees of codes.

Axial coding

Axial coding, "termed axial because coding occurs around the axis of a category" (Strauss & Corbin, 1998, p. 123), aims at reconnecting data broken up during open coding by linking categories to their subcategories. Strauss and Corbin (1998) suggest two forms of axial coding depending on the analytic focus: coding according to the dimensions and properties of categories or coding according to the changes in action/interaction over time and space. In both cases, each developed category must be related to the paradigm model which helps identify the structure and process of the phenomenon studied. The basic features of the paradigm model: (a) causal conditions, (b) context, (c) intervening conditions, (d) action/interaction, and (e) consequences, represent major categories and are related to the central phenomenon under investigation. The products of axial coding are categories and their subcategories.

Application of the principles of axial coding led the researcher to code for process, that is to examine the series of evolving sequences of actions undertaken by the various actors of the web-based competency and training management program implementation at Bell Québec. As an example, continuing with the first interview, within the category "Competency Profiling", a sequence of steps was identified as sub

processes of the process "Competency Profiling". Thus, "Technical raw documents inventory" was the first step which consequence or outcome, the "list of job profiles, task descriptions, performance evaluations forms, etc." became part of the conditional context for the next activity "Technical Development Competencies". The outcome (i.e., consequence) of activity "Technical Development Competencies" was "Well detailed Technical Profiles" which in turn contributed to the activity "Validation Technical". (See Figure 17 on p. 85 for an illustration of the output of axial coding. It should be noted that "axial and open coding are not sequential acts" (Strauss & Corbin, 1998, p. 136). Although the process of coding is here described in a linear fashion, in practice, the researcher employed these two techniques alternatively. For instance, during axial coding of the first interview, upon closer analysis of the categories derived during open coding, it was deemed necessary to subsume all codes pertaining to the development of technical competencies under the category "Profiling Technical competencies", itself a subcategory of the major category "Competency Profiling", along with "Profiling Behavioural competencies" and "Profiling Technological competencies".

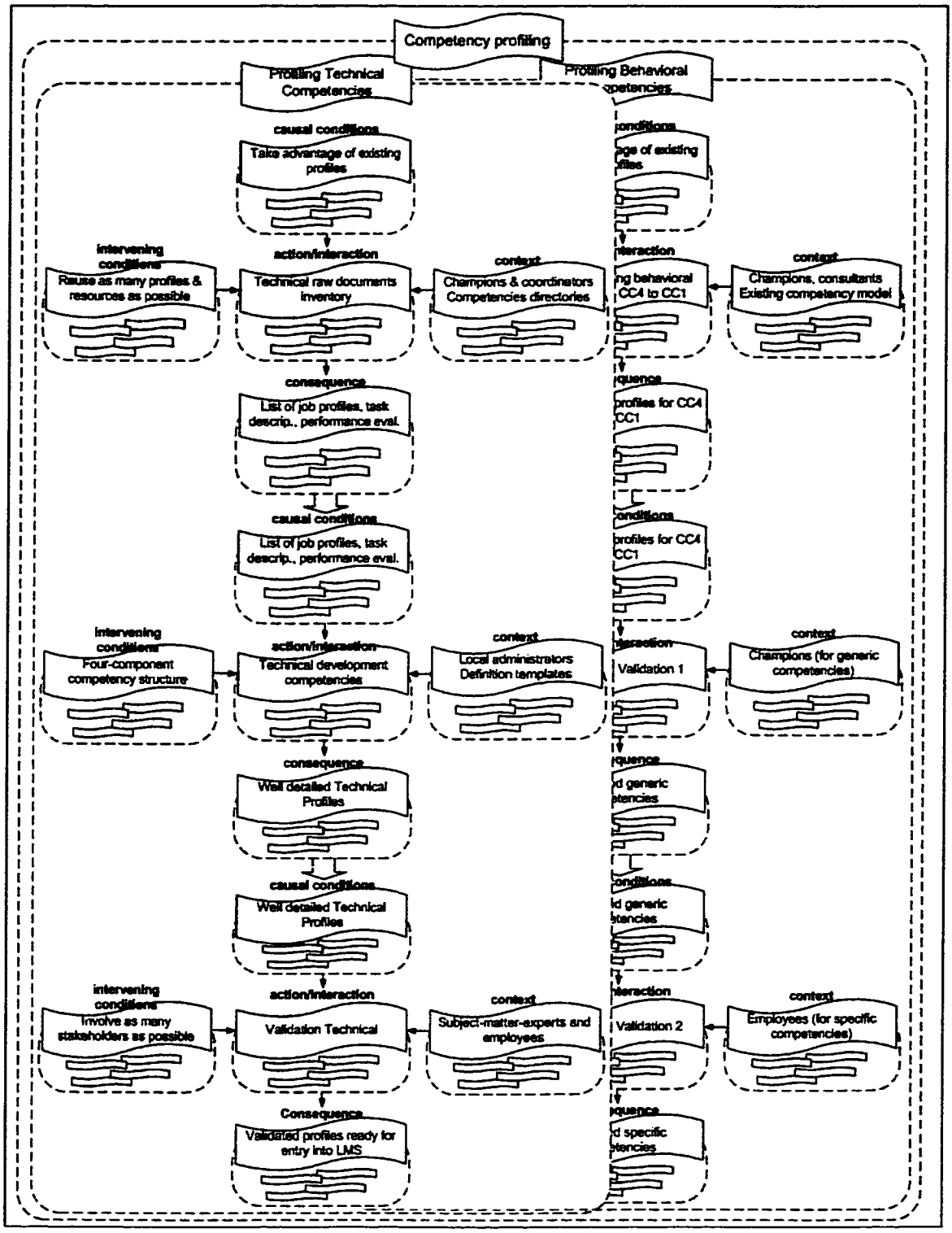


Figure 17 Two categories of concepts linked to their subcategories according to the paradigm model during early axial coding

At the end of the analysis of the first interview, axial coding resulted in nine major categories: "Planning", "Competency profiling", "Skill gap analysis", "Development plans", "Training solutions", "Change Management" and "Linkages". Within each major category, the conceptual relationships between the category and its subcategories were made based on the following assumptions:

- *Causal conditions* are the goals expressed in decisions and the sets of events that prompted the competency profiling efforts, the training solutions development efforts, the linking efforts, the skill gap analysis process and the change management initiatives.

- *Contextual conditions* are the particular spatial and temporal set of conditions that supported the processes described above. Under this assumption, human and material resources were viewed as contextual factors that converged to allow the strategies to take place.

- *Intervening conditions* are the standards or criteria set by the actors to ensure the success of the strategies undertaken.

- *Action/interaction* are the series of activities that connected to produce the overall processes undertaken to implement the web-based competency and training management program.

- *Consequences* are the outcomes of strategies and processes undertaken to implement the competency-based training program.

As an example, the process "Competency profiling" (action/interaction) was directed by the corporate decision (causal conditions) to update existing competency profiles or develop new profiles in order to provide employees with professional

development tools. The success criteria (intervening conditions) for that process, coded "profile structure examples", outlined a detailed structure for the definition of competency profiles. The latter were to include a statement for the job function, a description of the competency, further broken down into competency elements. Each of the elements was associated with four to five evaluation criteria corresponding to proficiency levels. As mentioned earlier, the process "Competency profiling" was broken down into a sequence of activities grouped under three categories of concepts (See Figure 17 on p. 85 for a close-up of the contents of the major category). The context (contextual conditions) for that process was the different human and physical resources employed. Finally, the outcomes (consequence) of the process "Competency profiling", the completed competency profiles, were identified as "Completed Competency Profiles". Figure 18 below on p. 88 illustrates the links between the major category "Competency profiling"and its subcategories identified during axial coding.

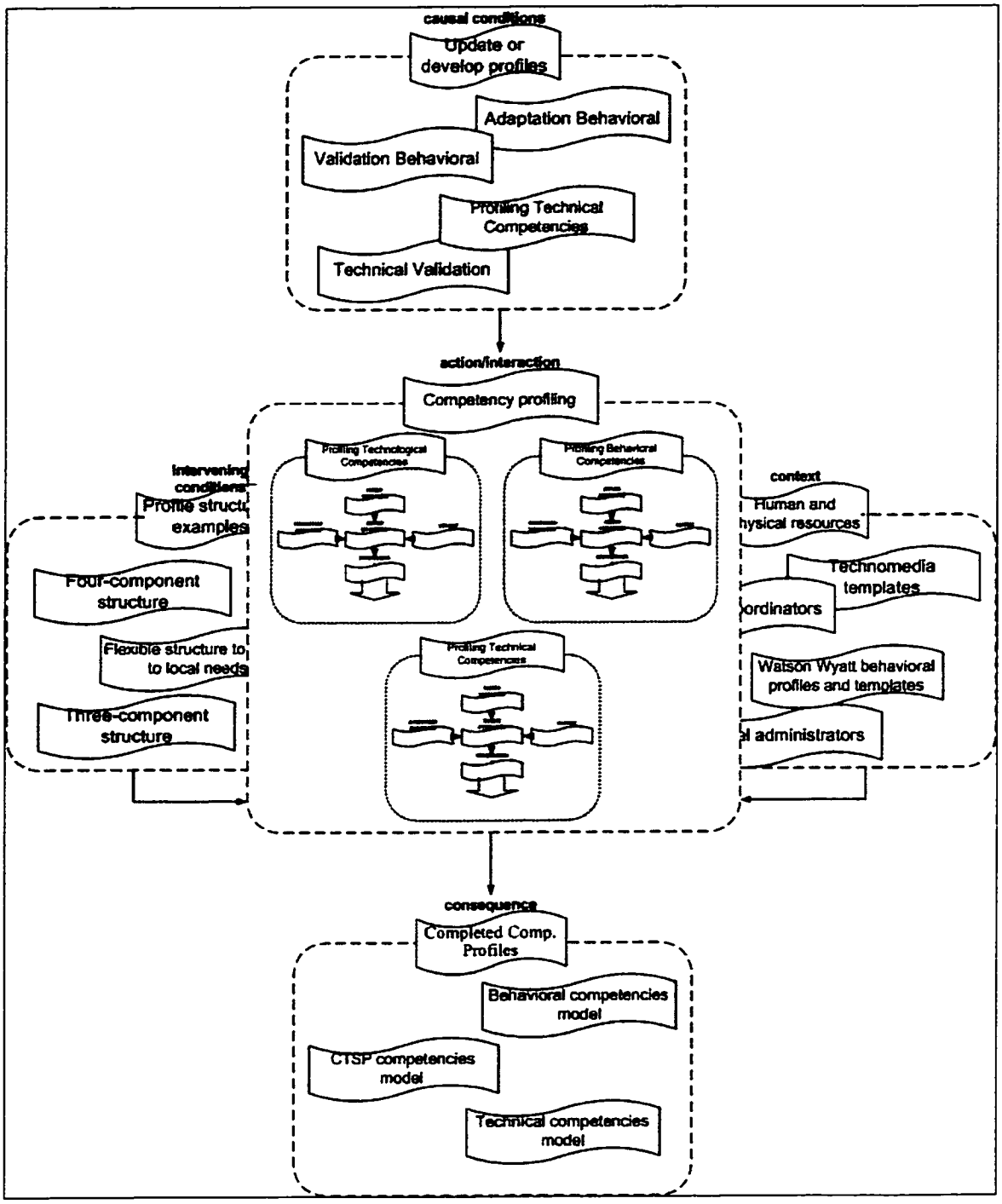


Figure 18 A major category linked to its subcategories according to the paradigm model during later axial coding

Findings for the first interview were organized into a matrix (see Appendix D for a sample of the matrix) which presented the major categories (i.e., "Planning", "Competency profiling", "Skill gap analysis", "Development plans", "Training

solutions", "Change Management" and "Linkages") along the horizontal axis while the components (i.e., causal conditions labelled "goals", context labelled as "human and material resource", intervening conditions labelled as "criteria", action/interaction labelled as "activities", and consequences labelled as "results") of the paradigm model were aligned along the vertical axis. The "goals" category is not listed in the matrix but is reported directly in the findings. Next, further analysis of documents provided by the first two participants generated additional information which was conceptualized and incorporated into the matrix. At this stage, findings for the first interview were considered provisional until analysis of the next interview transcript. As emphasized by grounded theorists Strauss and Corbin (1998), categories of concepts do not represent a single individual's account but rather the conceptual reduction of the accounts of a large number of people or groups of people (p. 145). The tentative categories synthesized in the matrix and derived from analysis of the first interview contributed to the refinement of the interview guide which was to be used with the next participant selected as part of the initial sample. As stated earlier, the initial sample included four participants from the Customer Services, the Consumer Marketing and the HR. Following the principle of "open sampling", the second interviewee came from the Customer Services, and the goal of the interview was to refine the tentative categories with their account of the implementation of the web-based competency and training management program also known as the "Élan" project.

Using both the refined interview guide and the matrix of tentative findings, the researcher sought to understand the particular details that distinguished the Customer Services unit, as well as the elements that confirmed emerging findings. Since the

Consumer Marketing and the Customer Services are on the same hierarchical level within Bell Québec's organizational structure and share the same status of "business units", it was expected that their account of the process followed would bear many similarities, yet also some differences due to their distinct number of staff. For instance, analysis uncovered that the change management approach in the Consumer Marketing unit included the distribution of 10-page paper guides on how to navigate within the environment to all 80 employees while the Customer Services had to consider the cost of printing a 10-page guide and opted to send its 5,000 employees a one-page description with a flowchart indicating the steps to navigate in the environment. As a result of open and axial coding of the second interview data, the matrix was augmented with subcategories (e.g., "limited paper-based navigation tool") representing the different reality of the Customer Services business unit.

The next round of data collection involved an observation and interview with a participant from the HR department, followed by an interview with a participant from the consultant firm Technomedia, and an interview with an employee from the corporate services. Selection of the participant from Technomedia was predicated on the fact that he had played a prominent role as leader of the team on the consultant side of the Élan project (see Figure 21 on p. 108) for an illustration of the composition of the Élan team). Having overseen the project from its inception, his perspective was crucial to represent the vendor side as opposed to the client side. Similarly, the participant from the BCE corporate services was selected because she makes all decisions pertaining to budget expenses related to the LMS (e.g., purchase of licenses) and to administration of the LMS (e.g., approval for opening of review periods). The researcher also sampled an

employee from the Consumer Marketing based upon the assumption that she could provide her perspective as a user of the system and help the researcher's understanding of the multiple factors involved in the implementation of a web-based competency and training program. Given that this last interview provided a balanced view of the benefits and challenges of the project, the researcher did not seek to apply the principle of "variational sampling" to select an employee for whom the program was not a successful experience. Through open and axial coding, categories became progressively well established after comparing data from each participant and from documents collected at the site.

Selective coding

Selective coding implies identifying the core category characterizing the phenomenon or central idea by systematically relating it to other categories, validating those connections, and filling in categories that need further refinement. The product of selective coding is the core category.

With respect to the present study, data analysis led to the identification of phases rather than that of a core category. Based on the completed matrix, an initial graphical model of the findings was created in order to integrate the major categories labelled "Planning", "Competency profiling", "Skill gap analysis", "Development plans", "Training solutions", "Change Management" and "Linkages" according to the chronological and logical development in which they took place in the project. Making use of organizing tools such as matrices and diagrams is a technique recommended by Strauss and Corbin (1998, p. 153) because it helps the researcher to take a macro view of the data and better understand the relationships of the overall theoretical scheme.

Prior to finalizing the data collection process, the researcher selected one last participant, the Élan project leader, also Bell Québec HR divisional director, to fill any gap in the findings. For instance, the category "Evaluation" represented the last phase in the diagram, but the sequence of activities during that phase was poorly developed and needed to be supplemented with the perspective of the leader of the project since he had extensive knowledge of the overall process. With the model of the developmental phases of the web-based competency and training management program completed, the researcher sought to validate the results of the study through member checking. The model was first sent to all participants for reviewing and a focus group intended to collect all their comments and suggestions for improvement was organized. Analysis of the participants' comments allowed for further refinement of the model until theoretical saturation (Strauss & Corbin, 1998) was reached, at which point the data collection and data analysis came to an end. See Figure 37 p. 171 for an illustration of the final model of the phases of web-based competency and training management program at Bell Québec.

Integrity and Trustworthiness of Case Study Research

The question of methodological soundness in case study research speaks to the evaluation of the integrity and trustworthiness of the research process, the data collected and the analytic logic used to derive the findings. Some qualitative researchers have proposed four specific evaluative criteria meant to address the quality of research designed to build theory empirically: credibility, transferability, dependability and confirmability (Lincoln & Guba, 1985; Patton, 1990; Talbot, 1995; U.S. General Accounting Office, 1990). The following section illustrates how the researcher applied these canons to this investigation.

Credibility

Credibility relates to the ability of the researcher to ensure the verity or truth-value of the findings which must reflect the respondents' stories and "preserve the holistic situation" (Guba, 1981, p.84). Several strategies can help ensure credible results, among which are: triangulation and member checking (Guba, 1981). Triangulation is the process of using multiple perceptions to elucidate meaning and corroborate the validity of an observation or interpretation (Stake, 1988). Triangulation involves gathering rich, comprehensive data by using multiple sources of data collection (e.g., interviews, observation and archival documents). Member checking implies asking key informants to review draft case study reports in order to confirm or refute the researcher's interpretation of their statements after analysis. In the present study, credibility was enhanced through the use of interviews, direct observation and documentary analysis to triangulate similar evidence of the actions, success criteria, roles and products involved in the implementation of the Élan competency-based training project. For instance, responses of participants regarding the structure of competency profiles and the content of the LMS-based course catalogue were compared with the written documentation about the LMS and with direct observation of the competency and learning modules within the LMS in order to confirm structural and functional elements of the LMS. Determination of credibility was also accomplished by submitting to each participant transcripts analyses (i.e., the matrix of findings) for review and to ensure that emergent findings and interpretations matched their views and experiences. Furthermore, upon reaching closure of data analysis, a second member check was carried out in the form of a focus group to

allow the participants to validate the final model of the implementation of the Élan project.

Transferability

Transferability in theory building research refers to the "explanatory power" of the findings. "Explanatory power means 'predictive ability', that is the ability to explain what might happen in given situations..." as is the case of large theories built upon densely developed categories of findings (Strauss & Corbin, 1998). Studies with a limited focus of investigation generate substantive theories that do not have the same explanatory power as general theories, but still have explanatory value with regards to the specific population. Such claim is echoed by Yin (1994) who argues that qualitative research claims "analytic generalization" or the extent to which findings are typical of the field sites from which they were obtained, rather than "statistical generalization" or the extent to which findings are representative of the larger population from which the sample was drawn. Transferability can be supported both with careful theoretical sampling informed by data analysis and with "thick" descriptions (Guba, 1981) of the findings to allow readers to assess the merit of the substantive theory in relation with the empirical setting. As discussed earlier, the researcher sampled knowledgeable participants in the best position to offer ample and accurate information on the activities, results and success criteria involved during implementation of the Élan project. Subsequently, the choice of participants, namely the Technomedia consultant, was aimed at obtaining the broadest range of perspective on the process of implementation of the Élan project, a sampling technique called variational sampling (Strauss & Corbin, 1998). Yet, maximum variation sampling was not achieved since no negative cases were sampled, a limitation which may

alter the explanatory power of the findings, although the account of the sole employee interviewed is considered balanced. Turning to the second strategy, providing richly described data, first, the researcher preserved the authenticity of the data with tape recordings, transcriptions and a case study database. As demonstrated in the "Results" section, findings are reported with verbatim excerpts of original accounts and clear descriptions of the contextual and temporal boundaries of the case from which the researcher interpreted the process of the Élan project. These elements of rigor will allow readers to draw their own conclusions about the phenomenon of web-based competency and training management.

Dependability

Dependability addresses the need to document procedures and methodological choices systematically to allow other researchers to track and replicate the steps taken in the process of inquiry. Suggested techniques to ensure dependability include developing a case study database and an interview protocol (Eisenhardt, 1989; Merriam 1998; Yin, 1994). At the outset of the study, a case study protocol (See section "Data Collection Methods" on p. 72 for more details on the contents) was designed to help the researcher (a) keep the purpose of the research in mind at all times (with the overview), (b) document decisions underlying purposeful sampling and collection of relevant data, and keep a chronological log of interview data collection (research journal), and (c) formulate new, specific interview questions according to emergent findings (with the interview guide).

An additional aid to enhancing dependability was to employ Nvivo to support a consistent approach to data analysis. Throughout the study, systematic coding and

memoing activities for each interview data were recorded as separate Nvivo files which, together with field notes, case study reports and diagrams, resulted in an audit trail or chain of evidence, Yin's (1994) third principle for rigor in case study research, of the analytic logic followed by the researcher. Furthermore, schematic diagrams of the data analysis process and research design which served as roadmaps for the researcher, also contributed to increase dependability (see Appendix E for a diagram of the research design).

Confirmability

Confirmability refers first, to the degree to which "data, interpretations, and outcomes of inquiries are rooted in contexts and persons apart from the [researcher] and are not simply figments of the imagination..." (Guba & Lincoln, 1989, p. 243), and secondly, to the researcher's ability to limit biases. Strauss and Corbin (1998) note the need for researchers to "achieve a certain degree of distance from the research materials and to represent them fairly;" (p.35). This is especially true for grounded theory research where the researcher is considered the main human instrument in an emergent research design with an iterative process between data collection and analysis. Thus, it is vital that the researcher makes explicit the analytic logic underlying the conceptual relations made between data and concepts. Confirmability, like dependability is enhanced with an audit trail, but also with external auditors assessing the coherence between the research process and the findings derived. Another strategy to ensure confirmability in the study is to adopt the constant comparison method and to acknowledge personal biases that may have distorted the findings. In this study, the researcher's supervisor and the thesis committee members examined the inquiry process and confirmed it as appropriate. Furthermore, as

discussed earlier, use of the constant comparative method translated in a continuous effort to draw logical connections from the data through systematic open, axial and selective coding.

CHAPTER 4

RESULTS

Introduction

The purpose of the research was to develop a holistic understanding of the complex process of using a LMS to align e-learning and classroom-based training with competency gaps. This chapter presents the findings obtained from a case study on the implementation of a web-based competency and training management program at Bell Québec, conducted to address the above mentioned goal and more specifically the following main research question and sub questions:

What organizational strategies, resources, results, criteria and factors are necessary to successfully utilize a learning management system (LMS) to align e-learning and classroom-based training with competency gaps?

- What organizational strategies, resources, results, criteria and factors are involved in the definition, referencing and management of a competency directory housed in a LMS?
- What organizational strategies, resources, results, criteria and factors are involved in the identification of gaps between the competencies required to achieve business goals and actual competencies held by employees?
- What organizational strategies, resources, results, criteria and factors are involved in the definition, referencing and management of a catalogue of e-learning and classroom-based training housed in a LMS?

- What organizational strategies, resources, results, criteria and factors are involved in the process of linking together a competency dictionary and an e-learning and classroom-based training catalogue housed in a LMS?

Terms and Definitions used by the Élan Project Team Members

ILE: Integrated Learning Environment is the name given to the proprietary web-based learning management system acquired by Bell Canada from the vendor Technomedia. The brand name is SIGAL for Système Intégré de Gestion d'Apprentissage en Ligne.

Online course: A training activity or educational content delivered via Bell Canada's intranet (i.e., web-based).

Self-paced learning: A training activity or educational content delivered on CD-ROMs or floppy disks.

Review period: An competency assessment or skill gap analysis conducted yearly for all employees at Bell Québec.

CTSP: The competency directory for technological competencies named "Programme de Compétences Technologiques de Base" at Bell Québec. Its English equivalent is the Core Technical Skill Program (CTSP).

Virage en ligne: The name given by the Élan team to the program intended to foster an e-learning culture at Bell Québec. Based on statistics that point to similar programs in Canadian organizations, Industry Canada (2002) coined the term "Move online" to describe such initiatives.

Events Leading to the Élan Project

The need for a web-based competency and training management program emerged from the vision of Bell Canada as a convergence leader in Internet-based communications initiated in 1998 and formally articulated by corporate leaders in 1999.

Early in 1998, training and corporate leaders at Bell Canada conducted an analysis of the causes of major failures of past new product development projects. The results of the analysis study revealed that Bell Canada was unable to anticipate adequately the human resources competencies needed to perform each phase of the product development cycle (concept, feasibility, development, marketing, sales, distribution). The problem was found to be exacerbated by the comparatively short product cycles times which average 18 months in the telecom sector. The following observations by the general manager at Technomedia capture the nature of the problem identified at the time:

> Ce que je voyais dans le marché et ce que je partageais avec des exécutifs de Bell, c'était que le cycle des produits était tellement court, on avait énormément de difficulté à cibler au départ si on avait des ressources pour embarquer dans le produit. On a rapidement ciblé des projets qui avaient été lancés où il y avait eu un taux d'échec rapide parce qu'on n'a jamais eu les compétences pour soit faire la mise en marché, soit faire une installation adéquate...on a identifié qu'au niveau des compétences, plus on est capable d'identifier a priori où sont les compétences, mieux on sera en mesure d'évaluer le processus d'évaluation d'opportunité.

Training, HR and corporate executives concluded that their ability to capitalize on business opportunities was highly dependent on their capacity to paint accurate pictures of their competency assets in order to acquire the needed competencies internally, or externally by recruiting.

As a result, in June 1998, a LMS, named Integrated Learning Environment (ILE) was implemented at Bell Canada's five main divisions: Bell Ontario, Bell Québec, Bell Nexxia, Bell Mobility, Bell Actimedia. At that stage, the competency management module, although in development, was not yet functional, and the basic purpose of the

LMS was to serve as a training management tool to help track costs more accurately and better target training investments. Based on the identified needs, the long-term goal for ILE was to increase employees' career development and self-management of training through a direct, online access to a single platform for the management of competencies and training. In September 1998, as a first step toward the long term vision of a web-based competency and training management approach, the LMS offered 34 online courses to all its 55,000 employees.

In the late 1998s, early 1999s, a new competency management module was created in ILE and an initial attempt to develop competency profiles to be later housed within ILE was carried out. This attempt failed because of the extreme detail with which competency statements had been defined. Statements resembled molecular descriptions of daily tasks, rather than the broader idea of competence typified as a set of knowledge, skills and attitudes adopted in the strategic vision of training and HR leaders, and upon which ILE had been conceptualized.

In spring 1999 however, a new strategy called the 3 C strategy revived the interest in competency management and the need for the development of core strategic competencies to meet the goal of the 3 C strategy. Bell Canada's 3 C strategy came in response to the growing influence of the Internet as a convergence medium between communications, media and e-commerce (Monty, 2001). The 3 C are outlined as follows:

- *C for connectivity*: Bell Canada's aims at exploiting existing phone line connections to sustain and increase the growth of cell-phone, wireless and satellite television, and Internet services connections.

- *C for content*: Because connection without content is valueless, Bell Canada aims at augmenting its connectivity with news, sports, entertainment, information and shopping, all with as much Canadian content as possible.

- *C for commerce, especially E-commerce*: Bell Canada wants to promote the transfer of business functions, such as electronic payments to the Internet, and deliver e-procurement and marketplace solutions to Canadian enterprises of all sizes.

Senior management at Bell Canada conceptualized a futurist portrayal of the organization, a depiction of the organization in 2004 based on the 3 C strategy, and subsequently, subject matter experts (SME) identified the crucial, core competencies needed to actualize the envisioned organizational profile. The output of this effort led to a corporate competency profile called the "Core Technology Skills Program" (CTSP) comprising 4 corporate competencies and 21 elements of competencies (see Figure 19 below on p. 103). Recognition of the crucial importance of these corporate competencies is exemplified in the high target set by Bell's senior management: at least 95% of Bell Canada's employees should demonstrate a proficiency at level 2 in the CTSP competencies.

Core Technology Skills Program (CTSP)

	Job Requirements	Assessment Type
C0013 - Understanding telecommunications	2	C - L (E)
Learning Elements		
Data Transmission Fundamentals	2	
Traffic Theory	2	
Understanding the physical layer of the network	2	
Established Network Design Principle	2	
Services offered	2	
C0014 - Internetworking concepts and architecture	2	C - L (E)
Learning Elements		
Transport Fundamentals	2	
IP Network Service Fundamentals	2	
Network Management	2	
Networking Fundamentals	2	
Internet Protocol Fundamentals	2	
Security Fundamentals	2	
C0015 - Understanding of IP based applications	2	C - L (E)
Learning Elements		
Understanding benefits of Internet Protocol Standard	2	
Knowledge of IP products and Services offered by BCE	2	
Ability to create Web-based content based on the HTML standard	2	
Knowledge of client/server architecture	2	
C0554 - PC Essential	3	C - L (E)
Learning Elements		
PC Basics	3	
Excel	3	
PowerPoint	3	
Word	3	
Windows Environment & System Configuration	2	
Internet & E-Mail use	3	

Figure 19 Sample Core Technological Competencies Profile
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In the fall 1999, an organizational analysis across Bell Canada's five divisions (Bell Ontario, Bell Québec, Bell Nexxia, Bell Mobility, Bell Actimedia) was undertaken with three objectives: (a) to evaluate the level of competence of executives primarily, and that of employees secondarily, (b) to give an impetus for the competency approach and self-registration to courses through ILE, and (c) to prepare the ground for the next round of competency appraisal at the individual level, projected in 2000/2001. Senior management including the president, executive vice-president and vice-presidents were asked assess themselves against the CTSP competencies model and provide an overall rating of the level of proficiency of their employees measured against the same CTSP model. Granted that the CTSP competencies model was not yet housed in ILE, the assessment was carried out with Excel questionnaires. In December 1999, the result of the organizational analysis uncovered a competency gap between the optimal competencies of the CTSP and the actual competence of a portion Bell Canada's workforce.

Findings from the organizational analysis provided strong evidence supporting the need for a web-based competency and training management system. Its envisaged purpose was twofold: first, to provide all employees with the basic, but crucial knowledge of IP and PC applications, necessary to advise and offer Bell Canada's customers connectivity solutions outlined in the first C strategy. Second, the web-based competency and training management program was viewed as a strategy to enhance employees' empowerment and independent professional development by providing them direct access to training offerings through an online "self-service". Besides, the need to shift to a web-based management system was compounded by another factor. In response

to dramatic transformations in the telecommunications industry which was affected by the deregulation, constantly evolving new technologies and globalization of business practices (Whalen & Wright, 2000), the Institut de Formation Professionnel Bell (IFPB) was downsized from 350 to 32 training specialists between 1996 and 1998. Next, in an effort to migrate internal training towards outsourced training and an intranet-based training catalogue, the IFPB became the Centre de Développement des Employés (CDE), later to be merged with Bell Canada Enterprises Corporate Services (BCECS). Upon the merger, BCECS became the owner and "watchdog" of the platform ILE with a mission to ensure that any technical modifications brought to ILE remained compatible among all five divisions (Bell Ontario, Bell Québec, Bell Nexxia, Bell Mobility, Bell Actimedia). Their responsibility also involve making financial decisions where ILE is concerned and communicating to Technomedia all requests for technical improvements about ILE emanating from the operational level.

A year later, in the summer 2000, the implementation of a new version of ILE with a new competency management module in a business unit outside Bell Québec, set the start of discussions at Bell Québec on the earlier plan to launch a competency appraisal among all levels below vice-presidents, namely directors, associate directors, managers and administrative assistants. Technomedia, a consultant firm was mandated by the current executive vice-president (EVP) of Bell Canada, to spearhead the new competency assessment as a project pilot to all 6,000 employees at Bell Québec. The Élan project, an HR initiative at Bell Québec, was born.

The Five Phases of the Implementation of a LMS to Align Training Resources with Competency Gaps

Empirical evidence gathered and analysed during the study suggest that the Élan project constituted a system of actions that evolved across five distinct phases, each characterized by changes in the system components identified during data analysis through the constant comparative method and the paradigm model (Strauss & Corbin, 1998). These system components were labelled as goals, human and material resources, activities, criteria and results and are here reported in the same sequence, albeit with slightly different labels (i.e., goals, inputs, processes, enabling and constraining factors, and outputs) for ease of understanding. These components are further nested in a supra structure of phases that also emerged as a result of analysis grounded in the data. The following discussion charts this evolution of across phases in more detail.

Phase 1 ANALYSIS: Planning of the Élan Project and Inventory

Flowchart of the Analysis Phase

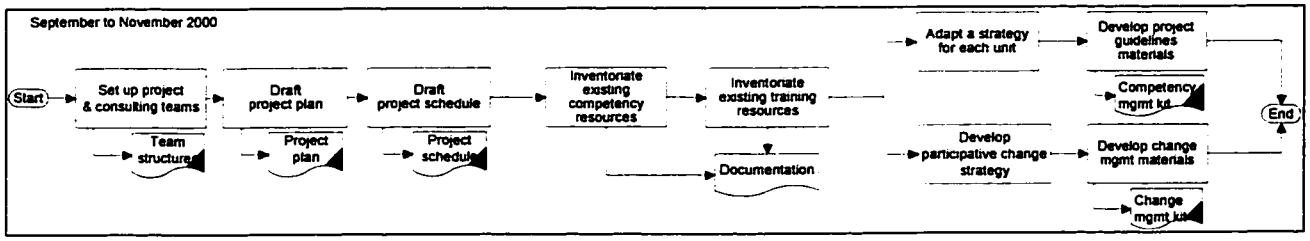

Figure 20 Flowchart of activities conducted during the analysis phase

Goals of the Analysis Phase

The goals of the analysis phase, carried out between September and November 2000, were to (a) establish the objectives, priorities, deliverables and activities for both the Élan project and the change management strategy, (b) to specify key measures of

evaluation for the success of the project, and (c) to carry out an inventory of all existing documents containing competencies and of relevant training resources.

Inputs for the Analysis Phase

The initial need, the closing of competency gaps, driving the Élan project called for a major intervention and coordination effort across all Bell Québec business units, for which no methodology had been outlined before, mostly because LMS-based competency management was a novel and emerging approach at the time. Thus, it can be said that the input of this phase was the problem characterized by the implementation of a web-based competency and training management program to bridge competency gaps.

Roles in the Analysis Phase

In this section, all roles performed during the project are first described, followed by those specific to the present phase. In September 2000, a joint Techno-Bell project team headed by Bell Québec's executive vice-president acting as project initiating sponsor, in concert with Bell Québec's vice-president Solutions acting as sustaining sponsor, was set up to coordinate the activities for the implementation of the Élan project. The team combined specialists in organizational development, change management, communications from Technomedia on the one hand, and representatives, also called champions, from each business unit from Bell Québec on the other hand. Figure 21 below on p. 108 illustrates the structure of the Techno-Bell team, often referred to as the Élan team.

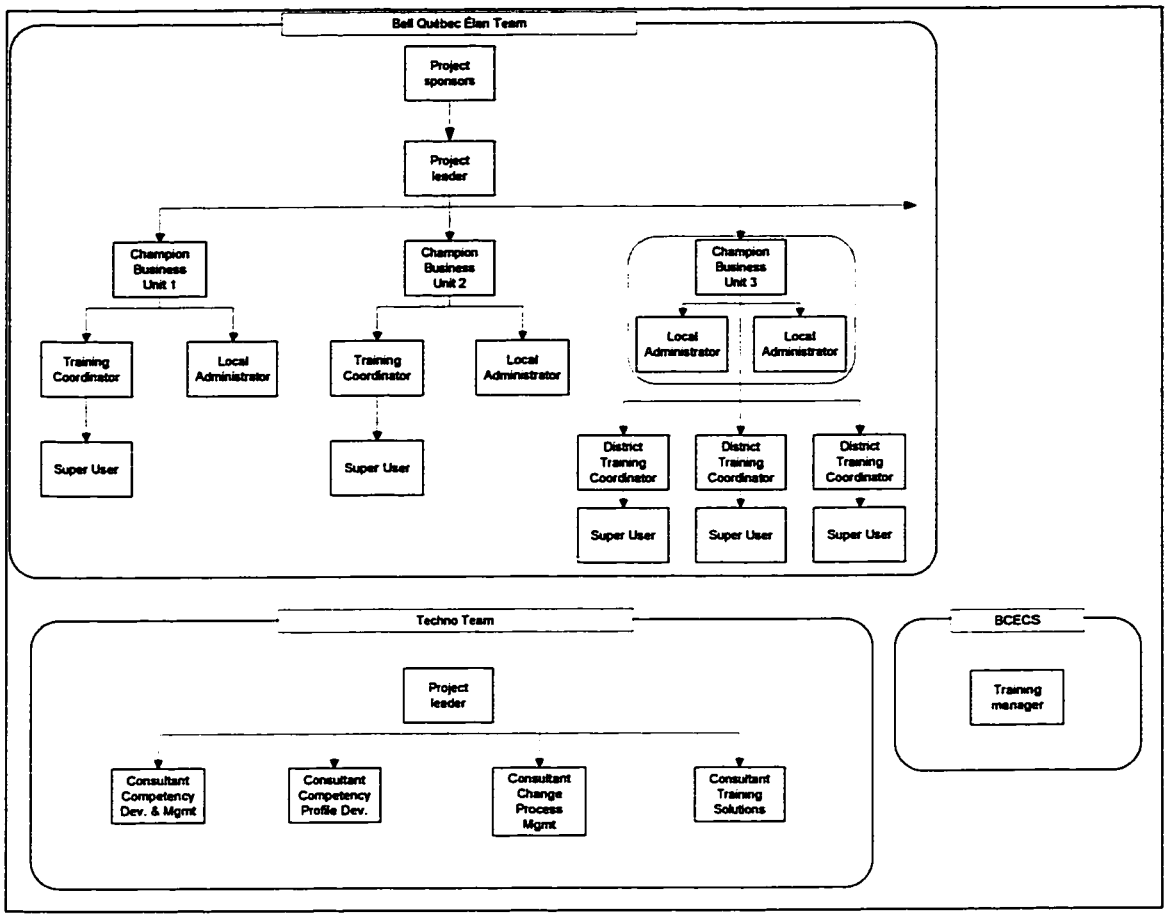

Figure 21 Team structures set up for the Élan project

The project leadership was assigned to the Bell Québec's HR divisional director who acted as the link between the sponsors and the champions. Throughout the project, the champions were responsible for supervising the processes in each phase, namely the inventory in the analysis phase, delegating responsibilities to the training coordinator and local administrator, launching the start of the competency appraisal, and continuously encouraging employees within their unit to embrace the change. The role of training coordinator consisted essentially in determining the most appropriate training solutions for groups of competencies, linking new solutions to competency profiles, registering employees to training activities and planning developmental activities for groups of employees. In some cases, however, the role of training coordinator would overlap with

that of local administrator. In the present phase, the role of the local administrator was directly involved with the inventory of competency materials while it focused on the definition of competency statements, creation of competency profiles and linking of existing training resources to the profiles in the next phases. In addition, an external consultant, specialized in workplace analysis, was assigned the task to design a template for the definition of competency profiles for the analysis phase.

Processes and Activities of the Analysis Phase

The activities carried out to fulfill the strategy for the analysis phase are summarized below and described in more detail in the following sections:

1. Set up project and consulting teams.
2. Draft project plan.
3. Draft project schedule.
4. Inventory existing competency profiles and descriptions.
5. Inventory existing training resources contained in the electronic course catalogue called the "Bell Course Catalogue".
6. Adapt the strategy to develop new competency profiles to each business unit's particular needs and constraints.
7. Develop a participative strategy towards change.
8. Develop project guidelines materials.
9. Develop change management materials.

At this stage, the first task was to set up the project team. Next, on the basis of identified needs, a project plan framing the rationale, the objectives, the scope, the deliverables, the set of evaluation measures, and a tentative project schedule for the Élan project was drafted. Additionally, upon completion of the project proposal and schedule, the inventory was launched across all business units.

In the inventory which took place between September and November 2000, all the available material pertaining to the competency profiles of each business unit was gathered by local administrators and training coordinators. Sources defining

competencies included paper-based and/or electronic-based competency models, job position descriptions and evaluation forms. Concurrently, all existing training resources such as the course catalogue comprised of classroom and online courses, self-paced courses on CD-ROM or floppy disks, coaching interventions, and online/face-to-face seminars, were inventoried to produce an estimate of the number of courses potentially useful. All put together, the Élan team calculated that 44%, 250 out of 570 existing job-related profiles, (corresponding to 68%, 4,080 out of 6,000 Bell Québec employees) could be reused, but the remaining 56% had to be developed (corresponding to 32% of employees). Also, from the Bell Course Catalogue which contained up to 1,200 learning solutions at the time, a fair number of existing solutions could be used.

In parallel with the inventory, Technomedia team members sought to anticipate potential enablers and barriers likely to affect the success of the Élan project. Based on experience from prior initiatives, they recommended that the implementation strategy for the web-based competency and training management program should be tailored to each business unit characteristics while the change process approached as a participative process involving the maximum number of people to be impacted by the change. To support both processes, they developed a set of competency development guides and change management materials during the month of November 2000.

Outputs of the Analysis Phase

The outputs of the analysis phase can be classified in the three categories listed below:

Planning documents and competency and training data

- The project plan and schedule (see Figure 22 on p. 112).

- The profile for technological competencies CTSP for all employees at Bell Québec (see Figure 19, p.103).
- A partial profile comprising behavioural competencies developed by the consultant firm Watson Wyatt for the executive level: vice presidents and top management at Bell Canada.
- A pile of raw documents including:
  - Competency models for positions specific to business units.
  - Evaluation tools for technical competencies listed by position codes.
  - Descriptions of job profiles.
  - Performance evaluation forms.
- Analysis reports on training programs for business units.
- An analysis report listing the type of training resources (coaching, classroom course, book, CD-ROM, etc.) potentially useful.

Example Project Plan

Rationale :
- Today's increasingly competitive telecommunications industry requires Bell Canada to bridge current competency gaps to maintain organizational performance
- Bell Canada's vision and 3Cs strategy entails to prepare its employees for tomorrow's challenges
- Demographic factors such as the upcoming retirement of a large number of baby boomers who will need to be replaced with skilled workers

Objectives :
- Align core competencies with the organization's vision, mission, strategy and values
- Align training initiatives with core competency needs
- Align training initiatives on anticipated competency needs and develop employees accordingly
- Develop training solutions to close current competency gaps and respond quickly to business, technological and organizational projects demands
- Foster organizational learning and employees' self-development with online learning
- Facilitate employee's mobility within the organization
- Measure the efficiency and effectiveness of training systematically
- Shift HR functions towards strategic and proactive leadership

Benefits
- Accurate picture of actual competency strengths and weaknesses
- Strategic and streamlined training investments
- Employee's accountability towards self professional development and employability
- Alignment of strategic HR actions with corporate business strategies
- Unique platform for online courses and competency management
- Integration of competency mgmt with performance evaluation

Success factors
- Top management sponsorship
- Communication and marketing of project goals and benefits to the organization
- Alignment between champions
- Commitment from employees
- Availability of resources
- Simple and coherent consulting support
- Centralized project management approach
- Simple competency profiles developed by the business units
- Availability of training resources

Success metrics
- 100% of employees complete their competency appraisals
- 60% of competencies profiles linked to at least one training solutions
- 45% of existing training initiatives have been converted to online
- 30% of development activities are online
- New agreements, contracts with online learning providers

Scope of project
The Élan project's target group was defined as all the employees of Bell Québec and the tentative timeframe was set at one year and a half, stretching from September 2000 to December 2002, which was the end of the second competency appraisal.

Project road map	Timeframe and deadlines
Scope of project and planning	2 months
Determine existing competency profiles and training resources	
Determine optimal competency profiles and training resources	
Draw up a detailed report on the results of inventory	
Establish the project strategy adapted to each business unit	
Develop a participative change implementation methodology for all business units	
Prepare project guidelines materials	
Prepare change management guidelines materials	
Development	4 months
Develop needed competency profiles	
Link competencies to available training solutions	
Develop new solutions and link them to competencies	
Introduce and communicate the project to all levels of the organization	
Implementation	3 months
Involve most people impacted by the change in the process of defining the change to build the necessary commitment	
Conduct competency appraisals	
Analyse and establish development priorities	
Establish development plans	
Identify training solutions to close gaps	
Monitor process	

Figure 22 Sample draft project plan compiled from documentation provided by Bell Québec

Competency management materials

– A template to define competencies based on the assumption that a competency was a set of knowledge, skills and attitudes. The template served also as a tool to list training solutions recommended for the defined competency (see Figure 23 below).

Competency Models in ILE (Technical / Behavioural)

The Local Administrator/Training Co-ordinator will learn how to complete this template during their training.

Competency Title (English/French):			
* General Description (English/French):			
* Specific Application area (English/French):			
Competency Structure Type *(See Attachment 4 for more details):*		**General Position Requirement:**	

Learning Element or Specific Levels (English/French)

	Title (E/F)	* Assessment Criteria (E/F)	Gen Pos Req
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Learning Solutions Suggested

ID Code	Course title / Development Activity	Level targeted	Learning Element / Level targeted

Figure 23 Competency and training resources definition template
Copyright 2000 by Bell Québec

Change management materials

- FAQ with answers to technological, administrative or process related queries.
- Email templates to be customized for each employee in each business unit.
- Mailing schedule for emails and their associated goal for each email message.
- Graphical model of the telephone and email support structure for technical, process-based and administrative problems users might encounter.
- Instruction guides for users and videos to demonstrate the process of competency evaluation.

Success Criteria for the Analysis Phase

The project team members defined the success of this phase as measured by the extent to which existing competency profiles were recycled, the highest possible reutilization being an indicator of time and financial savings, but also of respect for the competency materials commonly used and appreciated by individuals in each business unit. In this phase, 44% or almost half of competency profiles were retained. Such concerns for reusability are exemplified by comments from both one champion, "On a fait l'inventaire de ça [profils de compétence] et c'était important pour nous de "ne pas réinventer la roue" and from the general manager at Technomedia:

> Sachant que Watson Wyatt avait fait un travail au niveau des compétences comportementales pour les exécutifs de Bell, on a décidé de ne pas réinventer la roue, de reprendre Watson Wyatt et de descendre à un niveau inférieur pour personnaliser cette approche là et la philosophie en arrière jusqu'au niveau directeur.

In line with the criteria of time savings, the inventory had to be conducted within the two-month timeframe and terminated in November 2000 for the phase to be deemed successful.

Enabling and Constraining Factors of the Analysis Phase

A clear and precise communication between the corporate level on the one hand, represented by the project initiator, the project sponsor, the project leader with his assistant, the founder of Technomedia and his assistant, and the operational level on the

other hand, represented by the project leader, the champions, BCECS training manager and a representative from Technomedia, was deemed essential for two mutually dependent reasons. First, to ensure that operations would support the strategic vision, and in turn, to ascertain that the vision would rest on the needs articulated by the operations. As a result, two committees, the Élan champions committee and the Élan steering committee were formed in September 2000.

> Il y a ce qu'on appelle chez nous le comité des champions ...le comité des champions qui s'est occupé de l'implantation mais qui est aussi nos yeux et nos oreilles de ce qui se passe dans l'organisation (Élan project leader, interview).

Members of the latter started meeting every three months to discuss the implementation of the project, and resulting decisions were relayed to the champions by the project leader or his assistant during the monthly Élan champions committee. The Élan steering committee did not pursue its meetings since the implementation was running smoothly, but transferred its topics to the senior management direction committee presided by Bell Québec's president and held monthly meetings for discussions on Bell Québec's overall operations. For their part, the champions continued to meet once a month during the length of the project to share information about ongoing problems and issues encountered in each business unit and to submit possible solutions. Requests from the champions for improvements to ILE were submitted for approval to the BCECS training manager and barring any objection, the training manager would transmit the requests to the Technomedia team.

Furthermore, it was crucial that the web-based competency and training management program should be perceived as an implementation of new processes rather than as a software implementation, hence the decision to mandate change management specialists from Technomedia to oversee the change management process:

> Du côté de Bell, c'était important que ce ne soit pas perçu comme un système mais comme une approche en soi, et on visait beaucoup le 'pull-push strategy', je te pousse quelque chose et tu vas tirer quelque chose...donc l'idée c'était que les gens, au travers de la gestion du changement, comprennent à tout le moins, que c'était un changement pour le nouveau Bell, donc M. Marier innovait là dedans, en prenant sous sa tutelle un processus qui n'avait pas encore été testé à grande échelle (Technomedia's General Manager, interview).

Similarly, a message sent to all interested parties and stating that the new web-based competency and training management program was more a vehicle to further personal and career development and less an evaluation tool, was seen as pivotal enabler for the Élan project. Another key enabling factor was the latitude given to champions and employees to take ownership of the change process within their business own unit. The Élan team had agreed that Technomedia consultants should endorse an unobtrusive and supporting, rather than omnipresent and leading, role in order to facilitate adoption and commitment to the change process among Bell Québec employees. If the latitude was an enabler, the champions also felt that HR should have been involved earlier in the process to provide a central strategy as guidance.

Phase 2 DESIGN: Competency Profiling

Flowchart of the Design Phase

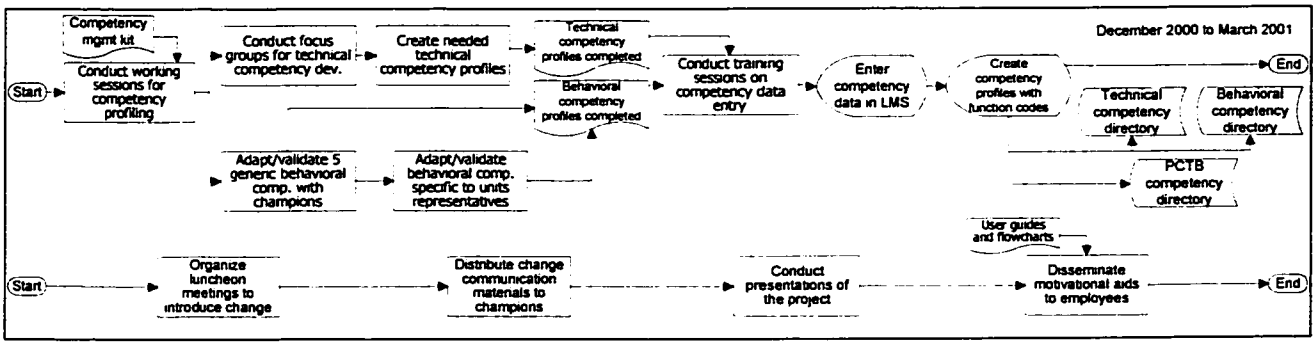

Figure 24 Flowchart of activities conducted during the design phase

Goals of the Design Phase

The design phase, which took place between December 2000 and March 2001, aimed at (a) adapting the profile of behavioural competencies for interested parties, (b) revising and selecting appropriate technical competencies profiles among existing ones, (c) developing new profiles for technical competencies corresponding to those job positions, specific to each business unit, for which no competencies had been found during the inventory, and (d) entering all revised and newly developed competency profiles into the LMS called ILE. Concerning the change management process, the goal was to operationalize the participative strategy devised in the previous phase.

Inputs for the Design Phase

Except for email templates and the mailing schedule, necessary inputs of this phase were the outputs of the previous phase and the Bell newspaper "BellNews" to disseminate information to employees.

Roles in the Design Phase

Human resources employed during the design phase consisted of the same ones used for the analysis phase, namely champions, training coordinators and local administrators. In addition, the consultant firm Watson Wyatt was given the responsibility to develop the second part of the profile for behavioural competencies. Further, four full-time staff members from Technomedia were directed to train one individual in each business unit to develop new profiles for technical competencies with the help of a template. Finally, HR employees provided all local administrators HR job codes needed to build competency profiles.

Processes and Activities of the Design Phase

The design phase included the following two categories of activities:

Competency profiling

1. Manage working sessions for competency profiling with team members (i.e., champions and training coordinators) and representatives of units.
2. Adapt and validate with champions the five generic behavioural competencies for CC1 to CC4.
3. Adapt and validate with units' representatives the two or three specific behavioural competencies for CC1 to CC4.
4. Conduct focus groups for technical competency development.
5. Create needed technical competency profiles.
6. Enter competency data in LMS.
7. Create competency profiles with function codes.

Change management

1. Organize luncheon meetings to introduce change.
2. Distribute change communication materials to champions.
3. Conduct information sessions to present the project.
4. Disseminate informative and motivational aids on competency appraisal.

Competency profiling: development of the profile for corporate competencies (CTSP). As discussed in section "Events Leading to the Élan Project" on p.100, under the direction of training specialists from BCECS, the profile of corporate competencies, the CTSP, had been developed in 1999 one year prior to the inception of the project, and based upon Bell Canada's strategic priorities outlined in the 3 C strategy.

Competency profiling: development of the profile for behavioural competencies. Bringing knowledge and expertise from a prior mandate to develop a behavioural competency profile for vice presidents and senior management at Bell Canada, consultants from Watson Wyatt decided to reuse the former profile on the grounds that requirements in terms of behavioural competence should not differ dramatically between the executive level comprised of the vice presidents, and the managerial and operational

levels comprising all other employees. These hierarchical levels are defined within Bell Canada as CC4 for directors of business units, CC3 for associate-directors of business units, CC2 for managers of business units and CC1 for administrative assistants of business units. The process unfolding was aptly summarized by one champion:

> Watson Wyatt, c'est une firme de consultants qui était donc déjà impliquée avec Bell. Ils avaient déjà eu un mandat préliminaire de développer des compétences comportementales pour les exécutifs, vraiment les VPs et la haute direction. Et comme ils avaient déjà fait cet exercice là, ils se sont dit, pour les autres niveaux hiérarchiques de l'organisation jusqu'aux niveaux les plus bas, on va partir de ça, parce qu'il n'y devrait pas y avoir un disconnect entre les compétences comportementales qu'on demande à nos exécutifs et les autres, ça ne devrait pas être complètement séparé, donc on est parti de ce travail qu'ils avaient fait, et eux [Watson Wyatt] ont adapté ces compétences - ce profil de compétences, les compétences et les éléments qui le composent pour que ce soit adapté aux autres niveaux hiérarchiques.

Thus, between December 2000 and March 2001, consultants from Watson Wyatt organized working sessions with champions, training coordinators and individuals effectively representing each business unit at Bell Québec, to revise the two parts of the behavioural profile. Five generic competencies (e.g., Vision, Taking charge diligently) required of all Bell Québec employees constitutes the first part, and two or three competencies specific to each unit make up the second part. (See Figure 25 below on p. 120 for an example of a profile of behavioural competencies).

Behavioural competencies management Bell Québec

	Job Requirements	Assessment Type
C0668 - Vision	4	C - L (E)
Learning Elements		
Understands his/her contribution to the achievement of the organization's vision	4	
Understands clearly and anticipates client needs	4	
Demonstrates business acumen in undertaking his/her activities	4	
Contributes to maintaining the organization's competitive advantage	3	
C0716 - Taking charge diligently	4	C - L (E)
Learning Elements		
Demonstrates a sense of urgency in dealing with problems	4	
Demonstrates flexibility and openness in the face of change	4	
Manages pressure effectively	4	
Makes the right decision in a timely fashion	4	
Resourceful and innovative in addressing obstacles	4	
C0718 - Execution	4	C - L (E)
Learning Elements		
Follows through on commitments to achieve individual and collective objectives	4	
Demonstrates a strong desire to contribute	4	
Addresses challenges in a spirit of cooperation and collaboration	4	
Rallies team members in achieving his/her mandates	3	
C0724 - Change Leadership	4	C - L (E)
Learning Elements		
Manages change with confidence and clear direction	4	
Communicates to rally team members	4	
Facilitates the establishment of partnerships	4	
C0725 - Learning	4	C - L (E)
Learning Elements		
Develops and maintains an effective network of contacts	4	
Encourages open exchanges	3	
Encourages development through coaching	4	
Is personally committed to a continuous development process	3	
C0740 - Strategic Orientation	4	C - L (E)
Learning Elements		
Works easily at the conceptual level	3	
Analyses and synthesizes in order to identify various possibilities	4	
Is efficient in influencing strategic choices	4	
Designs and defines a business model adapted to different contexts	3	
C0780 - Market Orientation	4	C - L (E)
Learning Elements		
Perceives market and industry trends	4	
Creates innovative solutions	4	
Demonstrates business acumen	4	

Figure 25 Sample behavioural competencies profile
Copyright 2000 by Bell Québec

One session involved the participation of champions to revise the five generic behavioural competencies while several other sessions had individuals from relevant units revise those behavioural competencies specific to their own business unit. In essence, their work focused on reviewing and validating each competency statement, element of competency and associated proficiency levels, for their relevance and importance to the functions and responsibilities of targeted jobs ranked along the different CC1 to CC4 levels, the latter which stratify each business unit. Particular attention was given to the evaluation of required levels of proficiency since they were the key differentiators, mainly among generic competencies. As a rule, given a similar competency, the required proficiency level increases as the level increases from CC1 to CC4.

Competency profiling: development of the profile for technical competencies. In December 2000, all competency materials gathered during the inventory were examined in focus groups comprising the champion, training coordinator and 6 to 10 employees divided in three groups of two or three individuals representing the range of expertise in each business unit. For instance, for the job function "consumer market" belonging to the Marketing unit, one focus group initially gathered only employees at the CC4 level to revise or create the competency profile with competency statements and elements before setting the proficiency levels. That profile, effectively reflecting superior performers' competencies, was the foundation for the creation of competency profiles for the CC3 to CC1 levels during another focus group involving two expert performers (CC3), two intermediate performers (CC2) and two entry-level performers (CC1). In these focus groups, most of the endeavour was centered on identifying adequate proficiency levels

for the profile because the definitions of competencies did not differ widely from one hierarchical level to the other. Also participating in the focus groups were specialists from Technomedia who provided templates to assist the definition of statements for technical competencies including the elements of competencies and the attribution of proficiency levels for each position level (see Figure 23 p.113). Instead of Technomedia specialists, the Sales and Channel Support unit opted for the services of an outside consultant, expert in competency mapping. For its part, the Marketing unit with the help of an outside consultant, conducted a review of their technical competencies profiles the following year, in September 2001, to improve them. Competency statements had been found to be too vague or inaccurate, hence the rewording of the definitions of competencies, elements and evaluation criteria.

> On avait une certaine structure mais comme on n'était pas des spécialistes, le résultat était que, parfois ça ressemblait à une description de poste plutôt qu'à une compétence, à une description de fonction plutôt qu'à une compétence ... et on l'a amélioré parce qu'on jugeait qu'on n'avait pas un niveau de détail suffisant, parce que les gens ne se reconnaissaient pas dans leur poste et c'était aussi l'opérationnalisation, dans le sens où quand la rédaction est bien faite, on parle d'une compétence et non d'une fonction ou d'une description de tâches (Marketing champion, interview).

After each business unit had completed both behavioural competencies profiles and technical competencies profiles, these and the CTSP competencies profile were entered into ILE's Bell Québec Competency Dictionary by local administrators. As a result, three competency models comprising several competencies profiles, were hosted in the Bell Québec Competency Dictionary. Then, in order to achieve an optimal integration with the HR personnel management system, local administrators assigned a specific HR four-digit job code to groups of relevant, distinct competencies profiles. Local administrators had been trained by Technomedia consultants for the task of data entry and provided with a workflow diagram to assist them in the overall process of

populating the Bell Québec Competency Dictionary and creating the ILE-based competency profiles with codes. (See Figure 26 below).

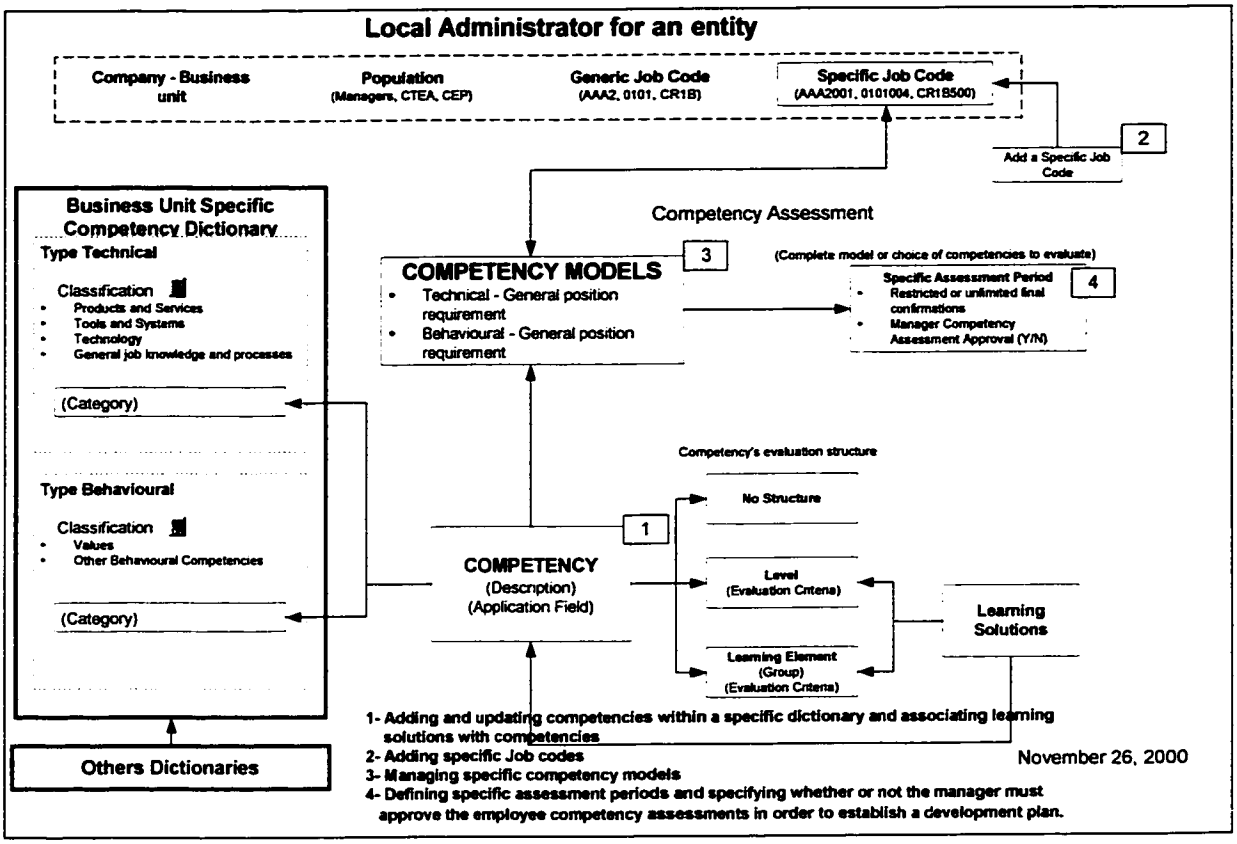

Figure 26 Workflow diagram for local administrators
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Change management in the design phase. In the design phase, the change management plan was formally rolled out. First, Technomedia specialists organized luncheon talks with champions to communicate the proposed strategies to manage potential resistance from interested end users and provide the necessary tools (e.g., graphical model of support network, see Figure 27 below on p. 124) designed to support the change action plan. Second, champions conducted presentations and demonstrations to disseminate to employees impacted by the change, information about the goals and

scope of the Élan project, its benefits, personal and organizational, its impact on daily activities, and the support network set in place by Technomedia consultants.

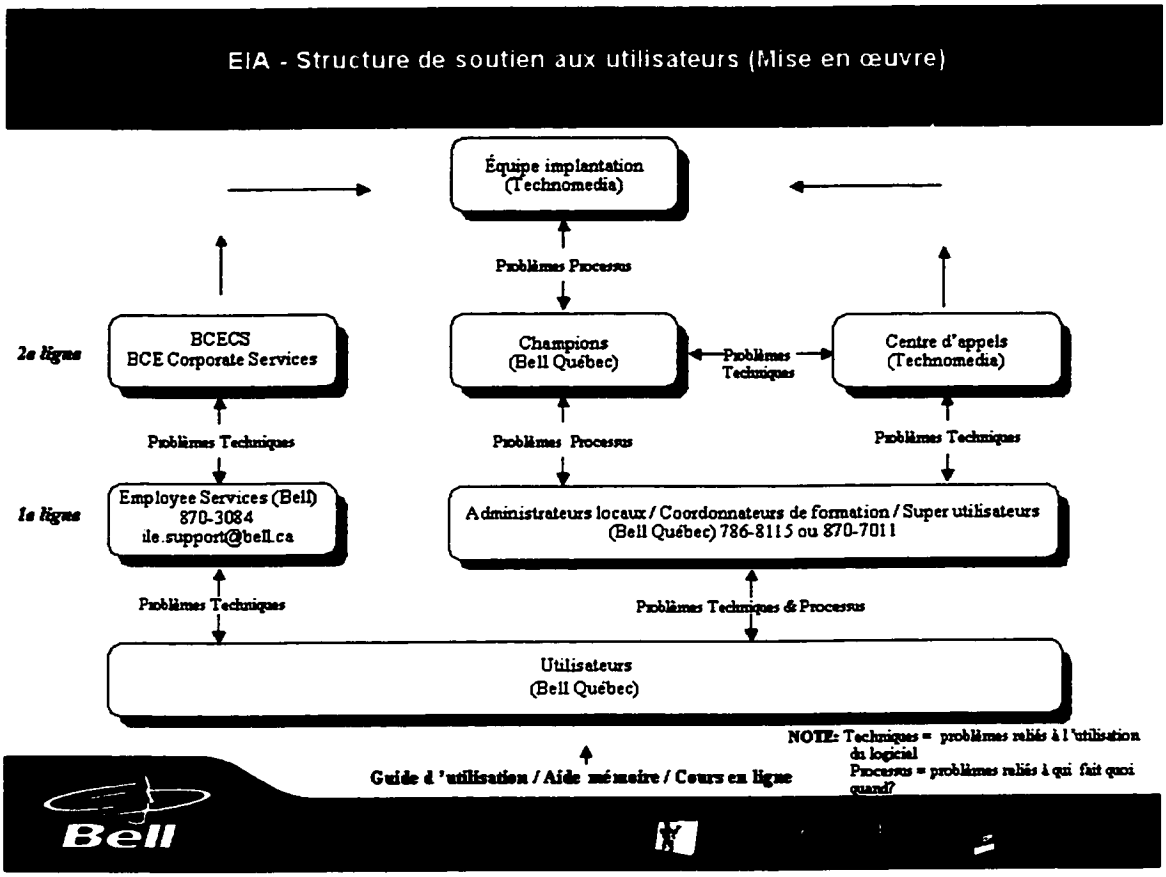

Figure 27 Support network structure
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The approach was slightly different depending on the business units. For instance, the Marketing unit chose to conduct one-hour demonstration sessions with groups of a dozen employees to show how to complete a competency assessment form with the system. The aim was to offer individuals a first tryout within small, reassuring groups of individuals where interactivity and questions would be welcomed. In keeping with this perspective, both the training coordinator and the champion simulated the process of competency assessment through ILE, answered questions and gave out user guides

developed in the previous phase by the Marketing unit based on Technomedia's material. The booklet showed screen captures with explications on how to navigate around ILE's competency management module. For its part, the Customer Services business unit, due to the sheer volume of its employees – approximately 5,000 – opted for the distribution of a one-page description with an animated flowchart of the steps to follow. Interestingly, some business units chose to produce and present onsite videos demonstrating the steps of the process of competency evaluation and training or developmental activities selection.

Outputs of the Design Phase

The primary outcome of this phase was the Bell Québec Competency Dictionary comprised of the three competency models: the CTSP (see Figure 19, p. 103), the behavioural competencies model (see Figure 25, p.120) and the technical competencies model (see Figure 28 below on p.126), all hosted within ILE. Collectively, more than 70% (400 out of 570) profiles were developed, a substantial increase from the baseline figure of 44% calculated in the analysis phase.

Compétences techniques cadres Bell Québec Gestion Produit Marketing Stratégie

Produits & Services

	Job Requirements	Assessment Type
C1586 - Utiliser à bon escient ses connaissances des produits et des services offerts dans le domaine des télécoms.	3	C - L (E)
Learning Elements		
Evaluer les produits et les services de Bell Canada en regard des bénéfices qu'ils représentent autant pour l'entreprise que pour les clients.	3	
Analyser le positionnement des produits et des services offerts par la concurrence.	3	

Processus opérationnel

	Job Requirements	Assessment Type
C0361 - Collaborer, dans le cadre de ses responsabilités, aux activités stratégiques de l'unité d'affaires de Bell Québec.	4	C - L (E)
Learning Elements		
Analyser, d'un regard critique, les prévisions de revenus et de dépenses du Marché Consommateur.	3	
Évaluer les impacts du plan de Marché Consommateur sur les opérations de vente de Bell Québec.	5	
Assurer le suivi de réalisation du Plan de Marché sur une base mensuelle et trimestrielle.	4	

	Job Requirements	Assessment Type
C1587 - Appliquer certains processus opérationnels et contribuer à leur évolution.	3	C - L (E)
Learning Elements		
Continuer au processus budgétaire.	3	
Contribuer au processus de gestion du personnel.	4	
Décrire l'importance du Plan de développement de campagne (ACT).	2	
Décrire le processus d'introduction de nouveaux produits sur le marché (NPI ou New Product Introduction).	2	

Compétences spécialisées

	Job Requirements	Assessment Type
C0362 - Effectuer, sur une base continue, la veille stratégique du Marché et de l'industrie.	5	C - L (E)
Learning Elements		
Colliger et analyser toute l'information pertinente décrivant l'environnement externe dans lequel évolue Bell Québec.	5	
Valider sa perception du marché et de l'état de la situation.	4	
Produire un rapport sur l'état de la situation.	5	

	Job Requirements	Assessment Type
C0364 - Élaborer le plan de marché consommateur Bell Québec et en assurer sa production.	5	C - L (E)
Learning Elements		
Coordonner l'ensemble des efforts nécessaires à l'élaboration du plan de marché.	5	
Communiquer le plan aux différentes instances concernées.	5	

	Job Requirements	Assessment Type
C0950 - Assurer le développement organisationnel de l'unité d'affaires	5	C - L (E)
Learning Elements		
Assurer le développement et l'application des mesures de reconnaissance et de motivation de l'équipe MKT Bell Québec et de l'équipe MKT corporative Marché Consommateurs.	5	
Favoriser la consolidation des équipes à des fins d'optimisation de leur performance.	5	
Assurer l'encadrement nécessaire à l'évolution des compétences professionnelles des équipes concernées.	4	

Figure 28 Sample technical competencies profile
Copyright 2000 by Bell Québec

Of particular interest is the fact that some competencies, not profiles, within the CTSP model were supplemented with two types of tests: one intended to help employees rate their actual level of proficiency and another aimed at evaluating employees' knowledge prior to registering for a given course. As a consequence, some competencies in the CTSP can be coupled with (a) both a test of competence and training pre/post tests, (b) a test of competence or training pre/post tests, or (c) nothing at all, as is the case for the behavioural competencies models (see a sample of a pre-test in Figure 29 below). With respect to the latter, only courses, whether online or classroom-based, linked to competencies are variously associated with pre- and post-testing, and when that is the case, very few are ILE-based. On the other hand, when courses are classroom-based, instructors routinely carry out pre and post training comparisons using formal tests.

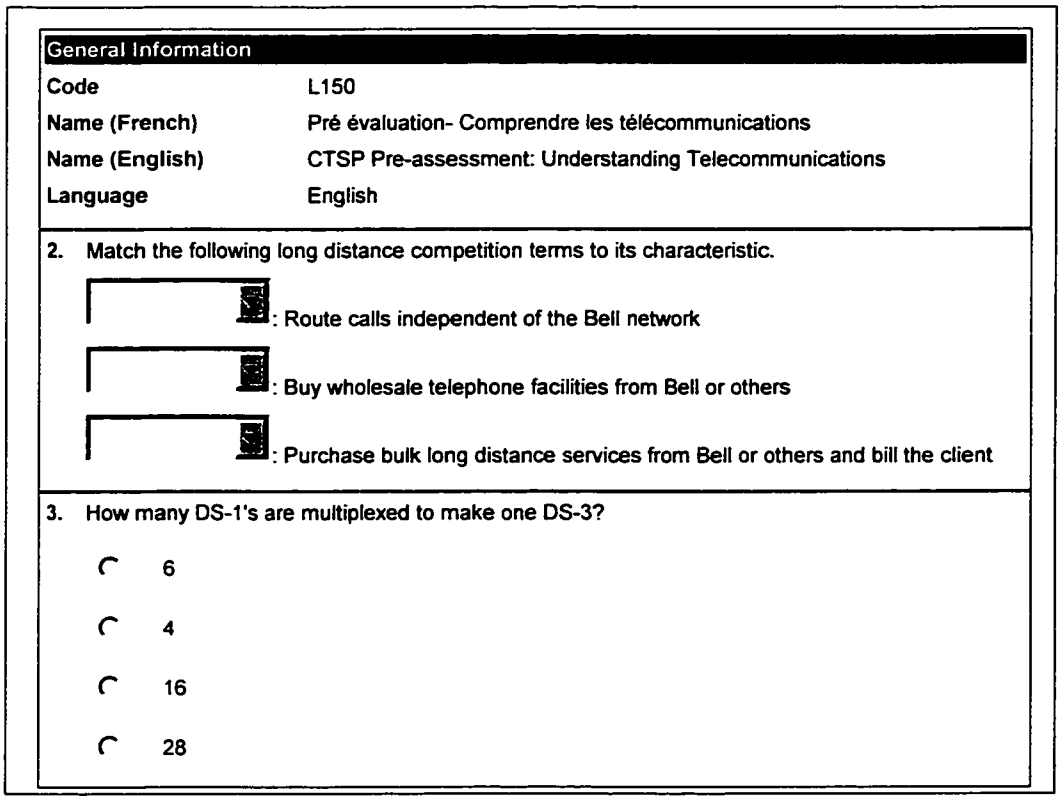

Figure 29 Sample pre-test for training for a CTSP competency
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Success Criteria for the Design Phase

The Élan project team members established that the successful development of competency profiles rested on clearly worded competency statements that described observable and measurable jobs behaviours. Such requirement was satisfied by adopting a common definition of competency understood as a cluster of knowledge, skills and/or attitude, and by complying with a common definition format with three components: an action verb (e.g., evaluate, establish), the object of the behaviour (e.g., Bell Québec consumer market plan) and the context/tools (e.g., within the limits of one's duties) or standard (e.g., on a continuous basis) for the behaviour. Examples of competency statements illustrating the use of various components are listed below:

- Establish the Bell Québec consumer market plan and oversee its production.
- Collaborate, within the limits of one's duties, to the Bell Québec business unit's strategic activities.
- Conduct, on a continuous basis, strategic monitoring of the Market and Industry.

A second measure of successfully developed competency profiles was predicated on the notion of optimal level of granularity or aggregation for the definition of a competency. More specifically, the question was to determine the right amount of detail necessary to render the competency statement explicit enough so employees could grasp its content, but abstract enough so employees could evaluate meaningful behaviours and not morsels of behaviours (i.e., tasks). Out of the 10 formats for competency definition available within ILE, champions from the different business units made independent decisions regarding the most suitable format for their own employees. One format

exhibiting four components was clearly a popular option among champions. It should be noted that the behavioural competencies were all defined according to that four-component format. The format is illustrated in Figure 30 and its four components are defined below:

1. The competency statement which describes the behaviour, in other words the range of skills and knowledge required.

2. The elements of competency which break down the competency statement into four to five statements. Elements are the building blocks of the competency and are organized according to a complexity level derived from the Bloom's (1956) taxonomy (e.g., application, analysis, synthesis, etc.).

3. The evaluation criteria numbering one to five (also ranked according to Bloom's taxonomy).

4. The required level of proficiency for the competency and for the element of competency.

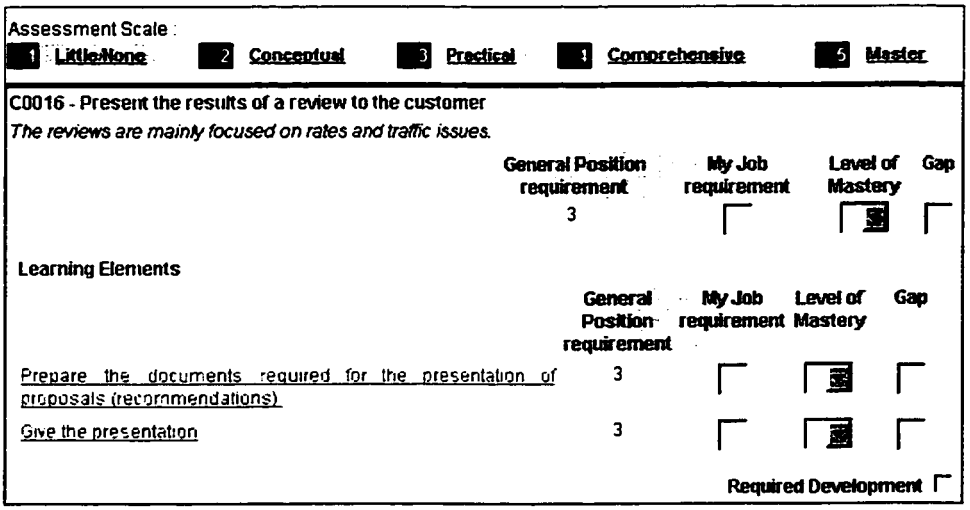

Figure 30 Four-component competency format

Discussing the above format, the champion from the Marketing unit commented:

> Moi ça me semblait suffisamment détaillé justement parce qu'on avait une structure où on avait une compétence avec plusieurs éléments, et pour chaque élément on avait des critères d'évaluation et en bout de ligne on a un niveau requis, donc c'était effectivement une structure qui me semblait complète.

For its part, the Customer Services unit utilized four different formats to accommodate its population of 5,000 employees, among which the format with a competency statement, competency elements and required levels was the most commonly used.

Finally, a timeline of three months for the completion of all behavioural and technical competency profiles was seen as a significant requirement to allow ample time for the upcoming competency appraisal process while also ensuring the on-time completion of the whole project scheduled for the end of May 2001. The following comments from one champion illustrate this time issue:

> On ne voulait pas nécessairement tout recommencer, on avait quand même des délais, on voulait rendre un produit bien, mais on voulait aussi qu'il arrive rapidement, on ne voulait pas passer 5 ans à développer des profils qui seraient désuets au bout de cinq ans de toute façon.

Moreover, the three-month timeframe was also viewed as adequate to maintain the project momentum and sustain team members and employees' motivation, in other words long enough to raise awareness thoughtfully through the communication campaign, but short enough to allow efforts to materialize into quick results.

Enabling and Constraining Factors of the Design Phase

The teaming model adopted within the large business unit Customer Services proved to be an effective tool to ensure some uniformity among the numerous competency profiles required for their 5,000 employees. See Figure 21, p. 108 for a graphical description of the team structure used at the Customer Services unit.

In effect, the team structure had a head group of three local administrators directed by the unit's champion, the latter liaising with 12 training coordinators, locally known as district coordinators, in charge of conducting the inventory of competency profiles and training resources, developing missing profiles in consultation with employees within their district, and transmitting all the data to the champion. The three local administrators acted as reviewers of the profiles before entering them into the LMS. The champion from Customer Services articulated the decision to set up a central team as follows:

> On a décidé de garder ça centralisé au lieu de donner une responsabilité d'administrateur local à chacun des districts ; pourquoi parce qu'on jugeait que de part le volume, de part le temps qui était très restreint et de part le fait que nos opérations, on juge qu'elles devraient se concentrer sur les opérations, donc c'est nous qui avions le rôle d'administrateur local, donc c'est nous qui avons entré tous les profils techniques...comme c'était centralisé on avait un gain d'efficacité ces personnes là sont devenues des expertes, donc au bout d'un certain temps il n'y avait plus de secret pour rentrer des profils de compétences pour elles, parce qu'elles faisaient à temps plein parce qu'on avait un gros volume de profils, et ça nous a permis de s'assurer une certaine uniformité de l'entrée des profils aussi. À cause du volume! C'est à cause du volume qu'on s'est organisé comme ça, sinon il aurait fallu former 12 personnes [administrateurs locaux] et s'assurer qu'on gérait la qualité de leur travail.

Further, access to professional expertise in competency profiling was found to be a crucial factor to the development of well-defined competencies. As exemplified by the experience of one unit which had to conduct a second round of competency mapping, specialists in competency modelling can greatly enhance the quality of competency profiles.

As pertains to the change process, constant and ample communication about the project was considered of vital importance. Through top-down and bottom-up communication channels, special efforts were expended to dispel uncertainties with forthcoming information, assuage anxiety and to give employees the opportunity to ask questions about the web-based competency and training management initiative.

In other respects, paper-based documents initially designed to provide users with concrete reference documents, were found to be superfluous once the online help was available within ILE, help which employees tended to use more readily than the paper-based documents.

Phase 3 DEVELOPMENT: Linking Competencies and Training Resources

Flowchart of the Development Phase

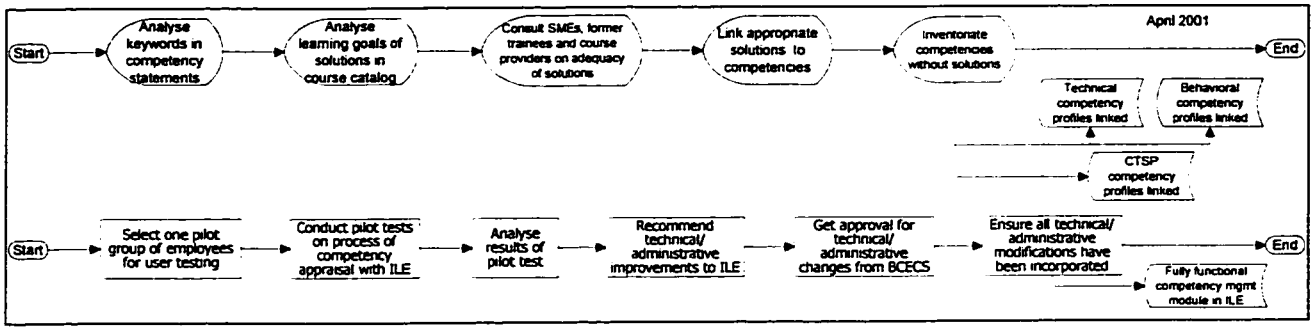

Figure 31 Flowchart of activities conducted during the development phase

Goals of the Development Phase

The output of the design phase effectively shaped the goals of the development phase, conducted during April 2001. Following the completion of the competency profiles in each of the three competency models, the aims of this phase were to (a) review information related to existing learning solutions and (b) create as many optimal linkages as possible between competencies and learning solutions hosted in the Bell Course Catalogue.

Concerning the change management process, the goal was to test the process of competency appraisal through ILE with a pilot group and solve any problems prior to the official launch in May 2001.

Inputs for the Development Phase

Together with the outputs of the design phase, (i.e., three ILE-based competency models), the inputs of this phase are an evaluation grid for online courses (i.e., web-based courses and CD-ROMs) and classroom-based course content, and the Bell Course Catalogue hosted within ILE.

Roles in the Development Phase

In addition to the human resources (i.e., training coordinators, local administrators and champions) deployed in the design phase, local administrators, BCECS training manager, HR representatives, subject matter experts (SME) and pilot test participants constituted the actors for this phase. As implied in the above stated goals, the role of training coordinator was particularly prominent in the development phase.

Processes and Activities of the Development Phase

The following activities were accomplished in the development phase:

Competencies-solutions linking

1. Analyze keywords in competency statements.
2. Analyze learning goals of solutions in the Bell Course Catalogue.
3. Consult SMEs, former trainees and course providers on adequacy of solutions.
4. Link appropriate solutions to competencies.
5. Inventory competencies without solutions.

Change management

1. Select one pilot group of employees for user testing.
2. Conduct pilot tests on process of competency appraisal with ILE.
3. Analyze results of pilot test.
4. Recommend technical/administrative improvements to ILE.
5. Get approval for technical/administrative changes from BCECS.
6. Ensure all technical/administrative modifications have been incorporated.

Competencies-solutions linking. In order to assist the evaluation of course content for compliance with the objectives of competency profiles before they could be linked

together, the Élan team sent initially a request for information (RFI) to Bell's five long-term providers of classroom-based course content, however to no avail. As an alternative, an assessment grid developed by a Technomedia specialist for prior projects was used to assess both pedagogical and technical components of online and classroom content. For instance, some evaluation criteria addressed the need for content to be broken down into modules and lessons, for practice exercises at the end of each lesson, and for test items at the end of each module. Other criteria dealt with the question of browser compatibility for online courses. Along with the evaluation grid, subject matter experts (SME) and former trainees provided advice on the content of some courses. On this basis, training coordinators reviewed course objectives and course descriptions looking for matches with the competency statements to help them establish as many suitable linkages as possible. However, at the end of April 2001, only 30% of the learning solutions had been linked up: « On a pu arrimer à peu près 30% des solutions seulement, il y a un 70% qui est toujours comme laissé pour compte et les organisations ont décidé de se prendre en main » (Technomedia General Manager, interview). It needs to be noted that 95% of competencies within the CTSP had already been associated to training solutions in 1999, therefore, where the CTSP is concerned, the linking effort within ILE only entailed making connections between competencies and solutions. The relative low percentage of linkages was a result of the time constraints, the lack of content availability and the lack of information on courses. Only one month was available to review course information, compare it with competency information and link both when suitable. Furthermore, at the time of the development phase, in April 2001, due to a policy that directed business units to honour long-term contracts signed with five course providers, business units could not

link courses outside those proposed in the Bell Course Catalogue, also called internal courses. Effectively restricting the search for courses which content might have matched the competencies, a new policy was adopted shortly after to authorize both business units and employees to look for external vendors, whether universities, institutes, colleges, etc., when no internal solutions is offered.

Lastly, trainees' feedback is commonly collected and sent by teachers directly to BCECS for statistic analysis. However, training coordinators cannot yet take advantage of such evaluation data to inform their decisions to link courses to competencies. This issue is elaborated in the section "Enabling and Constraining Factors of the Development Phase" on p.138. Given these facts and the number and range of content specificity of courses to be examined, Technomedia consultants, who had been mandated to supervise the linking process, recommended that the responsibility of the linking task and course development be entrusted to the operations (i.e., business units) since they had the best knowledge of their own needs in terms of content. Additionally, Technomedia consultants suggested that all factual and procedural content which did not vary considerably with the introduction of new products and services at Bell Québec, could be converted to online content. The conversion strategy for proprietary content was recently set in place for Bell Québec call centers with a goal of reducing the length of training from seven weeks to five weeks.

Change management. Champions and training coordinators set up small pilot groups (e.g., 5 to 6 employees for the Marketing unit and around 20 for the Customer Services unit) from their own business unit. A total of one hundred people, approximately 1.5% of Bell Québec workforce, tested the system by completing a competency

assessment (or skill gap analysis) form in a test-environment within ILE. The results of the pilot test revealed a positive reaction from employees, but important technical problems, for example, slow traffic and frozen screens. Recommendations for technical improvements were made to BCECS who authorized the changes and requested Technomedia to incorporate the changes. Finally, the champions assessed the modifications to ascertain the web-based competency management module was fully functional and ready for the next phase, the competency appraisal or "review period" as it was designated by Élan team members.

Outputs of the Development Phase

Key deliverables of the above-mentioned activities included the following:

- The CTSP model of which 95% of the total number of competencies were linked to training solutions listed in ILE.
- The behavioural competencies model of which 100% of the total number of competencies were linked to training solutions listed in ILE.
- The technical competencies model of which 80% of the total number of competencies were linked to training solutions listed in ILE.

Together, the three competency models were all housed within ILE and linked to 30% of all training solutions, leaving 70% remaining to be linked. A recently released figure puts the total ratio of competencies linked to at least one solution at 90% in January 2002.

Success Criteria for the Development Phase

A number of indicators for the success for this phase were formulated at project inception, but were later modified as the project progressed. Initially, the Élan project team members had set the following criteria:

- 60% of all competency profiles across all three models should be linked to at least one online learning solution.

- 30% of all competency profiles across all three models should be linked to a unique online learning solution.
- Online courses should accommodate Bell's technological infrastructure.
- All courses, both classroom-based and online should comply with pedagogical prerequisites (e.g., test items associated with content, motivational attributes) listed in the evaluation grid.
- Completion of activities within the time allotted.

The first two criteria were only tentative and so were not maintained because the Élan team estimated that the little time available for linking in the development phase would be better spent associating only popular courses, and wait for the competency appraisal to highlight critical training needs to develop and link the relevant courses. One training coordinator expressed it as follows:

> De décembre à mars, il y a eu tout le processus de profils à réaliser, les rencontres avec les employés pour établir les profils de compétences, donc ça ne donnait pas beaucoup de temps pour l'arrimage, donc l'option a été de dire après la période de bilans, on regardera où sont les écarts majeurs et on ciblera pour établir des priorités de développement de formation.

The next two criteria continued to prevail because they were in part linked to one of the objectives of Élan project and to Bell Québec's new business strategy for e-learning. Called the "Virage en ligne" or "Move online", the strategy is intended to operationalize the vision of Bell Canada as "Canada's leading communications services company" (BCE 1999 annual report, 1999). As for the last criteria, despite the limits imposed on the project and which are discussed below in the next section, the Élan team strived to ensure that all courses linked within ILE embodied optimal pedagogical characteristics. Finally, as in previous phases, it was critical to complete this phase by the end of April 2001.

Enabling and Constraining Factors of the Development Phase

According to the Élan members, together with the time constraints and lack of course content to address specific competencies (see section "Processes and Activities of the Development Phase" p.133), a number of other factors can be characterized as having constrained and facilitated the process of linking competencies with training solutions during this phase.

Course granularity or competency granularity? Five Élan members felt that when competencies were overly detailed, it was difficult to link them with existing solutions, essentially because most existing solutions did not reflect the level of granularity found in the competencies. Having been designed as monolithic courses rather than as a set of modules or learning objects, most courses would address a very large array of competencies and lacked sufficient details on the course content (e.g., specific objectives, labelled units) to assess it usefully. Consequently, the Élan team decided to conform to the granularity of the courses rather than that of competencies which meant that a course was linked to a set of competency elements rather that to individual elements, and a link to a set of competency elements automatically linked the solution to the competency statement. The reason behind that decision was predicated on the fact that a competency is more amenable to amendments because it only requires rewriting its statement whereas a course may necessitate redeveloping its content. Hence the move to (a) opt for "less than perfect" linkages with existing courses so as to have a certain number of competencies-courses associations ready for the approaching competency appraisal, and (b) concentrate the development and/or acquisition of new courses and subsequent linking effort upon urgent training needs singled out through the appraisal. In the long

run and for every newly acquired course, the Élan team intends to make adequate linkages, in other words a finer level of granularity in the associations between competencies and courses elements, a chief requirement.

Courses addressing large target population. In line with the above, it was found that courses which addressed a wide range of proficiency levels did not allow training coordinators to pinpoint precisely the learning solutions for a particular competency statement, let alone for competency elements. For instance, a single course on management may target beginner, intermediate and expert levels because it was designed to bring a learner from entry-level to up to expert mastery of the competency. The following observations by the general manager at Technomedia exemplify the dilemma posed by courses targeting a vast and undiscriminated audience.

> Quand on va chez les fournisseurs, ils ne sont pas enlignés à fournir une approche compétence. Je peux avoir une solution Ventes 101 qui va être à un niveau avancé pour un exécutif en ventes et qui va être de base pour un vendeur. Donc, la même solution peut répondre à des niveaux différents selon la population.

Confronted with such challenges, training coordinators made independent decisions as to which specific target population was appropriate before linking courses to competencies. Further, training coordinators added information notes to the course content descriptions to offer employees additional details on proficiency levels recommended for their competency needs.

Evaluation grids and trainees' feedback. Evaluation templates turned out to be vital tools to assess the quality of both online and classroom content before linking it to competencies. By the same token, access to SMEs was deemed very important to help evaluate the relevance of courses for competencies, because the specificity of content, namely for high level, advanced courses, was a challenge to training coordinators.

Conversely, difficulty to access courses evaluation feedback tracked in ILE for all courses taken at Bell Québec, whether internal or external, was seen an important constraint to the linking process since it rests on the evaluation of quality of courses. For instance, data such as the number of registration for a course – to screen the most popular courses – or the feedback from trainees, are critical indicators on which business units could base their decision to link or not a course, and in turn focus their training investments on course content viewed as crucial to employees and Bell. Such limitation was the topic of discussions and about to be removed at the time of writing the present document.

Finally, the pilot test was a key factor in providing crucial indicators of both the readiness of the system and the reaction of people to it. These indicators were vital to help meet the goals of the development phase, notably the indicators "linkages as numerous and optimal as possible" and "a smooth transition to web-based competency appraisal".

Phase 4 IMPLEMENTATION: Competency Appraisals and Development Plans

Flowchart of the Implementation Phase

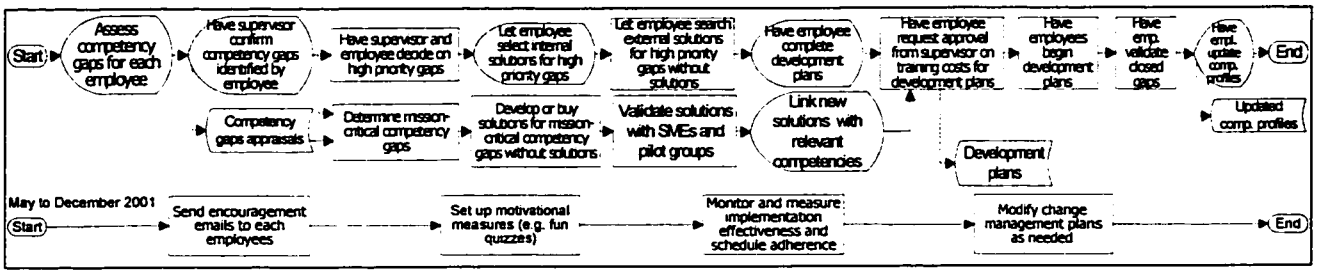

Figure 32 Flowchart of activities conducted during the implementation phase

Goals of the Implementation Phase

During the months of May to December 2001, the implementation phase served three purposes: (a) to introduce the new web-based competency and learning management system to all employees, (b) to get a global "map" of the competency gaps across the whole of Bell Québec in order to identify developmental priorities, and (c) to plan budget expenses and develop new learning solutions for crucial competencies requirements, for which no learning solutions were available in ILE. It should be noted that some activities of the implementation phase did not occur until May 2002 although they were planned in this phase.

With reference to the change management process, the goal was to ensure a smooth implementation of the appraisal process and gain a positive reaction to the web-based competency and training management approach.

Inputs for the Implementation Phase

The inputs for this phase were ILE's competency management module housing the three competency models, the Bell Course Catalogue and the material for the change management process which included the following:

- FAQ with answers to technological, administrative or process related queries.
- Email templates to be customized for each employee in each business unit.
- Mailing schedule for emails and their associated goal for each email message.
- Graphical model of the telephone and email support structure for technical, process-based and administrative problems users might encounter.
- The Bell newspaper "BellNews" to circulate information to employees.

Roles in the Implementation Phase

The human resources involved in phase 4 represent the project initiator, the project sponsor, the project leader, the champions, training coordinators, local administrators, and end users.

Competency appraisals

1. Assess competency gaps for each employee.
2. Have supervisor confirm competency gaps identified by employee.
3. Have supervisor and employee decide on high priority gaps.
4. Let employee select internal solutions for high priority gaps.
5. Let employee search external solutions for high priority gaps without solutions.
6. Have employee complete development plans.
7. Have employee request approval from supervisors on training costs for development plans.
8. Have employees begin development plans.
9. Have employees validate closed gaps and acquired competencies with supervisor.
10. Have employees update competency profiles.

Course development and/or acquisition

1. Determine mission-critical competency gaps.
2. Develop or buy learning solutions for mission-critical competency gaps without solutions.
3. Validate learning solutions with SMEs and pilot groups.
4. Link newly developed or acquired learning solutions with relevant competencies.

Change management

1. Send encouragement emails to each employee.
2. Set up motivational programs such as fun quizzes.
3. Monitor and measure implementation effectiveness and schedule adherence.
4. Modify change management plans as needed

Competency appraisals. The beginning of May 2001 set the launch of the "review period" (i.e., competency appraisals) across all Bell Québec's business units, and within the common three-week timeframe each champion set deadlines for his own unit. As an example, one champion decided to give employees the first week to complete assessments, the second week to approve assessments and the third to complete development plans. Another champion chose to give the global three-week period for

appraisals, while still providing explanations and guidelines on the three-step process. All employees who had gone through the introductory workshop were directed to begin their competency evaluation as soon as possible given the deadline set for the end May 2001. For a discussion on the introductory workshop, see section "Processes and Activities of the Design Phase", p.118). Typically, the employee would access the competency assessment module, consult his/her individual job-related competencies profile and using a scale of 0 to 4 or 5, and rate his/her acquired proficiency level for each statement of competency or elements of competency. As shown in Figure 33 below, the gap between the required mastery level (i.e., My job requirement) and the employee's actual mastery level (i.e., Level of mastery) would automatically appear under the "Gap" column.

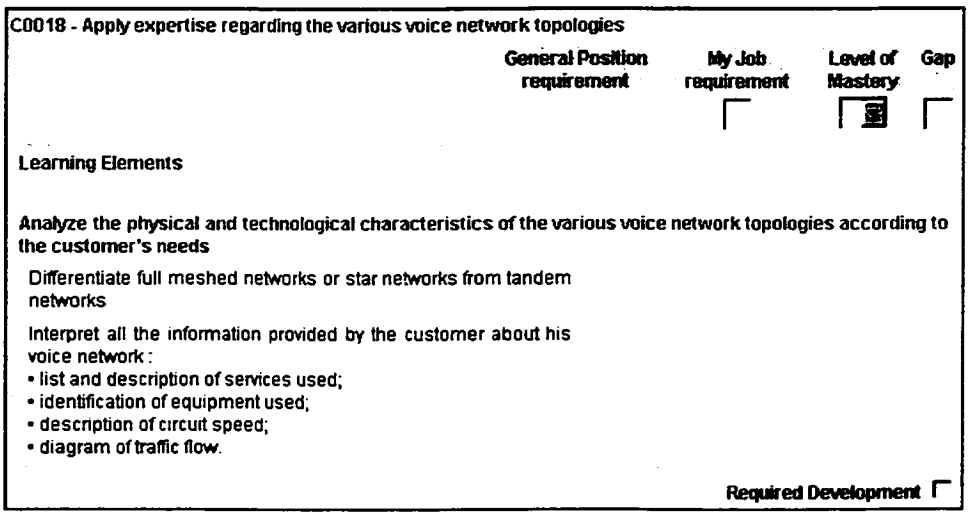

Figure 33 Gaps identified in a competency profile

With all competencies in the profile evaluated, the outcome would be an assessment report (a total of 16,000 assessment reports were completed, representing 3 assessment reports per employee) which the employee would direct to his/her supervisor for approval of the ratings. It is an opportunity for the supervisor and his/her employee to meet and discuss which competencies are considered high priority and which approach

would be the best one to acquire them. Once his/her ratings would be confirmed, the employee would select the competencies to be transferred to the development plan. The next step would be to choose among a menu of various delivery modalities (e.g., classroom-based course, web-based courses, coaching, self-paced or CD-ROMs) for learning solutions before selecting courses based on available information (e.g., course description, learning objectives, costs, location, dates, duration, etc.) and the employee's needs (i.e., his/her own identified competency gaps) and his/her preferences. As mentioned earlier in section "Processes and Activities of the Development Phase" p.133, following a new corporate policy, employees were given the choice to look for external vendors, whether universities, institutes, colleges, etc., when no internal solutions were available. In such event, a request from an employee to sign up for external courses was to be submitted by filling a separate form within ILE before sending it to his/her supervisor for approval of the content and cost of training. Lastly, the employee would transfer the selected activity (ies) to his/her personal development plan, request a last approval for the plan from his/her supervisor and then register for courses. Owing to the strong commitment of champions and other team members, all employees without exception had created their personal development plans (see Figure 34 below on p.145) at the end of May 2001 representing a total of 6,000 individual development plans (one per employee). Therefore, employees had a full year, until the next competency appraisal scheduled in May 2002, to complete their training/developmental activities.

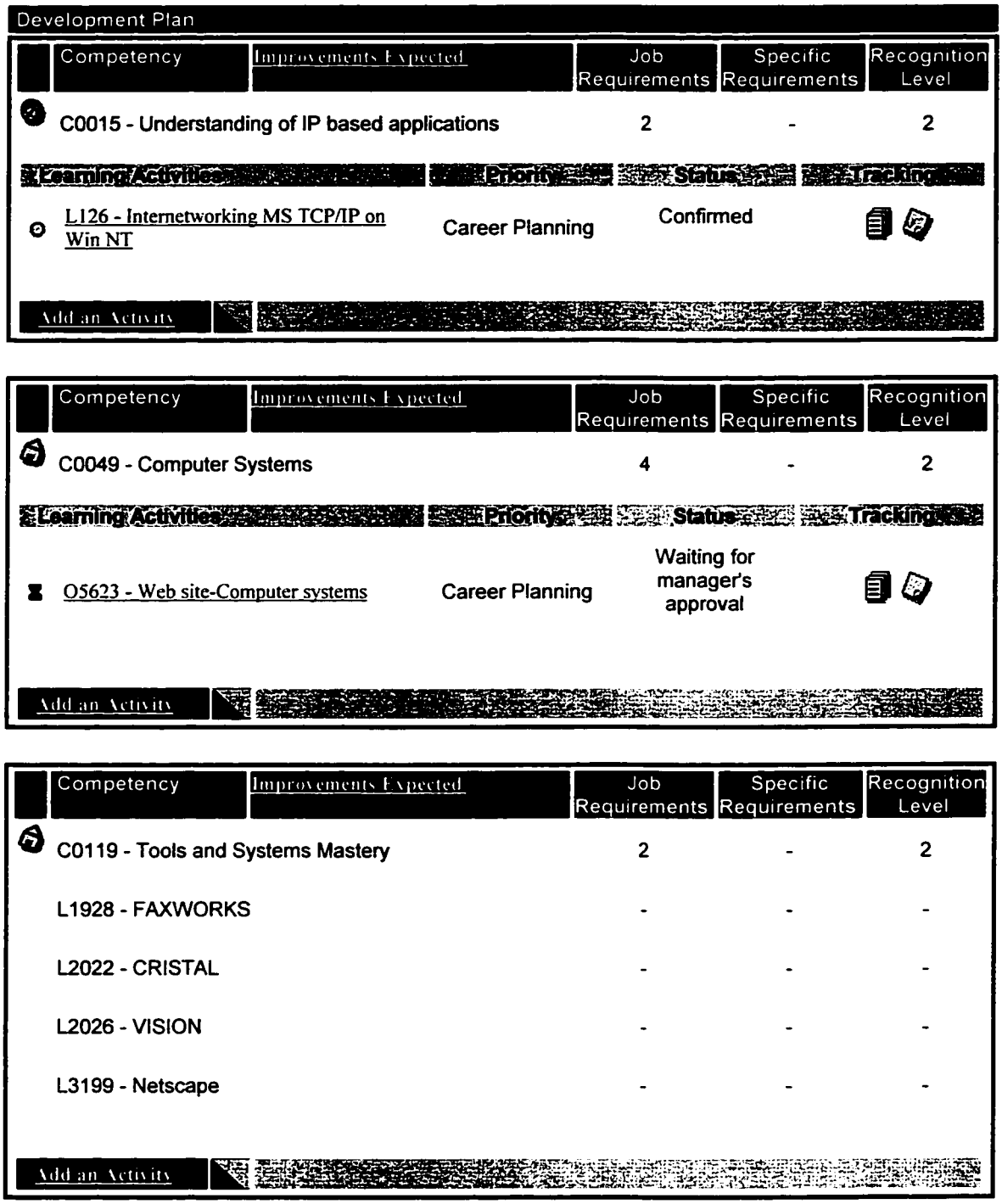

Figure 34 Sample development plan
Copyright 2000 by Bell Québec

In this phase, the change management process was a concerted effort by the Élan team to mobilize all necessary resources to sustain an optimal transition for all impacted

by the new approach. Throughout the appraisal process, employees could benefit from the various levels of help of the support network; the first option was to contact the super user and/or local administrator, the second option was to contact the training coordinator, and the third one was to contact Technomedia directly through email (see Figure 27 p. 124 for a graphical representation of the support network). The training coordinator, though had access to Technomedia directly through the phone at all times. One employee who helped her colleagues during the competency appraisal recalls: «Moi j'étais disponible pour des questions. Donc les gens se sont aventurés dans leurs profils. Il n'y avait vraiment pas beaucoup de questions, les gens ont embarqué, c'était quand même simple à remplir » (participant employed in the Marketing department, interview). Besides the support network, the Élan team adopted a strategy which one training coordinator referred to as the "the sandwich strategy" for the commonly known bottom up and top down communication, to boost employees' engagement, monitor the effectiveness of the process and adherence to schedule.

> Parce que c'est évident que si on a une communication juste vers le bas, ça va peut-être pas toujours se rendre à tous, on voulait faire la position 'sandwich' avec la haute direction on peut avoir un meilleur résultat si on passe tous le même message (Marketing training coordinator, interview).

Bottom up communication translated to periodic emails and face-to-face messages from champions and training coordinators sent to employees to remind them of the upcoming deadlines and encourage them to complete their evaluation. Through ILE, the exact number of employees who had not yet completed their appraisal was systematically tracked and reported by emails to champions for follow-up with interested parties. To instil curiosity about the web-based competency appraisal and motivate employees, the Customer Services business unit even set up a fun quiz to test employees' knowledge of

ILE. Top down communication translated in a couple of email messages sent by the project initiator, Bell Québec's then president, to show top management's endorsement of the project and spur motivation.

The results of the competency appraisal were in line with Bell Québec's forecasts: a very large number of employees demonstrated a gap in mission-critical competencies, notably in the following two CTSP competencies: "Internetworking: concepts and architecture" and "Understanding of IP based applications". These findings are discussed extensively in the section "Phase 5 EVALUATION Impact of the Élan project" on p. 153.

Building on the findings from the appraisal, the next step was to concentrate efforts on developing learning solutions for high priority competencies. As expected, the most important intervention focused on the two CTSP competencies aforementioned. Accordingly, an existing online course offered by the IIT, which content was too dense in comparison with the basic knowledge required for employees, was reduced from a seven-hour to a one-hour and a half course entitled "À la découverte du monde Internet: technologies et applications L060" and centered on basic concepts of IP applications. The choice of an online course was motivated by the belief that web-based learning is suited for the teaching of conceptual knowledge. In October 2001, the mandatory course was first offered to all vice-presidents and the project initiator, who acted as a pilot group to test the relevance and quality of the content before the course could be deployed to their employees. For the latter, the course was optional. Employees who had reported a gap in the two CTSP competencies had the latitude to close it by any means of their choice, be it coaching, face-to-face or virtual seminars or formal training. Yet, to bridge the gap

remained a key requirement of the Élan project who established at 95% the proportion of employees who should have closed their gaps by December 2002. (For more on this topic, see section "Phase 5 EVALUATION Impact of the Élan project" p.153).

A similar intervention was undertaken by the Marketing unit who tied training investments to the results of the appraisal and its strategic goals. Two competencies, "Develop marketing strategies and processes" and "Assess Bell Québec's competitors' positioning to adjust our business strategy " were one such examples of high priority competencies for the Marketing unit which called for an urgent training solution. Since, in September 2001, there was no available course to tackle the advanced and specific marketing needs of a portion of their employees, the champion and training coordinator at that unit commissioned UQAM to develop a two-day, instructor-led course entitled "Le monde des télécoms, une vision stratégique". The course content was validated by SMEs and delivered in January 2002. The course was rated as excellent by trainees and expected to be listed in the Bell Course Catalogue and linked in the competency dictionary as soon as the Marketing unit could access the trainees' feedback.

Other initiatives to populate the Bell Course Catalogue for relevant competencies include the development of departmental training programs by heads of business units (e.g., Sales and Channel Support and Information Technology) based on aggregate of employees' competencies gaps, and the purchase by HR of licenses for off-the-shelf online content from learning vendors NETg. Such acquisition effectively raised the proportion of available online content offerings within ILE from 12% to 45%, thereby helping the Élan team reach one of its targets. Evaluation of the success of the project is discussed more extensively in section "Phase 5 EVALUATION Impact of the Élan

project" p. 153. A valuable feature that shipped with NETg online courses are the online pre- and post tests offered prior to each course and also at the end of each learning module.

Apart from these major initiatives, a few online capsules were also created. The implementation phase can be said to have ended in December 2001 when employees implemented their individual development plans, but in reality, the end of this phase is marked by the second competency appraisal which allowed employees to validate the closing of gaps and update their competency profile.

Outputs of the Implementation Phase

The outcomes of this phase were the completed competency assessments and most importantly the resulting findings, individual development plans for each employee in Bell Québec and the new customized and off-the-shelf learning solutions.

Success Criteria for the Implementation Phase

The success of this phase was dependant on the adhesion of employees to the competency approach, a criterion which translated in 90% of people having completed both their competency assessment and their individual development plan.

Furthermore, given the fact that the project was implemented for the first time, respect of the three-week timeframe was an important criterion because a deadline meant that the momentum could not be lost.

Equally critical, results of the competency gaps evaluation for each unit and for the whole of Bell Québec had to be gathered at a specific point in time in order for vice presidents of each unit, senior management and BCECS to draw meaningful conclusions on aspects such as the state of competency gaps in each unit and across Bell Québec and

the success of the project in general. The training coordinator from the Marketing unit observed that:

> La période de bilans en tant que telle est vraiment fixe. On n'a pas le choix d'établir des dates parce le vp et même Guy Marier vont vouloir des rapports pour savoir où se trouvent les écarts, où sont les besoins de formation ; il faut que ce soit une photo, donc la période est fixe parce qu'on veut avoir un portrait réaliste.

In turn, the data could be used to make decisions at the operational level and corporate level regarding investments in training and in the ILE, another criteria of success for this phase. Indeed, the third objective of the implementation phase was "to plan budget expenses and develop new learning solutions for crucial competencies requirements without learning solutions in ILE" and for which the criteria was that new contracts should be signed with online learning providers. Inherent in the set objective and criteria is the assumption that a workforce with basic online skills would further the company's 3C strategy of Bell Canada as an Internet leader.

Enabling and Constraining Factors of the Implementation Phase

Communication, seen as a vital supporting factor, was approached with the implicit assumption that both senior management and employees' expectations had to be expressed and satisfied. Thus, employees were allowed to address issues of concern to them and senior management was able to demonstrate strong sponsorship of the web-based competency and training approach, presented as a tool for personal development and discussion between employees and supervisors rather than as an evaluation tool. The following comments by the general manager at Technomedia emphasize the Élan team's conviction:

> On voulait vraiment forcer la discussion entre le cadre et l'employé, peu importe le niveau hiérarchique, mais à tout le moins que l'outil, aussi simple soit-il ou complexe serait-il, que l'outil devienne un moyen pour le cadre et l'employé à se parler une fois par année sur ma contribution dans l'organisation, mon développement, mon employabilité, c'était une vision qu'on avait initialement et qu'on a toujours maintenue, aider les gens dans leur employabilité.

Related to the creation of development plans, the champions and their staff noticed that higher effectiveness could be achieved in the competency appraisal if it followed directly the performance evaluation which is a distinct intervention scheduled in January every year. The goals of the performance evaluation process are different from those of the competencies', and are essentially concerned with salary promotion and career advancement. Yet, the performance evaluation process also implies identifying broad orientations for meeting the performance goals set as a result of assessment. However, when the competency appraisal occurs six months later in May, employees have to repeat part of the work of identifying development activities, albeit in a more detailed manner and for a different purpose. Consequently, it has been suggested (a) that competency appraisals take place immediately after performance evaluation and (b) that the start of the performance evaluation be brought earlier in December instead of January while competency appraisals begin in January. On that basis, employees would have the full year to implement their development plans, in other words to register and take courses. A second argument in favour of the proposition stems from the fact that currently, employees who plan to take courses in September following the completion of their development plans in May, June or July, are penalized when training budgets cuts - in September at the end of the financial year- compel them to cancel their courses. Since budgets are distributed in January, earlier registrations in February would ensure that employees benefit a full eight-month before they are told to cancel course registrations. One training coordinator suggested that:

> Peut-être même l'évaluation de performance pourrait se faire en décembre et là en janvier on aurait la période de bilan pour permettre vraiment un an complet, à l'employé de se développer, et puis en janvier les budgets sont là, tandis que quand on est rendu à la mi-mai ; l'année financière finit en mars, donc les gestionnaires ont le budget, ont l'enveloppe de formation, tandis qu'à la mi-mai...c'est arrivé l'année passée malheureusement, en septembre passé, les gens de l'équipe

> consommateur ont été coupés de leur budget. Donc, même si en mai, ils avaient réalisé leurs bilans, plan de développement, ils ont sélectionné des cours qui allaient peut-être jusqu'en décembre de la même année, mais en septembre ils ont été coupés, donc ils n'ont pas pu être développés.

In similar respects, it was found that the tight schedule imposed for the completion of individual development plans ran contrary to the principle of "developing one's competencies". The rationale is that by definition development plans are supposed to foster long-term career goals and therefore should not be subjected to a deadline, but rather be visited on a continuous basis throughout the year. In keeping with this standpoint, the Élan team members agreed to give employees the latitude to complete their plans within one year following the second competency appraisal, conducted in May 2002. Nonetheless, employees are strongly encouraged to complete it in the weeks following the competency appraisal, precisely for the reasons outlined above, that employees should enjoy ample time to carry out their developmental and training activities.

The last although not the least enabling factor was the fact that business units had been authorized to select external courses and not solely courses from the five internal providers with whom Bell Canada had signed contracts.

Phase 5 EVALUATION Impact of the Élan project

Flowchart of the Evaluation Phase

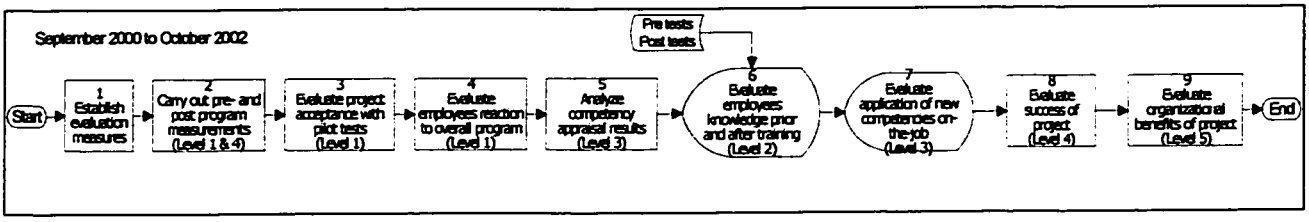

Figure 35 Flowchart of activities conducted during the evaluation phase

Goals of the Evaluation Phase

The primary goal of this phase was to evaluate the effectiveness of the web-based competency and learning management system as measured against the goals of the Élan project. An important note is in order here: the activities of the evaluation are commonly iterative in nature and integrated with the activities of the program implementation. This is especially true of activities such as pre-program measurements and midcourse data tracking. On that account, the timeline of the evaluation phase can be said to have stretched from September 2000 at the beginning of the Élan project, to October 2002, approximately one year after the end of its implementation in December 2001.

Inputs for the Evaluation Phase

For this phase, the inputs were (a) the LMS ILE, used to capture measures such as the number of course registrations or the number of competency gaps reported, (b) the employee satisfaction survey used for assessing employees' perception of the company's efforts to provide development opportunities and tools, and (c) the customer satisfaction survey to record the number of complaints, response time to customer requests, etc.

Roles in the Evaluation Phase

Several individuals contributed to monitor, measure and report on the evaluation activities of this phase: the project leader, the champions, training coordinators, consultants from Technomedia and BCECS training manager. Since the vast majority of data tracking was done through ILE, the LMS managed by BCECS, the role of the training manager was central to this phase.

Processes and Activities of the Evaluation Phase

The ongoing progress and impacts of the Élan project were evaluated according to the following steps:

1. Establish evaluation measures.
2. Carry out pre and post program measurements for levels 1 and 4 data.
3. Evaluate project acceptance with pilot tests (level 1).
4. Evaluate employee reaction to overall program with focus groups (level 1).
5. Analyze competency appraisal results (level 3).
6. Evaluate employees' knowledge prior to and after training (level 2).
7. Evaluate application of new competencies on-the-job (level 3).
8. Evaluate success of project (level 4).
9. Evaluate organizational benefits of project (level 5).

The above activities are listed in the chronological order in which they took place during the Élan project and therefore are elaborated in similar order. Yet, analysis of the data led the researcher to uncover a framework highly similar to Kirkpatrick's long-standing four levels model (Kirkpatrick, 1994). Therefore, activities conducted during the evaluation phase will also be laid out along these levels where appropriate. Table 4 below on p. 155 is a visual summary of the findings for the evaluation phase. The matrix is adapted Phillips's (2001) ROI model which adds a fifth level to Kirkpatrick's model.

Table 4

Summary of findings from analysis of events that unfolded in the evaluation phase

	Needs	Objectives	Measures	Success criteria	Instruments	Data sources	Timing	Responsi--bilities
Level 1	- Employees want flexible learning solutions (blended) - Employees want to manage their own career development	The web-based competency and training management program and courses should be well received by employees and commitment to self-development should show	What is the reaction and satisfaction of employees toward the competency program and towards the training solutions taken, especially regarding online learning?	Positive reaction from employees	Pilot tests Focus groups	Employees Champions	Prior to, during and at the end of Élan project	Champions BCECS
Level 2	Employees lack basic knowledge and skills in IP and networks (to support the 3C strategy) and need solutions to close gaps	Employees should have basic understanding of concepts, processes and procedures related to IP and networks products and services, as well as other competencies targeted in the development plans	Have employees reached the learning objectives set in courses taken, and what basic skills and knowledge have they acquired as a result of training activities included in the development plan?	Vary from one test to another	Pre- and post tests in ILE and from instructors	Employees Champions	During Élan project, prior to and after training	Project leader BCECS
Level 3	A program to monitor and close competency gaps is currently not available	Employees should demonstrate a working knowledge (level 2) of IP and networks products and services (i.e., CTSP competencies in line with strategic goals), as well as strong skills related to other targeted competencies	Have employees closed the competency gaps identified in their development plans? What competencies (and at what level of proficiency) have been developed as a result of the Élan project?	95% of employees should have a level 2 in the CTSP	Second competency appraisal with ILE	Employees Champions	One year after the first competency appraisal	Project leader Champions BCECS
Level 4	Bell Québec cannot anticipate the competencies needed for new projects and business opportunities	1. The corporate level should be able to align training initiatives on current core competency needs	1. Is Bell Québec able to (a) draw a clear picture of the overall competence of Bell Québec's workforce at specific points in time and (b) focus training initiatives on gaps?	1. (a) 100% of all employees must complete their assessment within 3 weeks; (b) n/a	1. (a) ILE 1. (b) HR training investments records	1. First competency appraisal	Before and at the end of Élan project	HR, Project leader Champions
		2. Bell Québec should be able to align training initiatives on future competency needs	2. Is Bell Québec able to forecast future competency needs?	2. Forecast of future competencies	2. HR records	2. Industry reports and appraisals		HR, Project leader Champions
		3. Bell Québec should foster organizational learning and employees' self-development with online learning	3. What is the number of course registration for online courses? What is the number of online offerings?	3. (a) 30% of 2,900 employees enrolled in L060; (b) 30% of all registrations for online learning courses; (c) 45% of the course catalogue consist of online courses	3. (a) ILE 3. (b) ILE 3. (c) ILE	3. ILE training tracking reports		HR, Project leader Champions
		4. Measure the efficiency and effectiveness of training systematically	4. Is Bell able to produce regular tracking reports of costs, time, employee's satisfaction for training?	4. Regular tracking reports	4. ILE	4. ILE training tracking report		HR, Project leader Champions
Level 5	Difficulty to measure the company's assets in mission-critical competencies	The web-based competency program should contribute to an increase in the satisfaction of employees and customers	Is Bell able to provide employees with career development opportunities and tools? Is Bell able to satisfy customer demands?	Increased satisfaction index	Employee and customer satisfaction survey	Employees Champions Customers	Before and at the end of Élan project	BCECS

The *first* activity of the evaluation phase coincided with initial planning activities in the analysis phase. In line with the Élan project's objectives stated in the project plan, the Élan team and BCECS training manager established the measures of evaluation required to assess the achievement of these objectives. Tentative decisions were also made concerning the data collection methods, the sources of data, approximate times for data collection and the individuals likely to be in charge for the data collection steps. The output of this activity was a section within the project plan listing requirements and guidelines for the evaluation process.

Level 1: Employees' acceptance and satisfaction with the Élan project. The Élan project team considered important for employees to react favourably to the Élan project, namely to the web-based competency appraisal and the "Move online" (i.e., "le virage en ligne"). Thus, the *second* task was to capture Level 1 data using a survey. More specifically, during phase 1 in October 2000, a pre-program measurement of the employees satisfaction index was taken as part of the regular annual employee satisfaction survey. The questionnaire survey which covers 120 questions divided in a dozen categories including two on career development and skill upgrading is regarded by the Élan project leader as the true indicator of the success of the project at Level 1:

> Donc il y a deux indicateurs de succès, via les focus groups et via le sondage auprès des employés ; et ce qui n'a pas été fait jusqu'à maintenant mais ce que j'intègre cette année, c'est d'utiliser des éléments du sondage pour mesurer l'impact de Élan ...ce qu'on veut faire c'est de faire un lien au niveau du perfectionnement professionnel; on sait que dans l'organisation on mesure des indices de perfectionnement professionnel au sein du sondage ; il faut utiliser ces indicateurs de perfectionnement professionnel pour voir l'augmentation de satisfaction ou l'augmentation de valeur du logiciel ; si le perfectionnement professionnel et le mouvement, les possibilités de mouvement au sein de l'organisation ou de développement, si ces deux indicateurs sont à la hausse, c'est une résultante du projet. Donc, le sondage auprès des employés, ça c'est le vrai indicateur.

The same measure, repeated in October 2001 and during phase 5 of the project, indicated a slightly favourable response from employees. Post-program measurements

taken in October 2002 have yet to be analyzed before it can be determined whether the index is on the increase when compared with results obtained in October 2001 and 2000.

Jumping to phase 3 of the project, the *third* activity of the evaluation phase involved conducting small pilot tests with groups of 5 to 6 employees in each business unit. As noted earlier for phase 3 of the project, the goal of the pilot tests was to measure the participants' satisfaction with the web-based competency and training management program and opinions on the readiness and functionalities of the ILE system. Champions and training coordinators collected data through discussions and observations taking note as participants offered feedback. Overall, the results revealed a positive reaction from employees, but important technical problems, for example, slow traffic and frozen screens. These data were reported to Technomedia by the training manager from BCECS and to the project leader and project sponsors. Changes were made in accordance with the feedback and reported back to the participants in an informal manner.

The *fourth* evaluation step in phase 5 of the project took place in January 2002 and consisted of a dozen focus groups conducted mostly in the largest business unit, the Customer Services, with 150 employees who expressed positive comments to questions related to such issues as: the ease of access to the competency management module, the usefulness of the competency appraisal and overall competency management program, its timeliness, etc.

Level 3: Pre-program measurement of employees' on the job application of acquired knowledge and skills. Between the end of May and August 2001, the *fifth* operation in the evaluation phase required the compilation and analysis of all the data gathered through the competency appraisal, these data effectively representing the pre-

program measurement of the actual competency gaps. Results are shown in Table 5 below.

Table 5

Proportions of competencies gaps

	Types of competency profiles	**Ratio of employees with competency gaps**	
CTSP	Basic knowledge of PC	26%	
	Understanding telecommunications	32%	
	Internetworking: concepts and architecture	48%	40%
	Understanding of IP based applications	49%	
Behavioural			7%
Technical			85%

The aggregate of Bell Québec employees who reported a gap in the CTSP competencies is 2,400 employees (40%), 420 employees (7%) and 5,100 employees (85%) for the behavioural and technical competencies respectively. As pertains to the CTSP competency model specifically, results showed that a significant number of workers, 2,900 out of 6,000 employees (48% of Bell Québec workforce), had a competency gap of 1 (the difference between the employees' average acquired level of 1 and the required level of 2), in two competencies, notably "Internetworking: concepts and architecture" and "Understanding of IP-based applications". Since these competencies are directly aligned with the Bell Canada's strategic objectives, it was critical that a training solution be designed to help employees bridge the gap.

The results of the assessment were a strong argument for allocating training budgets and aligning them on needs as suggests the following comment from the general manager at Technomedia: « On savait qu'en réussissant l'exercice, c'était la première

fois que dans une division de Bell, les unités d'affaires arrivaient avec des chiffres qui étaient soutenus par un exercice total ».

As mentioned earlier in section "Processes and Activities of the Implementation Phase" p. 142, a course entitled "L060 À la découverte du monde Internet: technologies et applications" and centered on basic concepts of IP applications was developed by the IIT, then piloted with the project initiator and all Bell Québec's vice-presidents in October 2001 during 30 days, and subsequently delivered online to all their employees a month later in December 2001. In August 2001, for the 2,900 employees who had identified a gap, the following objective was restated: 95% or 2,755 employees should report having closed their gaps on the two corporate competencies by December 2002. Employees were free to choose any solution deemed appropriate, whether coaching, a CD-ROM, an online or classroom course, etc.

Regarding the gaps reported for behavioural (7%) and technical (85%) competencies, the third objective (i.e., to reduce individual gaps), could not be associated with a success criteria after the Élan team realized that competency definitions were so varied from one business unit to the other that they could not be aggregated for a meaningful analysis. The Élan project leader's observations below capture the difficulty to extract meaningful conclusions about behavioural and technical competencies gaps:

> Sur les autres compétences, pour l'instant on a trop de variété et de diversité dans les appellations de compétences. Donc il y a beaucoup de rationalisation des outils de compétences, pour qu'on commence à parler un langage commun à travers toute l'organisation. La compétence SAP par exemple, se lit de plusieurs façons différentes ; parfois elle est dans la section « Produits et services », parfois «Outils et services ». Alors tout ça fait que si on veut savoir quels sont nos besoins en terme de compétence SAP, c'est pas vraiment possible.

Level 2: Employees' acquisition of new knowledge and skills. The *sixth* main activity of the evaluation phase, a logical follow-up of the fifth activity above described,

occurred in phase 4 of the project. Although the activity was not carried out in a systematic manner for all courses attended during phase 4, its purpose was to measure employees' prior and after-course knowledge in order to determine the contribution of training courses, especially the L060 online course developed by the Élan team on concepts of IP and Internetworking. Hence, before commencing the L060 course, all Bell Québec executives took the associated 10-item online pre-test and post test. Next, within a set timeframe of 30 days, executives completed the training at their own pace and were asked to rate their appreciation of the course. Following an overwhelmingly positive rating, the course was proposed via the ILE to all Bell Québec employees in December 2001. Thus, through the use of criterion-referenced online tests offered prior to taking the course, following each learning module and at the end of the course, learning was tracked in significant detail for these two competencies ("Internetworking: concepts and architecture" and "Knowledge of IP applications"), but these level 2 data have yet to be analyzed to be meaningful.

For other courses or solutions (e.g., coaching, seminar) for which employees had registered to close their gaps, the measuring of the degree of knowledge absorbed as a result of training was dependent on whether pre- and post tests were associated with the courses. As an example, instructors of classroom based-courses on technical competencies would routinely administer tests prior and after training and send tests scores together with the overall appreciation ratings (Level 1) of trainees to BCECS. By contrast, according to the Élan team, very little in the way of pre- and post testing is feasible for courses targeting behavioural competencies, regardless of their delivery modality (i.e., online or classroom-based). The rationale, according to the Élan project

leader, is that behavioural competence typically includes "soft" skills which do not lend themselves easily to objective testing:

> Il faut faire attention que toutes les compétences ne s'évaluent pas nécessairement par tests, par prétests ou post tests. Les compétences comportementales, par exemple ne sont pas évidentes. Dans certains cas, oui on peut avoir des indicateurs qui peuvent donner une tendance vers la compétence. Par exemple, chez nous on a une compétence comportementale qui s'appelle la vision. Ça s'évalue très mal! On peut faire une série de questions, de diagnostics qui vont dire cette personne semble avoir la vision. Mais ça s'apprend pas, on peut nécessairement passer un post test pour dire oui, maintenant la personne est capable d'avoir la vision.

Still, comparing data measured with pre- and post testing is of concern to the Élan team who sees it as a desirable goal for all competencies in the future.

Level 3: Post-program measurement of employees' on the job application of acquired knowledge and skills. The *seventh* activity was the evaluation of the impact on the job of both the IP course and the web-based competency management and training program. At the end of phase 4, the measurement started in May 2002 in the form of a second round of competency appraisal, five months after the end of the L060 course attended by vice-presidents and a year after the first round of competency appraisal. As noted earlier, findings for the two corporate competencies had indicated that 48% (2,900 out 6,000 employees) had reported a competency gap. In contrast with the previous year, the competency appraisal was launched at different times, with some units having done it throughout May 2002 and other having chosen to wait for the following September 2002. Using the same instruments, competency assessment electronic forms and supervisors' feedback, and the same measures and success criteria, namely (a) "95% of Employees should demonstrate a working knowledge (level 2) of IP products and services" and (b) "Employees should demonstrate strong skills related to targeted competencies", the goal was to measure the extent to which gaps related to the two corporate competencies and other competencies requirements, identified in the previous competency appraisal, had

been closed. Repeating the same process done the year before, employees completed an individual competency assessment within ILE. Definitive figures for the second competency appraisal will be available in December 2002, but at the time of writing this thesis, preliminary results signalled a significant difference with the baseline figure of 2,900. Indeed, 55% or 1,600 out of the 2,900 employees who had initially reported a gap on the two corporate competencies, have closed their gap. On this basis, the Élan team concluded that halfway through the timeline due to end in December 2002, they had reached half of the set target of 95%. These provisional findings are viewed as very positive and an indicator of the transfer learning acquired through the L060 course.

With regards to the gaps identified for behavioural and technical competencies, data tracked within ILE was not formally analyzed for the reason mentioned earlier, namely that the wide variety in the competency labelling precluded a valuable calculation of the number of gaps closed for each competency and its impact on performance on the job.

Level 4: Impact of the Élan project on the organization. The *eighth* task of the evaluation phase translated in an assessment of the business impact of the Élan project measured against its initial objectives. As stated earlier, the Élan project had been driven by the overall need to anticipate and develop timely competencies needed for new projects. In phase 1, this need was further outlined in four major objectives within the project plan along with critical measures to determine whether they had been reached. Table 6 on p. 163 below parallels objectives, measures and results.

Table 6

Objectives, measures and results of the Élan project

Objectives	Measures and success criteria	Results as of August 2002
1. The corporate level should be able to align training initiatives on core competency needs	1. a. Up-to-date detailed pictures, across all three competency models, of which competencies are currently up to the required level and which are not, for all 6,000 employees at Bell Québec, every year b. Evidence of training initiatives tied both to competency gaps and to Bell's strategic business plan.	1. a. 90% of employees completed an assessment of acquired and non-acquired CTSP competencies b. Development of the course L060
2. Bell Québec should be able to align training initiatives on future competency needs	2. A forecast of crucial competencies needed in the future and associated training plans	• The CTSP competencies reflect Bell's strategic, future orientation • Bell's most recent strategic priority related to voice over IP is not yet reflected in the CTSP competencies
3. Bell Québec should foster organizational learning and employees' self-development with online learning	3. a. 30% of the employees who have reported a gap in the two CTSP competencies should register to the L060 online course b. 30% of all registrations should be for online learning courses. c. 45% of the course catalogue should consist of online courses	3. a. 32% of employees with an initial gap in the two CTSP competencies closed it with the L060 online course b. 36% of all registrations are for online learning courses. c. 45% of the course catalogue consist of online courses (NETg)
4. Measure the efficiency and effectiveness of training systematically	4. Regular tracking reports of training costs, employee's satisfaction for training, online training consumption	BCECS captured 55% of overall enterprise training activities through ILE, an 18% improvement over two years

In May 2002, following the second round of competency appraisals, an assessment of the overall impact of the Élan project was carried out by the Élan project leader and the champions. The aim was to determine how successful the project was in reaching its objectives, using both quantitative data (i.e., ratios of competency gaps, online learning offerings, training activities tracked, registrations online curriculum and the number of staff required for future mission-critical competencies) and qualitative data (i.e., alignment between corporate competencies and company's vision).

Related to the *first objective*, results showed that the first competency appraisal carried out in May 2001, had yielded an up-to-date, comprehensive picture of acquired and non-acquired competencies for each employee without exception. (See Table 5 on

p. 158 for a detailed summary of results). Yet, although the data concerning all competencies (except those of the CTSP) were not suitable for tabulation by type of competency across Bell Québec due to a lack of uniform definitions, valuable information such as the distribution of gaps across business units could be derived. Unlike the above though, the data related to the CTSP were highly useful because it yielded findings concerning the whole Bell Québec organization. These data were judiciously used to inform the decision making that led to the design of the L060 online course, an indication of the success of the Élan project related to the first goal. The general manager at Technomedia recalled:

> On s'est dit, il faut qu'on fasse un cours qui va toucher quatre à cinq mille employés, on le voyait, on voyait vraiment l'écart, on n'avait pas de solution qui existait sur le marché, on a fait une capsule qui durait 45 minutes et qui a été lancée et qui a répondu à l'écart le plus grand qui était « Connaissance des produits IP ».

Furthermore, analysis of the up-to-date picture of acquired and non-acquired competencies data partially addressed the *second objective* and led to encouraging results. On the one hand, the CTSP competencies reflect Bell's strategic future orientation, and on the other, Bell's most recent strategic priority related to voice over IP is not yet reflected in the CTSP competencies. The present CTSP competencies reflect the portrait drawn for the Bell Canada of 2004 back in 1999, and captured in their catch phrase: "One stop shop for telephone, wireless, IP, data and business solution". However, the results of the evaluation also suggested that although Bell Québec could currently meet the emerging need of voice over IP telephone, with the forecasted increase in demand, Bell Québec would need to update its current workforce competencies if it is to remain competitive. As stated by the Élan project leader:

> Dans une génération ou deux, l'ordinateur sera très puissant pour transmettre les communications voix. Et la tendance, c'est que nos compétiteurs ne sont plus Telus ou un autre, nos compétiteurs

> sont Cisco, IBM, etc. qui vendent des réseaux qui peut transporter la voix, et la voix devient donc juste une application « data ». Mais ça veut dire que j'ai 5000 techniciens dans tout Bell Canada qui ne sont pas à ce niveau de compétence là, ce n'est pas reflété dans le CTSP. Alors il faut commencer à travailleur sur de nouvelles compétences, qui ne sont pas encore évaluées, parce qu'on commence seulement à les identifier depuis six mois.

As a result, given a 50% gap in Internet Protocol and a 30% gap in voice over IP, the project leader reasoned that training investments would prioritize the smaller gap given its impact on the future, rather than the large gap with no impact on the future. Further, the results of the evaluation suggested that although Bell Québec could currently meet the emerging need of voice over IP telephone, with the forecasted increase in demand, Bell Québec would need to update its current workforce competencies if it is to remain competitive.

While the competency management software ILE does not in itself anticipate future competency needs, its valuable contribution was to enable decisions makers to compare current industry trends with Bell Québec's present competencies, identify the lack of competence in voice over IP and plan their strategies for future training investments. In this sense, the Élan project was a successful initiative. Yet, the real success according to the Élan project leader will be when Bell Québec is able to identify and close competency gaps prior to the industry need becoming crucial:

> À moyen terme, le but est de pouvoir établir un besoin de compétence, de pouvoir établir le niveau d'écart et de le combler avant la réalité du besoin. Par exemple, si je prends l'exemple de voice over IP, actuellement on parle de 50,000 téléphone par année, c'est considérable mais ce n'est pas énorme ; actuellement on peut rencontrer le besoin de d'affaires, mais si on retourne à deux où on a manqué des besoins d'affaires...je dirais que d'éviter ces situations là sera un succès.

The *third objective* targeted the online course L060 and aimed at measuring the impact of the Élan project and the online learning program on organizational learning and self-development. Accordingly, it was decided that 30% or 1,000 out of 2,900 employees should register for the online course L060. The 30% target represents a third of 2,900, a

conservative estimate motivated by the knowledge that fewer than 2,900 employees would choose formal training on IP, and that about two-thirds would bridge their gaps through other learning methods. Consequently, it was decided that only 1,000 training should be ordered from the IIT. In August 2002, findings revealed that 32% or 520 out of 1,600 who reported having closed their gap, did it through the online course L060, 2% above target. Moreover, consumption of online learning was above target only halfway through the timeframe, a result which predict even better results at the deadline in December 2002.

Perhaps, the biggest benefit linked to the Élan project was the higher number of registrations for online learning. Prior online registration records had revealed that only 1% of employees had opted for e-learning. Eight months after the implementation of the Élan project, in June 2002, 36% were online learners, a huge increase from the 30% target. Bell Québec at the time was not only the sole division above target, but it was also markedly above the overall 24% reached by all divisions included.

Excellent results were also obtained with respect to the sub objective aimed at increasing the percentage of online learning offerings to 45%; important contracts with content vendors like NETg signed in May 2002 brought the total number of online courses from 225 (17%) to 425 (47%) of all training offerings provided by the Bell curriculum.

With regards to the *fourth objective*, the systematic tracking of the effectiveness and efficiency of training, regular quarterly tracking exemplified the success of Élan project as measured by that objective. In July 2002, BCECS gave a PowerPoint presentation on BCH learning investments as of May 2002, it was shown that ILE

captured 55% of overall enterprise training activities, an 18% improvement over two years. Training investments related to Bell Québec were as follows: $1.7 million which included payments to external suppliers for development, delivery and maintenance, but excluded cost of learning facilities, time away from work and associated expenses as well as internally produced curriculum development and delivery since these were already recorded by the Finance and should not be recorded twice. Among other costs tracked, online course offerings showed a constant increase between year 2001 and 2002, and as stated earlier, online curriculum registration at Bell Québec was above target with 36%. Further, data collected for level 1 (i.e., employees' satisfaction), level 2 (i.e., learning), level 3 (i.e., on-the-job application) and level 4 (i.e., business impact) through the evaluation process presently discussed are another example of the systematic tracking of the effectiveness of training.

Level 5: Benefits of the Élan project. The *ninth* and last step of the evaluation phase took the form of an assessment of the long-term organizational benefits of the Élan project. At project inception, the Élan team had decided that non-monetary benefits such as employee and customer satisfaction would be the best indicators of success for the project, as opposed to a return on investment (ROI) on the project. The decision was motivated by two factors. First, the impetus for the implementation of the Élan project came less from the need to reduce training costs than from the drive to increase employees' critical competencies and better align training initiatives and investments with competency needs. The reasons underlying the decision to forgo an ROI evaluation are delineated in the following statement by the Élan project leader:

> Pour un ROI sur le projet, il n'y en a pas eu. Il y avait une décision financière de le faire mais pas sur un calcul de retour sur investissement. La première décision de lancer le projet Élan était une

> décision financière 'on va mieux décider notre formation', mais il n'y a pas eu 'combien cela va me coûter pour mieux investir dans la formation' .

Second, since the ROI was not the primary driver of the project, the huge costs of monitoring, capturing and reporting the ROI of the entire Élan project would outweigh the benefits. On that basis, the yearly employee satisfaction in October and the quarterly customer satisfaction surveys were identified as significant sources of data related to the organizational contribution of the Élan project. As discussed earlier, results for the employee satisfaction survey conducted in October 2002 were being analyzed at the time of writing this thesis. Likewise, the customer satisfaction survey will yield post-program results in the near future which will be compared with results obtained from past years surveys.

Outputs of the Evaluation Phase

The outcomes of the evaluation phase were a summary of the results of the Élan project disseminated in various forms (e.g., PowerPoint presentations with charts, diagrams and tables) during meetings of the Élan committee. A sample of a results summary is shown in Table 6, p. 163.

Success Criteria for the Evaluation Phase

Timely data and accurate content of the evaluation data was of primary concern to the Élan team. Measures from piloting tests, employee satisfaction or competency appraisals had to be obtained at the required time in order to inform decision making and proceed with the next step of the project. Systematic monitoring of the progress of the implementation was made possible through the use of the LMS ILE. Further, strict schedules and deadlines for measurements (i.e. for pilot tests or employee satisfaction survey) had to be observed.

Enabling and Constraining Factors of the Evaluation Phase

Third factors contributed to the success of evaluation. First, from the perspective of the Élan team, accurate measurement of employees' competency gaps was dependent on the employees' perception of the appraisal. Analysis of the results from the first competency appraisal had showed that 3,100 employees satisfied the competency requirements outlined in the CTSP model, but the Élan team questioned the validity of these results on the grounds that supervisors perceived a higher gap in their employees. The Élan team speculated that either the employees had overrated themselves or the required proficiency levels was too low and concluded that intensive communication about the "inconsequence" of incompetence was needed in order to reduce employees' fear of the impact of the appraisal on their job. This issue is depicted in the following remarks by the Élan project leader:

> L'autre chose qu'on a établit c'est que ça reste un jugement subjectif et de l'employé et de son cadre ; les gens au moment de la première ronde de bilans, les gens n'ayant pas trop compris la conséquence de l'incompétence...pour l'instant, il n'y en a aucune, la conséquence c'est qu'on va t'aider à y remédier. C'est pour ça que pour moi l'écart réel est beaucoup plus grand que l'écart rapporté.

Second, as noted earlier, the LMS ILE also played a pivotal role in the accuracy of evaluation data such as total number of online registrations, completed competency assessments or proportions of competency gaps in various categories. Finally, constant circulation of evaluation information among all responsible for data collection, analysis and reporting was seen as a determinant of the success of this phase.

The model below synthesizes the experiences that have been described in this chapter in a graphical form using IBM flowcharting symbols as shown in Figure 36 below. The model should be read from left to right and top to bottom, following the path of the lines. For phase 2, 3 and 4, the activities related to the change management process

are illustrated below those related to the competency management process. Greyed numbers indicate at what point in time numbered activities in the evaluation phase occurred.

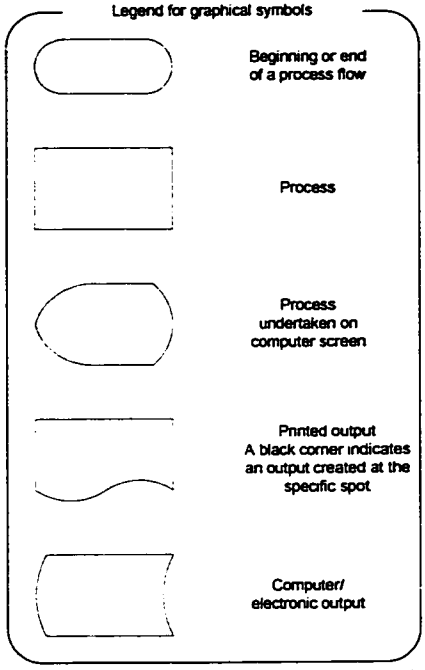

Figure 36 Legend for the final model

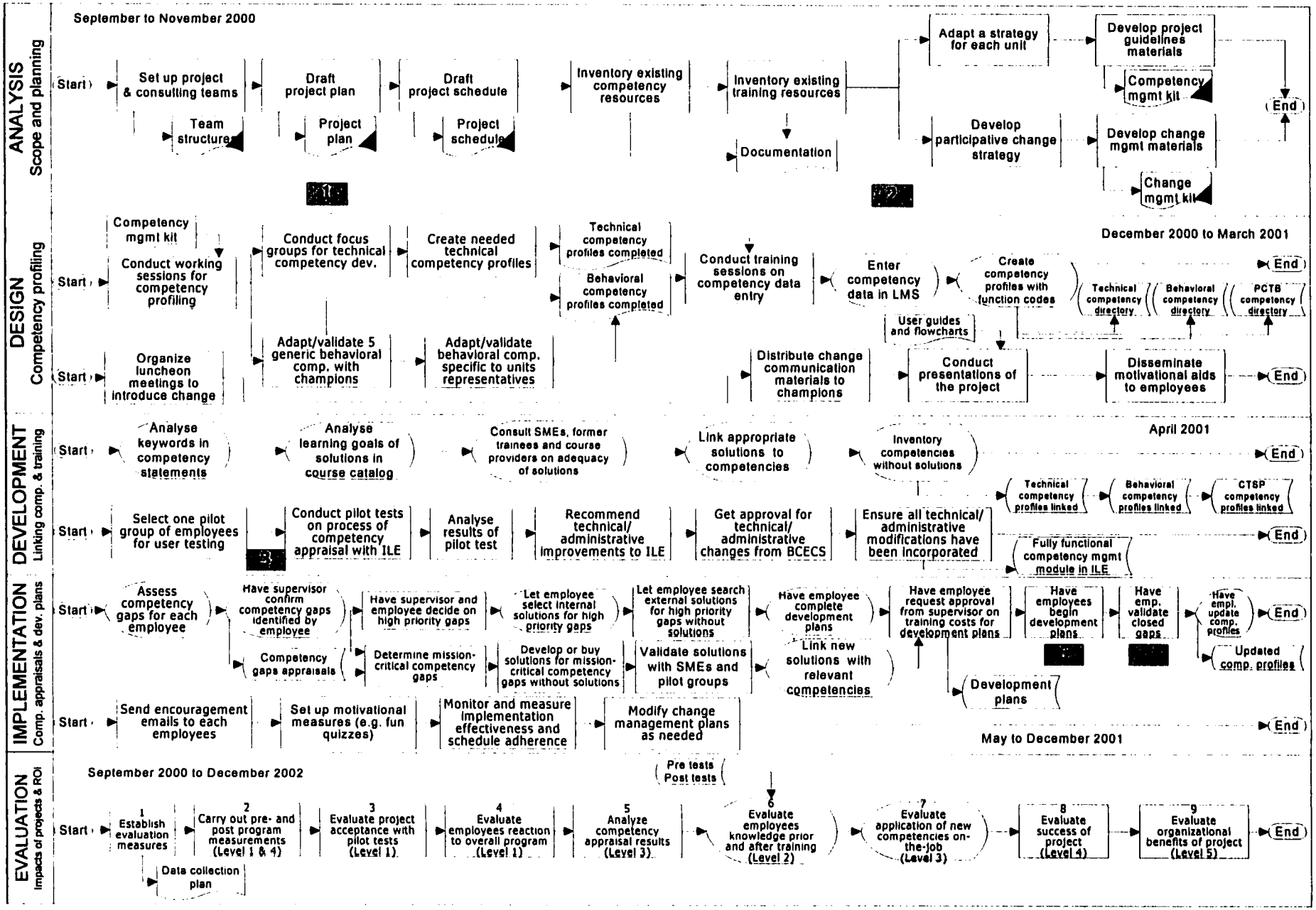

Figure 37 Final model of the phases that characterized the implementation of the web-based competency and training management program at Bell Québec

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

Introduction

This chapter summarizes the main findings of the study in the first section. In the second, the limitations of the study as well as implications of the findings and the model for future research on web-based competency and training management through a LMS are discussed.

Conclusions from the Findings and Implications for Practice

A Phased Implementation

The findings of the study strongly suggest that the process of utilizing a LMS to align e-learning and classroom-based learning resources with competency gaps follows a pattern of phases highly akin to systemic analysis which advocates a methodology to optimize systems in five main phases: analysis, design, development, implementation and evaluation (See the work of La Rocque & Stolovitch, 1983, for a description of the systemic approach). In this study, the system to be optimized was the web-based competency and training management at Bell Québec and the unfolding stages were the early planning activities, the competency profiling efforts, the linking of competencies to learning offerings within ILE, the launch of the competency assessment process and the cyclical evaluation work. A systemic approach to problem-solving was also detected within each phase where the decision-making process followed by the Élan team led it to anticipate and plan all elements of the system: resources to be used (i.e., inputs), activities

to carry out (i.e., processes), results to expect (i.e., outputs), benchmarks to observe (i.e., criteria for success), and factors (i.e., mediating elements). Although, as discussed in the literature review in chapter 2, a formal methodology does not yet exist for web-based competency management, evidence from the literature on skills management points to similar findings. (For more on this topic, see the works of Bejcek & Pezzuti, 2001; Duxbury, Dyke, & Lam, 1999).

Pivotal Role of Change Management

Another major theme derived from inductive analysis was the fundamental role of the change management strategy throughout the phases of the Élan project. The success of the Élan project was greatly enhanced by the development and implementation of a well-structured and systematic communication and change management plan. Senior management and the Élan team first acknowledged the potential barriers, namely resistance to change, lack of understanding of the purpose of competency management, fear of evaluation and its consequences on job and promotion, associated with a large-scale initiative that impacted a great number of people. As a result, they resorted to very effective strategies such as piloting, stakeholder involvement, constant, clear, and bottom-up as well as top-down communication about the goals and deadlines for the Élan project, non-threatening climate around assessment, and demonstration of strong endorsement from senior management. The approach to change management is congruent with classical principles and steps described by a number of change management practitioners (Carnall, 1995; Carr, Hard, & Trahant, 1996; Gouillart & Kelly, 1995; LaMarsh, 1995; Katzenbach, et al., 1996; Kotter, 1996) and claims that the introduction of competency-based management in an organization has higher chances of success if it

is used for development and training rather than other applications such as performance appraisal or succession planning (Lucia & Lepsinger, 1999, p. 21; Marelli, 1998, p. 13). That the implementation of a web-based competency management program with competency gap analysis unfolded smoothly with only minor incidents across Bell Québec, is very likely a reflection of the Élan team's clear and consistent intention to see web-based competency management deployed for employees professional growth.

Challenging Competency Definition Efforts

The study highlighted the presence of a mediating entity which affected the dynamic change from one phase to another, particularly between the competency profiling phase (i.e., phase 2) and the linking phase (i.e., phase 3), and from the latter to the evaluation phase. The challenge posed by the definition of competencies posited as observable and measurable job behaviour descriptions, the meaning of which would be obvious to everyone and the level of specificity of which would be optimal, was clearly reflected in several instances. For example, one business unit had to rewrite most of their competency statements with the help of a consultant because employees experienced confusion when reading the competencies to assess themselves. Approximatively worded competencies also hindered the evaluation effort due to many duplicates in ILE that warped the statistics (e.g., number of employees reporting a gap in a given competency) and undermined the validity of overall results. Further, highly detailed competency statements proved to be an impediment to the process of linking competencies to learning resources through ILE. The problem posed by the labelling of competencies is well documented in the literature on traditional competency mapping. Findings from a survey of competency frameworks in UK organizations show that "the issue of defining

competencies in a meaningful and useful way is a problem for half of users" (Miller, Rankin & Neathey, 2001, p. 43). In line with this, Green (1999) notes that behaviourally defined competencies involving several people contribute to rich, accurate definitions that can reduce ambiguity, redundancy and even prejudice in gap analysis. These principles were widely embraced by the Élan team although some efforts remain to be made to clarify some definitions.

Core Competencies, Behavioural and Technical Competencies, and Proficiency Levels

Behaviourally defined competencies are not to be confused with behavioural-type competencies. The latter refers to competencies that reflect interpersonal skills or "soft skills" (e.g., team work, communication, decision-making) demonstrated in accomplishing job behaviours. The structural characteristics (i.e., one set of core competencies, another set of behavioural competencies and a last set of technical competencies) of the competency models at Bell Québec appear to have played an important role in the effectiveness and usefulness of the web-based competency management approach toward assessment and precise training recommendations. Indeed, competency profiles were viewed as comprehensive enough to cover the set of responsibilities associated with a job position and detailed enough to allow the targeting of specific competency gaps. These findings parallel others from studies having examined organizations where competencies are in use. Models consisting of a set of behavioural competencies and a set of technical/functional competencies are present in two-thirds of organizations in the UK while the majority divided their models into core or generic, and specific competencies to address the needs of particular populations (Miller, Rankin & Neathey, 2001, p. 47). Other features of the Bell Québec competency

dictionary commonly found in organizations are the categorization of competencies under headings, the addition of explanatory statements for the competency definition and the use of proficiency levels.

Competency-based Theory of Instructional Design

Behaviourally defined competencies seem to be even more relevant in the context of web-based competency management and more specifically when matching competencies and learning in a LMS. In the case of the latter, it is not only the wording of competencies which is important, but that of the learning resources as well. As suggested by evidence from the data and from the literature, the output of the process of matching competencies to learning solutions within a LMS is highly dependent on the quality of the inputs, in other words the extent to which the competency definition maps onto the learning definition. The Élan team and more specifically training coordinators experienced much difficulty in attempting to link training resources which were either insufficiently or vaguely described. Tuso and Longmire, 2000 note:

> One of the biggest challenges associated with this approach [competency-based learning] is the necessity of matching existing learning content to the competencies within a competency model. The problem is that most existing content is still in the form of courses, instead of in smaller instructional units that can be accessed independently to address individual learning needs and performance gaps. (p. 34)

This study showed that the identification of (a) two levels of learning objectives: general and sub-objectives, (b) sub components such as modules with explanatory information on the content they cover, (c) the target audience, and (d) pre- and post tests, are critical elements that can help establish valid and precise linkages between competencies and training resources. In essence, these requirements speak to the need for

two imperatives: (a) precise referencing (e.g., metadata tagging) of learning resources in the LMS to ensure the "label on the package" accurately describes its content, and (b) object-based instructional design principles underlying the development of learning resources intended to be catalogued (e.g., classroom-based courses) and/or stored (e.g., e-learning courses) within the LMS. Emphasizing that the challenge of matching competencies to learning content "involves both instructional design and technology concerns in reconfiguring content to adapt to a competency model", Tuso and Longmire (2000) recommend that designers break down existing learning offerings into learning objects defined as "modular units small enough to map to specific components of the competency model" (p. 36), before assigning metadata tags to learning objects. These tags provide information (e.g., subject matter, difficulty level, audience characteristics) on the targeted elements of competency (ies). Results from a survey of Australian vocational training practitioners support similar claims and suggest that resources such as training packages be catalogued down to the level of individual units of competency and elements of competencies using metadata heading and other resources descriptors (Gilding, Jones, Thompson & Silberg, 2001).

Competency Appraisal for Career Development Rather than for Performance Evaluation

The decision to implement the Élan project predominantly to support professional growth and to keep the performance evaluation process a separate initiative, appears to have played a significant part in the accuracy of data collected through the competency appraisal. The results of the competency appraisal conducted in May 2001 indicated that 45% or 2,900 employees had rated themselves as lacking the required proficiency level in the two IP competencies ("Internetworking: concepts and architecture" and

"Understanding of IP based applications") directly aligned with Bell Canada's strategic goals. Although this figure is considered quite high by the Élan team, the project leader speculated that it did not reflect the reality of actual gaps for these two competencies based on information shared with middle managers in various units. The cause was identified to be employees' fear of the consequence on their job position of admitting a lack of competence. In short, despite intense efforts to portray the web-based competency and training management program in a positive light, a number of employees were still apprehensive of potential penalties. With continued messages about what the Élan project leader called "the non-consequence of incompetence", these employees were expected to experience less apprehension with the second competency appraisal to be ended in December 2002. Similar claims are found in the literature where it suggested that "skills assessment should never be tied to performance. It should be a tool to help employees develop challenging career paths and for managers to identify and correct organizational skill gaps" (Governor's Office for Technology (GOT), 2000, p. 9) and "when an appraisal is linked to compensation the individual has an incentive not to admit mistakes" (Green, 1999, p. 96). In addition, it can be argued that a non-threatening climate around competency appraisal would enhance the validity of evaluation results with exact data, and in turn accurately inform decision-makers for aligning training offerings on competency needs. While valid measurements are a "*sine qua non*, another important condition must be considered for a successful evaluation process. As stated by some Élan team members, the yearly competency appraisal should be conducted at the same moment in all business units, if decision makers are to draw meaningful conclusions at the organizational level at Bell Québec.

Implications for Future Research

Limitations of the Research

The purpose of the research was to develop a holistic understanding and a descriptive, systemic model of a complex phenomenon that had not been explicitly represented in the past. Indeed, the absence of systematic empirical research on organizational strategies to use a LMS for aligning training offerings with competency gaps motivated the researcher to conduct an exploratory case study of one company. As in most exploratory research, this research has methodological shortcomings with respect to sample selection and generalization.

Given that few organizations actually focus extensively on both web-based competency management and web-based training at the organizational level, the choice of a case company was limited to large organizations since they are more likely to make the huge investments required to acquire a LMS. As a result, the model generated by this study cannot be regarded as illustrative of smaller companies where web-based competency management and e-learning activities might be outsourced to an application service provider (ASP), nor can it be generalized to large organizations where web-based training is not the appropriate answer to competency development.

The specificity versus comparability of findings in qualitative research speak to the emic-etic distinction. The former refers to the assumption that phenomena is influenced by the cultural setting and therefore findings are not necessarily transferable to another culture. The latter refers to the premise that some aspects of phenomena lend themselves cross-cultural comparison using "etic instruments, (i.e. the items of scale should be applicable to all culture in the same way)" (Salzberger, 2000, p. 2). The

researcher strived to adhere to emic principles in order to portray the phases of implementation of the web-based competency and training management program at Bell Québec from the participants' perspective. However, as is common in the emic approach, the researcher was also the measuring instrument and therefore was subject to personal bias with regards to the identification of systemic phases in the Élan project. Accordingly, it can be said that the researcher's prior knowledge of systemic analysis is likely to have constrained the findings in this study.

Future Research Methodologies

The descriptive and systemic model can, however, serve as a starting point to develop propositions and new research questions for subsequent empirical testing with multiple case studies comparing different organizations using web-based learning management systems. Such explanatory research will add insights into the factors that that are essential to successful alignment of training resources with competency requirements through a LMS, while also expanding the theory of effective web-based competency and training management. As revealed in this study, change management strategies emerged as a determinant factor in the process of using a LMS to tie training to competency needs. With relation to this factor, one question of research merit would consider the extent or degree to which change management strategies contribute to implementations of processes and technologies intended for competency and training management.

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APPENDIXES

Appendix A

Two Samples of Interview Guide

1. Profiling and referencing competencies in LMS

Roles

1.1. Who is responsible (human resources) for managing and modelling competencies in your organization?

1.1.1. What is/are their job title(s) and position(s)?

Inputs

1.2. Which resources (human, tools, documents) are used to manage and model competencies?

1.2.1. Can you describe the competency management capabilities of your LMS?

Strategies

1.3. Can you describe the strategies, actions, procedures you use to model competencies?

1.4. What framework is used to model competencies within your LMS? (competency ID, competency title and competency description?) How are the company's job positions described/organized within your LMS?

1.4.1. Are competencies, skills classified along *proficiency levels*?

1.4.2. Are competencies, skills weighted within roles?

1.4.3. Are employees linked to job roles?

1.4.4. Do you find it useful to locate employees by skills? Why?

1.5. Do you attempt to align your competencies with your business *strategic goals*?

1.5.1. How are the company's required core competencies defined and *linked to the organization's structure*? By job roles, position?

Criteria

1.6. What criteria (conditions, policies) do you use to direct the process of competency profiling and referencing in your LMS?

1.7. How often are competency profiles revised and updated?

Outputs

1.8. What outcomes do you expect when you model competencies within your LMS?

2. Competency/skill gap analysis and training assessment

Roles

2.1. Who is responsible or involved (human resources) in assessing competency/skill gap analysis in your organization?

2.1.1. What is/are their job title(s) and position(s)?

Inputs

2.2. Which resources (human, tools, documents) are used to conduct competency/skill gap analysis?

2.2.1. Can you describe the capabilities of your LMS for competency/skill gap analysis?

Strategies

2.3. Can you explain the steps and strategies you use to evaluate competency gaps with and without the help of a LMS?

2.4. Do you assess skill requirements for each employee in the company?

2.5. Is it a profile-driven skills assessment? What is it called? (pretest?)

2.6. How is skills attainment determined? By supervisors? Through 360° evaluation? What is it called? (post test?)

2.7. Can you link competencies with tests in your LMS? (*post training assessment*)

2.8. How do you track skills taught by courses? (*post training assessment*)

Criteria

2.9. What criteria (conditions, policies) do you use to direct the process of competency/skill gap analysis?

2.10. What circumstances (internal promotion to a new team, new hire into the company) prompt the use of competency/skill gap analysis?

Outputs

2.11. What are the outcomes you expect when you conduct competency/skill gap analyses within your LMS?

3. Developing and referencing Reusable Learning Objects in a LMS

Roles

3.1. Who is responsible (human resources) for developing and managing e-learning training in your organization?

3.1.1. What is/are their job title(s) and position(s)?

Inputs

3.2. Which resources (human, tools, documents) are used to develop and reference learning objects in your LMS?

3.2.1. Can you describe the learning management capabilities of your LMS?

Strategies

3.3. Can you describe the strategies, actions, procedures you use to develop and manage your e-learning training database and interventions?

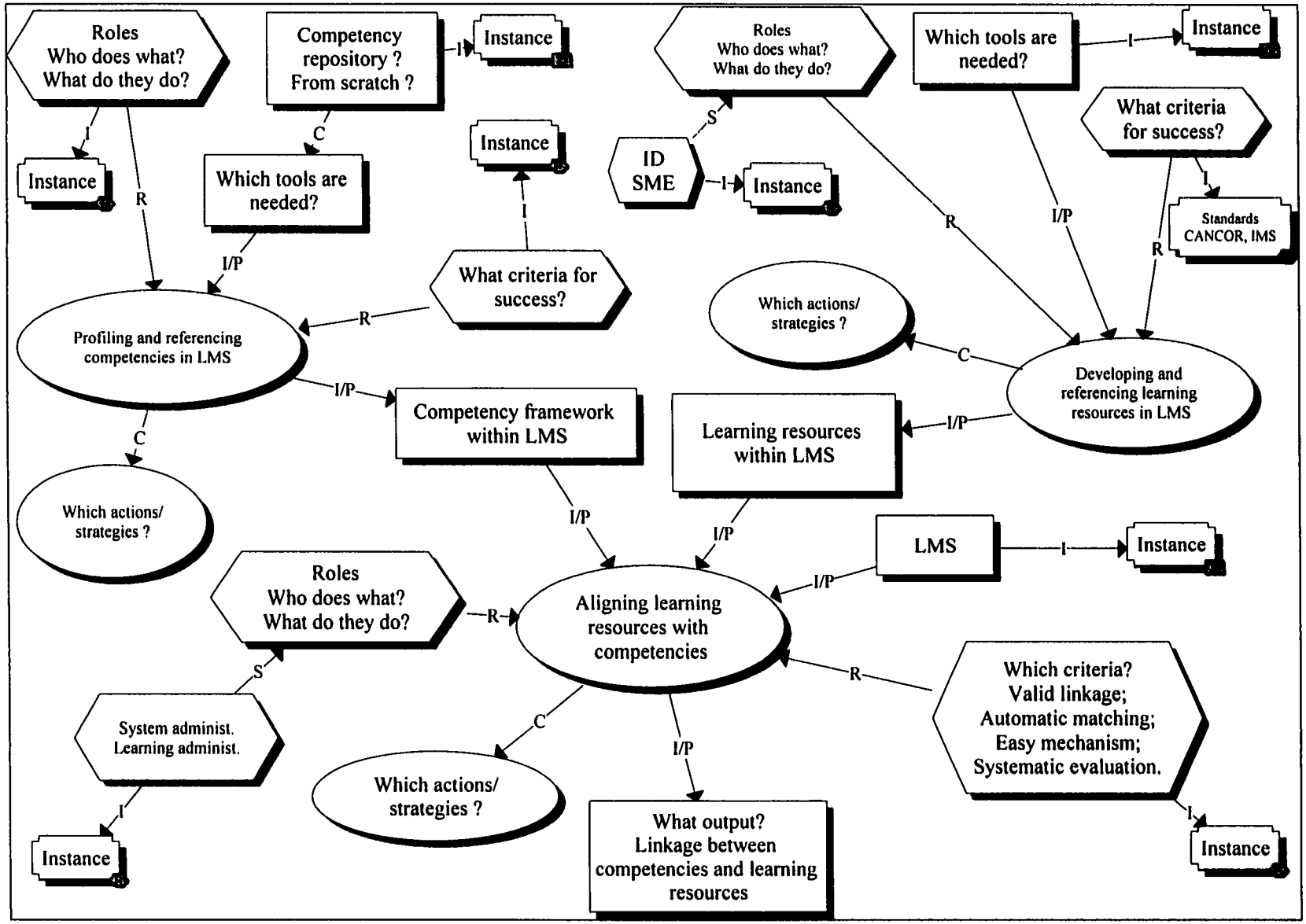

Figure A 1 Sample of the graphical interview guide

Appendix B

Contents of the Case Study Database

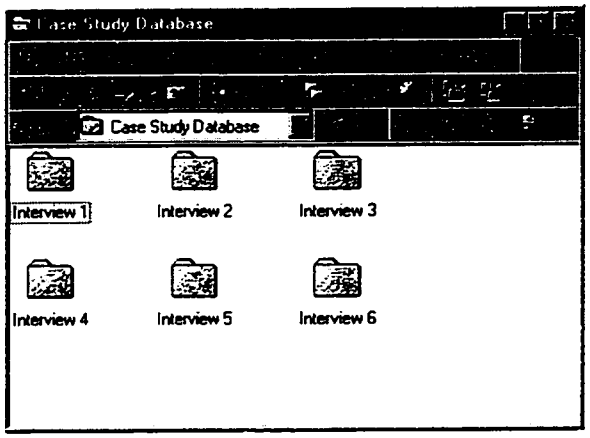

Figure B 1 The main case study database for the research

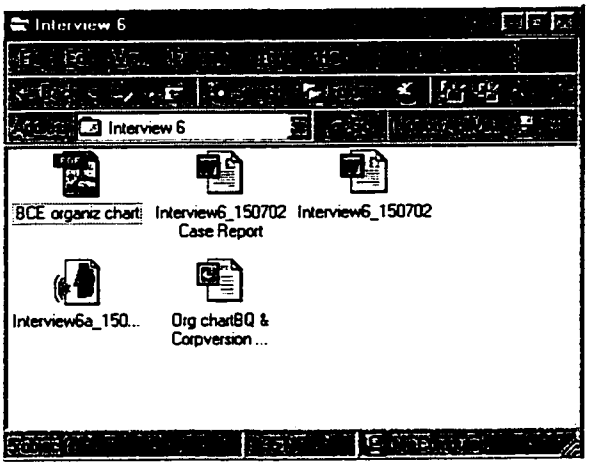

Figure B 2 The contents of a specific case study database for one interview folder

Appendix C

Sample of an Interview Transcript Coded

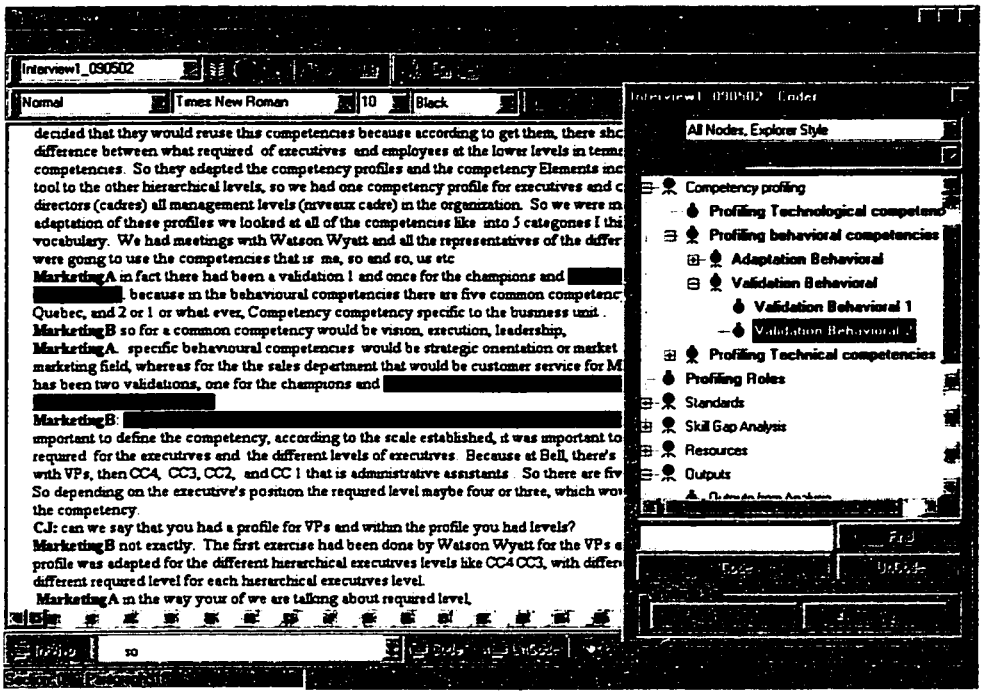

Figure C 1 Interview transcript with the list of codes in the Coder on the right

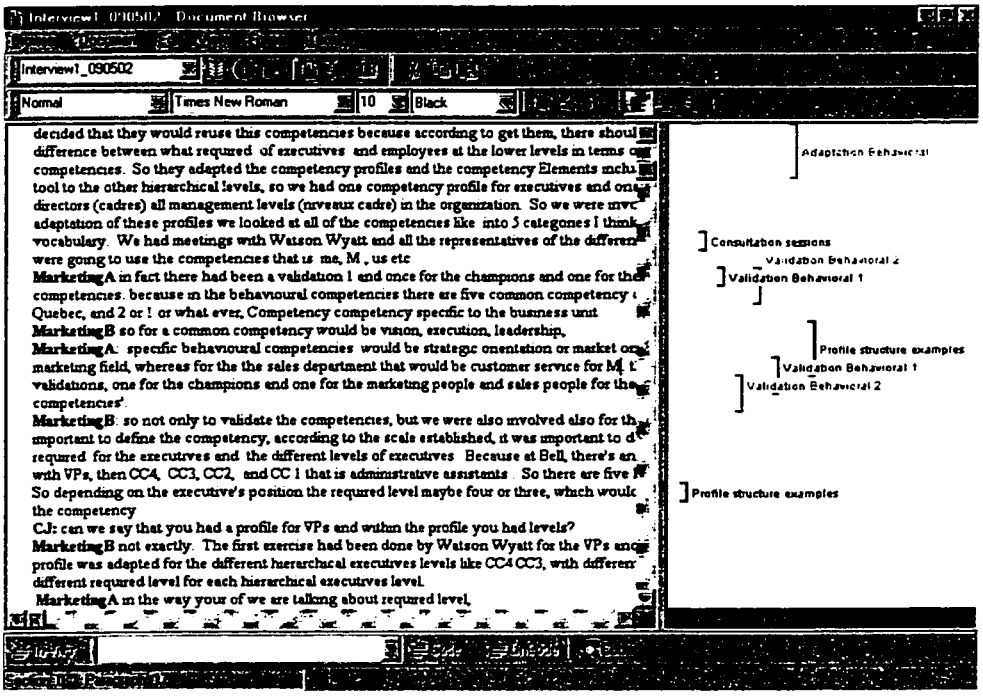

Figure C 2 Interview transcript with coding stripes related to text segments

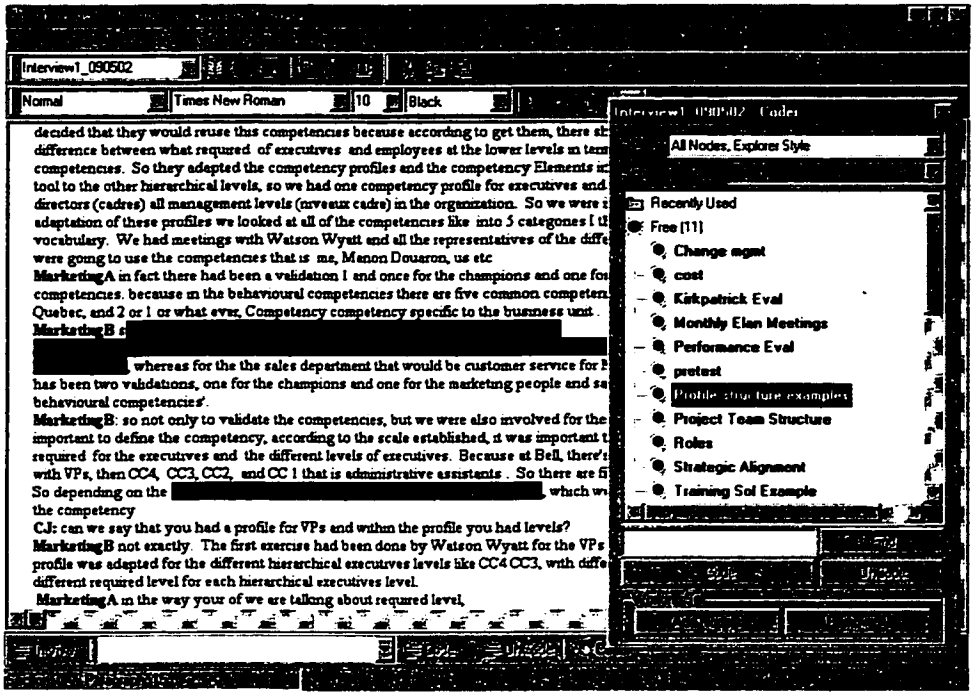

Figure C 3 Interview transcript with the list of free nodes in the Coder on the right

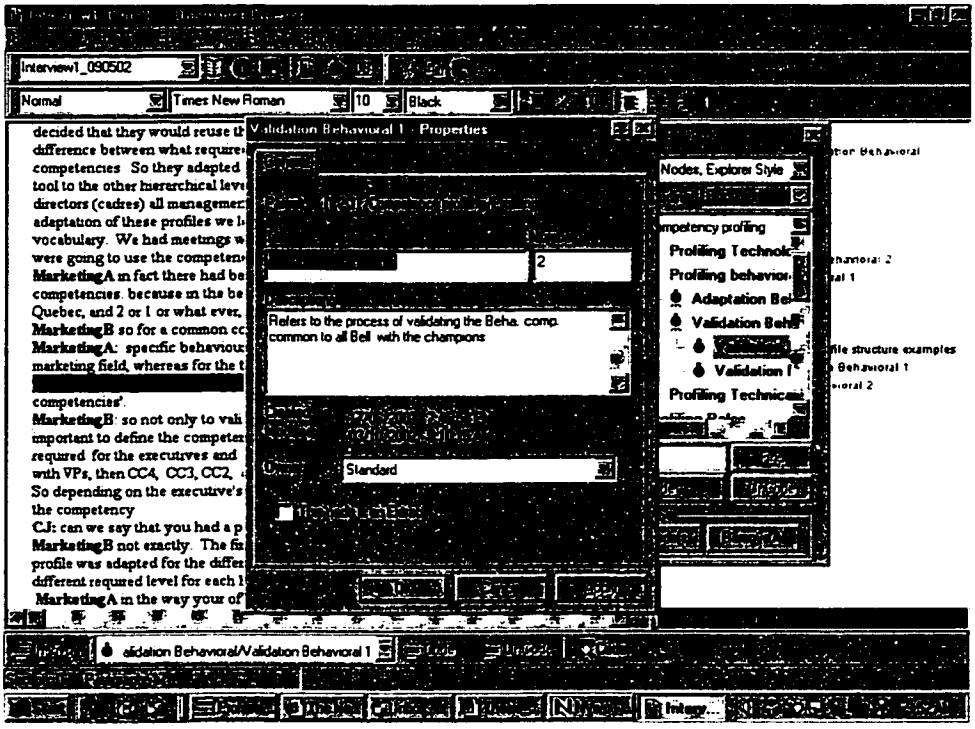

Figure C 4 Memo for the coding stripe "Validation Behavioural"

Appendix D

Sample of a Matrix Summarizing Findings from Analysis of One Interview Data

	Envergure et planification (Planning)		Arrimage et développement des solutions d'apprentissage aux profils (Linkages)	
	1. *Identification des acquis et des besoins (bilan de départ).* 2. *Développement de la stratégie adaptée à chaque unitéIdentification des impacts, résistances potentielles et incitatifs à l'exploitation du processus de gestion et de développement des compétences avec SIGAL* 4. Inventaire des compétences existantes et des solutions d'apprentissage existantes 4.1. Recherche de tous les documents contenant des référentiels de compé., descriptions de compé., de postes, de tâches, etc. 4.2. Recherche de tous les outils d'évaluation de compé. 4.3. Identification du catalogue électronique Bell de cours	1. Adaptation du référentiel CPT pour les CC4 à CC1 2. Validation du référentiel CPT pour les CC4 to CC1 2.1. Validation 1 auprès des champions pour les compé. CPT communes à Bell Québec 2.2. Validation 2 auprès du représentant de l'unité d'affaire pour les compé. CPT spécifiques au Marketing 3. Développement du référentiel « Techniques » pour l'unité d'affaire Marketing 3.1. Profils sommaires avec énoncés de compé. 4. Révision des profils sommaires avec consultant indépendant 5. Validation auprès des employés avec des experts matière 6. Formation des adm. locaux à SIGAL, donnée par Technomedia 7. Saisie des profils de compé. dans SIGAL 8. Création des profils dans SIGAL à l'aide des codes de postes	1. Sélection des solutions d'apprentissage (dans catalogue de cours Bell) applicables à chacune des compétences des 3 référentiels (CTSP, CPT, Techn.) 1.1. Évaluation des objectifs d'apprentissage (généraux et spécifiques, verbes d'action) pour chaque cours 1.2. Évaluation des mots-clé de la compé., éléments de compé. 1.3. Consultation d'experts matière 1.4. Consultation d'employés ayant déjà suivi le (les) cours 2. Arrimage des solutions d'apprentissage existantes aux énoncés de compé. ou aux éléments de compé. 3. Identification des compé. prioritaires, sans solutions d'apprentissage 4. Recherche et développement des solutions manquantes le cas échéant (ex : dév. du L060)	*Conduite du changement* 1. Démonstration d'une heure sur le module CMC de SIGAL avec des groupes de 10 employés 2. Distribution de guides d'utilisation et feuilles de route 3. Lettre d'encouragement de l'initiateur du projet aux employés 4. Stratégie du sandwich: messages top-down et bottom-up *Bilans de compétences* 1. Tests pilote de la démarche d'évaluation des bilans de compétences avec un groupe de 5 à 6 employés 2. Évaluation des tests pilote 3. Recommandations d'amélioration de l'outil SIGAL à BCECS 4. Transmission des recommandations à Technomedia 5. Lancement de la période des bilans de compétences à tous les employés 5.1. Évaluation des écarts de compétences par chaque employé 5.1.1. Approbation des bilans de compétences de l'employé par son gestionnaire 5.1.2. Sélection des compé. à développer en priorité 5.2. Élaboration des plans de développement 5.2.1. Sélection d'une solution d'apprentissage parmi le choix de solutions prescrites pour chaque compé. à dév. 5.2.2. Recherche par l'employé de solutions externes pour les compé. sans cours offerts. 5.2.3. Entrée des informations relatives au cours externe dans le formulaire SIGAL approprié 5.2.4. Approbation du cours et des coûts de formation par le gestionnaire de l'employé 6. Prétest des connaissances de l'employé (seulement pour le CTSP). Formulaire SIGAL 7. Suivi des cours par l'employé 8. Posttest des connaissances de l'employé (seulement pour le CTSP) Formulaire SIGAL 9. Évaluation de la performance 9.1. Rédaction des orientations de développement 10. Mise à jour des profils de compétences avec les nouvelles compétences acquises
	⇒ *Plan d'intervention pour élaborer et entrer dans SIGAL les profils de compétences et solutions d'apprentissage arrimées* ⇒ *Plan de conduite du changement* ⇒ Dictionnaire Bell Québec de compétences de SIGAL. Comprend 2 référentiels de profils de compétences : - Technologiques CTSP (compé. dév. par BCECS & communes à Bell Québec) - Comportementales ou CPT (compé. dév. par *Watson Wyatt* initialement pour les VPs) ⇒ Docs bruts. Comprend 1 ensemble de compétences diverses: - Techniques ⇒ Gabarits de définition de compé. de Technomedia ⇒ Catalogue électronique Bell de cours : 5 fournisseurs :	⇒ Référentiel SIGAL « Techniques » de profils de compé. spécifiques au Marketing ⇒ Référentiel SIGAL « Comportementales » de profils de compé. communes à Bell Québec et spécifiques aux unités d'affaire ⇒ Référentiel SIGAL «Technologiques» CTSP de profils compé. communes à Bell Canada	⇒ Plusieurs solutions d'apprentissage arrimées aux profils de compé. (profils arrimés) ⇒ Catalogue électronique Bell révisé	⇒ Structure d'appel et de soutien aux utilisateurs (Super utilisateur, coordonnateur de formation, courriel à Technomedia) ⇒ Bilans de compétences finalisés ⇒ Plans de développement finalisés

Appendix E

Model of the Research Design Used in this Study