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Personalized Learning for Online Training: A Decade of Francophone Research[1]

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ABSTRACT

The centre for research and expertise in lifelong learning known as SAVIE has been working in the field of adult education since 1996. This chapter is based on a decade of investigation of partnerships with institutional and community-based organizations and deals specifically with the online training of trainers working in community settings. It addresses the following questions: What are the obstacles to be taken into account when offering training online to community-based trainers? What competencies must trainers develop to help learners in synchronous and asynchronous online training environments? How can we adapt learning environments to take into account prior learning and knowledge so as to achieve a *personalized* pathway adapted to their learning needs? The chapter concludes with lessons learned from this body of research.

RÉSUMÉ

Le centre d'expertise et de recherche sur l'apprentissage à vie (SAVIE) oeuvre dans le domaine de l'éducation aux adultes depuis 1996. Ce chapitre décrit les études menées pendant une décennie sur les partenariats avec des organismes institutionnels et communautaires, partic-

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ulièrement en ce qui a trait à la formation en ligne des formateurs travaillant en milieu communautaire. Les questions suivantes sont abordées: Quels sont les obstacles dont il faut tenir compte lorsqu'on offre une formation en ligne à des formateurs en milieu communautaire? Quelles compétences les formateurs doivent-ils mettre en oeuvre pour aider les apprenants dans des situations de formation par Internet en temps réel ou en différé? De quelle manière peut-on adapter les contextes d'apprentissage afin de tenir compte de l'acquisition préalable de connaissances ainsi que de l'importance d'un cheminement *personnalisé*, en fonction des besoins d'apprentissage de chacun? Le chapitre se conclut par des réflexions et recommandations tirées de ce corpus de recherche.

Introduction

The emergence of a knowledge-based economy profoundly changes our views on education. Communication and information technologies (CIT) have become the tool *par excellence* for enhancing learning flexibility and effectiveness. While certain characteristics of the use of technology may still be debatable, its potential to improve the quality of learning is obvious when it is implemented in conjunction with quality content and effective pedagogical practice (Karsenti, 2006).

Successful adoption of CIT requires organizational change (Drucker, 1991). Change impacts trainers – men and women with a professional history, different points of view, and practices developed over years of experience in teaching and learning. Technological change challenges and upsets the professional lives of trainers (Bourbonnais, Comeau, & Vézina, 1999; Vézina, 1999); therefore, it is important to manage this change. The successful introduction of CIT in educational settings is not so much a matter of technological capacity, but rather the trainer's ability to exploit the potential of the technology to enhance the learning of students. When technology is introduced without considering the organizational context or when it is underutilized by personnel, the educational benefits are limited.

In this pedagogical context, the goal of integrating CIT into trainers' practice raises several questions. What skills must trainers develop to help learners in both synchronous and asynchronous online environments? How should learning environments be changed so that they include the prior knowledge and learning profiles of trainers-in-training? How should they be changed to ensure the approach is person-

alized and right for their learning needs? What obstacles must we take into account when introducing computer platforms to online trainers?

In order to answer these questions, we conducted a longitudinal study from 1996 to 2005 inviting Canadian francophone teachers, adult educators, counsellors, and community-based trainers who wanted to develop CIT skills necessary for online instruction. The study (a) identified the CIT learning needs of this population, (b) evaluated an online learning environment using a personalized learning plan based on users' needs and learning profiles, (c) identified areas of resistance to technological change, and (d) described solutions to counter these obstacles. This process enabled us to explain the principles that an online training model must respect in order to ensure the program's success.

We began by examining the educational foundation of our community-based research program – personalized learning. The second section reviews our research, exploring the obstacles and resistance to CIT change in organizations – an important factor in introducing online learning to work environments. The third section indicates that our previous research encouraged the development of a new CIT system for online trainers. Fourth, we review three major findings of this research study and present the results of our research. Finally, we describe the lessons learned for the workplace from the implementation of our research study. The lessons include the conditions for the introduction of online training in the workplace and the principles that trainers of online learning should consider in doing this work.

Our Educational Approach: Personalized Learning

When we began our research in community settings, we spent considerable time determining the pedagogical approaches that would guide the training model. We situated our approach in an intermediary space (Dumazedier, 1985), the meeting point between the educational institution (i.e., the place we would deliver the program) and the individual (i.e., learning characteristics and competencies of individual participants) in the social context of both formal and informal lifelong learning. The principal concerns of our research, therefore, are the *organizational*, *pedagogical*, and *technological dimensions* apparent in the personalization of online educational environments. We examine the psychological problems experienced by adult learners in their online training and learning workplaces. In choosing this perspective, our research draws on the work of Bandura (1986), Deci and Ryan (1985,

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2000), and Zimmerman (2000). We examine the individual characteristics of the adult, his or her behaviors, and the educational environment in which the work takes place. Figure 1 provides details of this pedagogical workplace environment.

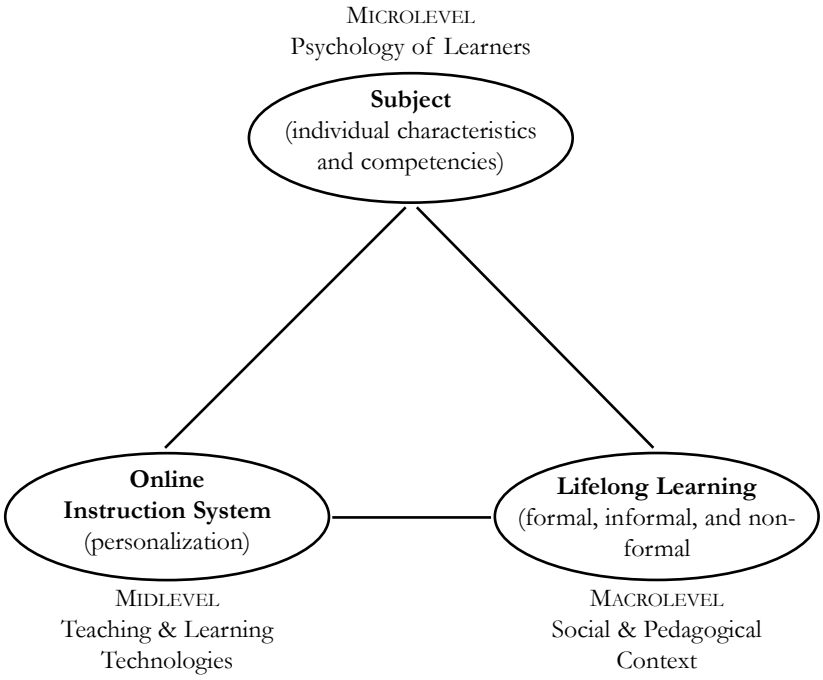

Figure 1: Components of the Pedagogical Model

LIFELONG LEARNING

The concept of *lifelong learning* has evolved since it first emerged in the early 1970s. As Pagé, Bérubé, Lemelin, and St-Pierre (2004) reported:

> From the confirmation of the right and the need of every individual to learn throughout life (UNESCO, 1972), to the concept of lifelong education as a key to entering the 21st century (UNESCO, 1996), or the concept of pursuing purposeful learning throughout life (OECD, 1996), the Treaty of Amsterdam defined this concept as "encompassing all purposeful learning activity, whether formal or informal, undertaken on an ongoing basis with the aim of

> improving knowledge, skills, and competencies." (European Commission, 1999, p. 18)

The Declaration of the Fifth International Conference on Adult Education, referred to as the Hamburg Declaration (1997) and the recent work of the OECD and the European Union make it possible to define this concept. It is described as the formal or informal learning processes whereby people have developed their abilities since childhood. Lifelong learning is founded on the base of education with constant upgrading of knowledge and skills. Both education and upgrading are necessary and serve as the major factors of economic and social growth in contemporary society.

More specifically, in our research, the notion of lifelong learning rests upon the four pillars of education established by UNESCO: *learning to know*, *learning to do*, *learning to live together*, and *learning to be* (Delors, 1996). "Learning to know" refers to learning how to learn, a concept of considerable importance in adult pedagogy. "Learning to do" means transferring skills to a work context and to one's social life. "Learning to live together" means understanding cultural diversity and the creation of alliances between disparate social groups. Finally, "learning to be" means the full development of the personality to self-actualization.

The notion of *lifelong learning online* includes the acquisition of knowledge as a continuous process. It does not end when you leave school or university, but continues throughout your professional life and even after retirement, embracing all stages of life and all social groups, facilitated by e-learning (E-learning Portal, 2005). Thus, lifelong learning brings together all forms of learning (Williams, 2007). Lifelong learning is:

- *Formal learning* includes activities that take place in organized, structured and graduated contexts, intended to result in the acquisition of recognized certification, for example, university programs offering credits.
- *Non-formal learning* includes learning activities organized in the workplace or community organizations, but which are not normally pegged to a given scholastic level and progression, and which do not typically lead to recognized degrees or certification.
- *Informal learning* includes unstructured, self-directed, and self-paced activities sometimes connected to an individual's personal or professional goals, such as intergenerational learning (in the

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family, the neighborhood, city or community, seen as an integral part of the learning environment, just as they are fundamental elements of the economy and society).

These learning alternatives should be available to all citizens. Lifelong learning means giving people a second chance to improve their basic skills as well as to take advanced learning.

We reflected upon the principles that would stimulate a taste for lifelong learning among our adult participants. This reflection led us to the development of the concept we call the *personalization of learning*.

The Personalization of Learning

The concept of personalized learning emerges from current humanist theories, pulling together Rogers' theories of personalization and the principles of self-directed learning found in Carré, Mlékuz, and Poisson. (1996). Rogers' (1969) theories apply to both the learner and the trainer.

From the *learner's* point of view:

- Learning takes place when the student perceives the relevance of the knowledge to be acquired.
- Hands-on (or active) learning facilitates learning and generates the best understanding and retention of new knowledge.
- Learning is facilitated when students assume part of the responsibility in the learning process. Learning is maximized when learners formulate their own problems, choose their own resources, determine procedures to follow, and live with the consequences of their choice.

From the *trainer's* point of view:

- The instructor helps students to choose and clarify their goals and purpose.
- The instructor endeavors to organize and provide easy access to the greatest possible range of learning resources, such as written materials, resource people, and technology.

Subsequently, we drew upon theoretical notions of self-directed learning, based on perspectives from educational technology, to enhance the concept of personalized learning. This enabled us to use learner characteristics to personalize learning. The goal of this concept was to facilitate autonomous learning in educational institutions (Jezegou, 2004; Sauvé, 1983). Personalized learning emerges through implementing

teaching methods that allow the autonomy of the learner. It requires us to:

- Rethink training programs to establish teaching methods based on the experience and potential of the trainees.
- Offer a range of materials geared towards self-directed learning that is available to learners.
- Create conditions that help adults to direct their own learning, and to become more autonomous and self-regulating.
- Deploy training mechanisms that adapt to the learning characteristics of adult learners and allow them to use their knowledge and skills as resources.

Once these principles were established, we reflected on how to apply them with the support of CIT. How could training mechanisms based on CIT take into account the *learning characteristics* and *skills or competencies* of adults-in-training? Let us examine these two concepts more closely.

Learning Characteristics

The act of learning is complex. A learning situation emerges from a specific environment, but it also engages the learner's characteristics. To learn means not only to change your behavior, but also to change the meaning you give to your experiences. Cognitive psychology enables you to understand the active role played by the individual in learning situations with regard to everything from learning strategies to the examples you invoke to give meaning to activities. The constructivist approach has also provided evidence of the importance of the organization of knowledge in memory and of the social interactions in the elaboration of new knowledge.

Individual characteristics are those traits that inform the behavioral differences between individuals. In a learning context, individual characteristics are often identified as *individual characteristics in the context of learning*, or *learning profiles*, or *learning characteristics*. For example, as elements of learning characteristics, Québec's Conseil supérieur de l'education (CSE, 2000) lists academic achievements, conceptual understanding, learning styles, learning preferences, learning strategies, self-regulation, motivation, and degree of engagement. In our research, we focused on learning styles, learning strategies, self-management methods, and motivation in the learning context. These characteristics were chosen for their capacity to increase the learner's chances of

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success and perseverance in studies and, by extension, to augment every adult's chances of investing in lifelong learning. Let us briefly examine the characteristics that we felt exemplified autonomous learning.

Learning styles refer to the distinctive cognitive, affective, physiological, and sociological behaviors that act as relatively stable indicators of the way in which a student perceives and processes information and interacts with and responds to a learning environment (Keefe & Monk, 1986). Garton, Dyer, and King (2000) demonstrated that when teachers consider learning styles, learners' productivity improves. Building on this result, Briggs (2000) argued that adults should be conscious of their learning styles. Some adult learners are comfortable with theories and abstraction, but others prefer phenomena observable by empirical means. Some prefer active learning, while others are more introspective in their approach. Researchers agree that it is impossible to claim that one style of learning is better than another because learning styles are an expression of different learners' characteristics. Consequently, one of the goals of teaching – or of online training – must be to equip adults with the tools that are most effective in each category of the learning style (Felder & Brent, 2005). Many authors have studied a range of variables in learning styles in different training contexts. In our research, we have considered the following variables:

1. The processing of information (adaptation of Kolb's questionnaire, 1976, 1999).
2. Preferences regarding styles and conditions for learning (Canfield, 1980).
3. Attitudes and behaviors in learning situations (Grasha, 1990).
4. The methods through which an adult learner approaches his or her studies (Entwistle & Hilary, 1995).

Learning strategies are defined as observable and non-observable methods (i.e., behaviors, thoughts, techniques, and approaches) used by an individual with a particular intention, adjusted in response to variables in a situation. These strategies vary as a function of the knowledge that is to be acquired. In our research, we examined the strategies used by adults in four of the situations most typical of learning:

1. When they listen to a presentation or demonstration made by a trainer.
2. When they read manuals or photocopied texts.
3. When they do exercises in order to apply one or more procedures that they have to learn.
4. When they solve problems.

Taking into consideration the learning strategies of adult learners, teaching favors the development of autonomy, "which evolves through the development of a range of learning strategies and through the acquisition of knowledge of the contexts in which to use them (St. Pierre, 2004, p. 27. Trans. from French).

Self-regulation methods refer to the strategies used when a person assumes responsibility for his or her own learning. In our research, we have examined different moments of adults' lives during a program of studies or ongoing training: (a) at the beginning, (b) for a semester, (c) for a course session, and (d) for a work period of training. Romainville (2000) hypothesized that successful adult learners are those who are able to plan, execute, and control, as well as adjust and evaluate their strategies as necessary. Gollwitzer (1996, in Bouffard et al., 2001) demonstrated that good planning has many advantages in encouraging perseverance in studying because it facilitates the initiation and monitoring of action. It also improves performance, diminishes stress, and heightens the psychological wellbeing of students.

Finally, *motivation in a learning situation* involves adult learners' perceptions of themselves, their skill levels, and their degree of control in a given situation. More precisely, the perception of competence confers the sense that one is capable of accomplishing an activity, which may relieve uncertainty in the adult learner. The more adults who believe they have the required skills to accomplish learning, the more they engage with the activity, even if they find it difficult. The perception of worth is the degree to which adult learners judge an activity useful and interesting in relation to their personal goals. If an activity is considered *useful* and *interesting*, they tend to engage. The perception of *controllability* refers to the degree of autonomy and control that a learner can exercise over the way an activity unfolds. It also involves the perception of responsibility felt by the learner about success or failure. If adults believe they exercise control over their learning, they will try harder to understand the content. Adults who believe that they have little control over their learning may limit themselves, for example, to memorization (Viau, Cartier, & Debeurme, 1997). Once a personal learning approach is determined, the next step is to establish the adult learner's skills so that the training is adapted to his or her needs.

Competencies

The knowledge, interpersonal skills, and expertise acquired throughout life permit adult learners to accomplish diverse tasks. Once

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a person can integrate specific information to accomplish a given task, we say that the person has developed a specific competency. When a competency is activated, it results in performance.

Confusion arises over the many schools of thought, methods, and vocabulary pertaining to *skills*. The same may be said of *competency profiles*, so the term requires definition. According to *la Direction générale de la formation professionnelle et technique* (1998) of Québec, a *competency* is an ability to act, succeed, and progress. It enables an individual to complete tasks or activities and is based on ways of knowing: specific knowledge, skills in disparate domains, perceptions, and attitudes.

In our research, *skill* refers to an integrated repertoire of the ways of knowing (knowledge), understanding the know-how (skills), and using personal skills (attitudes) resulting in behaviors. Together, these enable an individual to complete a task in a way that conforms to the exigencies of a work situation. Like Lévy (1998), we define a skill-in-action as "an enacted skill, a situated skill, which emerges and functions in a finalized act, in order to do something" (p. 4). A skill is a social construction and possesses a collective dimension because it is recognized by others. It is inseparable from motivation because it is linked to a *signifying situation* constructed by the learner (Bruner, 1991).

Obstacles and Resistance to CIT Change in Organizations

Little formal research has been conducted on the training of trainers because researchers have concentrated on the advantages and disadvantages of integrating CIT in classrooms, focusing on learners (Heer & Akkari, 2006). Larose et al. (2002, 2004) studied factors stimulating or inhibiting the integration of CIT in teaching practice and on the transfer of skills acquired in training to teach practice. Several contextual factors may impede this transfer, such as the equipment available at the training site, the amount of time available to the trainers, the importance of the training as recognized by the institution, and collaboration between colleagues (Paquin, 2007). Carugati and Tomasetto (2002) examined teachers' feelings of competence and anxiety relative to their use of CIT. The authors concluded that training could play a determining role in reducing anxiety because it guides teachers towards a greater acceptance of innovation. The skills acquired must include not only technical but pedagogical skills. Trainers-in-training should be able to acquire a critical mindset and reflect on teaching scenarios using CIT, thereby altering their instruction to learners. Coen (in press) noted that

the current challenge for teachers is to transform their teaching to make the integration of CIT more likely, rather than integrating CIT into their traditional teaching practice. The introduction of this technology represents a profound paradigm shift that strikes at the underlying educational approach chosen by teachers.

Our research on the lifelong learning of trainers and teachers involved an informal survey of approximately a dozen trainers in community settings. The results of our study showed obstacles and areas of resistance to the use of CIT in support of their training. Our respondents justified this resistance on the basis that they would have to change their method of teaching and that they were not adequately trained in this area (Sauvé et al., 2002b). Who are these trainers in work settings? The majority are women with an average age of 35. Most have a university degree and a sufficient knowledge of their clients and their needs. Their familiarity with CIT varied from weak to average.

To explore why CIT training is seen as an obstacle and area of resistance by participants, we began a research study with trainers in community settings. To develop the research questionnaire, we adopted the model based on deficits developed by Demetreiadis et al. (2003), which explained teacher perceptions of CIT integration. This model described the reasons for their negative perception of CIT and concluded that teachers generally considered themselves technophobes, traditional in their teaching style, and resistant to change. In addition, these studies explored the obstacles and barriers limiting the use of CIT due to a lack of computers, a lack of peripheral equipment, a lack of training and technological skills, or the difficulty of planning learning activities in innovative ways (Pelgrum, 2001). Further, we incorporated the Poelhumber and Boulanger (2001) classification of obstacles and elements of resistance to change, which we adapted for our study. As seen in Figure 2, the barriers to change affect four professional areas of work of teachers and trainers. These are summarized below.

Economics of teaching. Weighing the trainers' time and effort against the benefit to their personal life, workplace, and their students' learning shows that the economy of teaching with CIT has yet to be demonstrated to the satisfaction of trainers. The first barrier identified by the authors, regardless of the envisaged change or the instructor's age, is the *time* required to prepare new course components. In certain teaching domains, the use of CIT affects course content, requires regular updates, and results in increased work for the trainers. This extra work acts as a disincentive and is a negative consequence of CIT implementation. To

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these factors, we must add the lack of technical knowledge and of the time to acquire it (Conseil supérieur de l'éducation, 1997), as well as the anxiety of beginners faced with computer-based tools (Belisle & Linard, 1996).

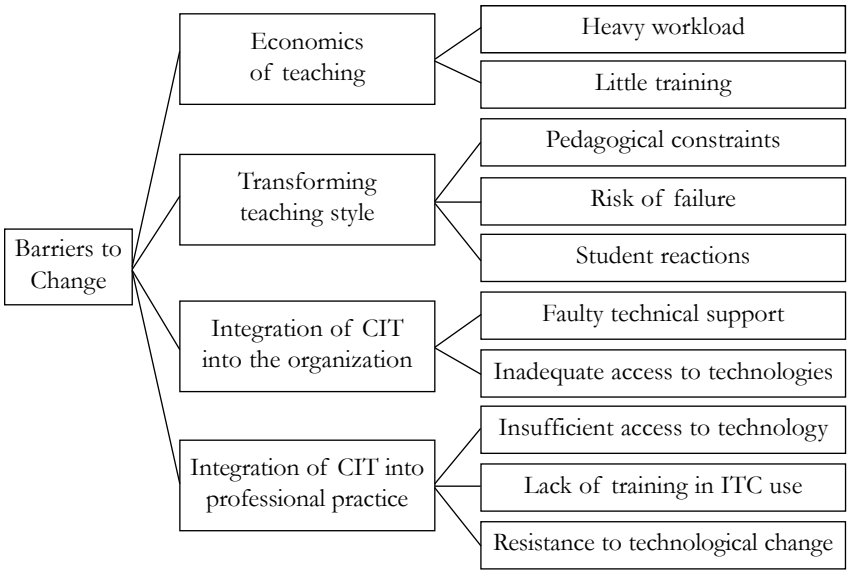

Figure 2: Obstacles to Change

Transforming teaching style. The introduction of CIT alters the teacher's relationship to students and work methods. Poellhuber and Boulanger (2001) defined *teaching style* as the habitual manner of the instructor's being and acting in class. The introduction of multimedia to courses, or simply their restructuring through the integration of CIT, imposes changes in instruction. Here again, the issue of lack of time is a factor. The changes to course preparation caused by CIT are demanding and increase the instructor's workload. The predominance of traditional classroom teaching, still perceived as the most effective pedagogical method, is an obstacle to changing teaching style (Bibeau, 1998, Poellhuber & Boulanger, 2001). This impression was re-enforced by the type of training offered to trainers-in-training, which is limited in terms of CIT use, and often has a traditional approach to new content (Collins, 1999; Meunier, 1997; Roberts et al., 1999).

Fear of failure is another element that limits the adoption of CIT. Experimenting with new methods poses a certain risk for the trainer.

One of these fears is that the trainer will be confronted by difficulties because of deficient hardware or a lack of technical knowledge (Devauchelle, 2002; Racette, Bilodeau, Charlebois, & Rondeau, 2002). Furthermore, doubts about the usefulness of CIT compared to proven teaching tools continue today; therefore, trainers lack motivation (Bibeau, 1998). While CIT is not a teaching requirement (Poellhuber, 1998), it offers user-friendly and powerful tools that facilitate teaching.

Participants' reactions promote or inhibit the integration of CIT, because the learning activities depend on a pedagogical model that requires great learner involvement and ways of learning (Dary & Mallet, 1998; Huot, 2003), yet students are sometimes under-prepared for this fact. A study by Peraya (2000) on distance learning concluded that the performance of students facing a system of CIT-based self-directed learning leads to a decreased response. He attributed this effect to the delivery mode, which differs from the traditional mode, and destabilizes expectations and competencies. Racette et al. (2002, p. 44) argued that students' negative attitudes about their participation in videoconference training represents a resistance to change or lack of interest.

Integrating CIT into the organization. The difficulties encountered in the integration of CIT into teaching relate primarily to organization. Bibeau (1998), Fournel (1999), Poellhuber and Boulanger (2001) stated that the lack of support in organizations is a major obstacle to the integration of CIT. Poellhuber and Boulanger (2001) defined *support* as the set of actions and interactions originating from the circle of trainers who might otherwise integrate CIT in their workplace. Furthermore, Bibeau (1998), Grillet (1999) and Devauchelle (2002) emphasized that insufficient or obsolete hardware, lack of means, and the absence of a technician to perform the hardware maintenance, are frequently mentioned as barriers to the use of CIT. Thus, internal resistance hardly affects the use of CIT in teaching, but the lack of support from pedagogical and technical services are major obstacles.

Other institutional factors hinder the integration of CIT in training because they exert pressure on the time available. These factors include, for example, the establishment and evaluation of new programs, task or workload readjustment, and sick leave replacements.

Integration of CIT into professional practice. To integrate into professional practice, a trainer requires regular and easy access to master CIT computer-based tools (Devauchelle, 2002; REFAD, 2002a, 2002b). Poellhuber & Boulanger (2001) assert that:

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> the conditions of access include all measures that allow an easier and more frequent use of technology (computer, software, platform, files), regardless of time, from physical locations that are themselves easily accessible by the professor (his or her home, office, work areas located near places where s/he meets students or is available for consultation, etc.). (p. 61, Trans. from French)

Collectively, these factors become crucial in the adoption of certain software products. For example, emailing is easy to learn, but is only of benefit if the trainer uses it regularly.

Technological knowledge is indispensable to the use of CIT; however, the lack of training of teaching personnel in this domain is mentioned in numerous articles (Association canadienne d'éducation, 2001; Devauchelle, 2002; Huot, 2003; O'Haire, 2003; Racette et al., 2002; REFAD, 2002a, 2002b). The difficulties encountered by the trainers are real and include lack of replacement during the training period, days taken from their free time without remuneration (Dary & Mallet, 1998), and lack of time. These factors are often experienced in integrating new learning into a teaching program.

Poellhuber and Boulanger (2001) referred to the phenomenon of *resistance to change* among CIT users in a school environment. These users prefer the tools – the software and harware – with which they are already familiar. For example, an instructor familiar with the use of Microsoft Office 2003 will show little inclination to change to Microsoft Vista.

Once resistance and obstacles to CIT-related change were known, we implemented a training program for online trainers, called Form@tion. For a description of the online training program, see Appendix A. This resource provides a list of online competencies for facilitators, technical assistance, instructors, and program managers.

Key Findings of CIT Online Training Program

Between 2003 and 2005, 67 trainers-in-training were involved in a study to explore the obstacles and areas of resistance to a new CIT program that was designed for the personalized-learning system model described earlier in this chapter. The participants in the study were primarily women (85%) and were trainers, guidance counsellors, career counsellors, and others responsible for training in community organizations. Their average age was 35; 43% have a university-level education, 31% college level, and 22% a secondary diploma.

In this section, we look at three findings.

1. We examine obstacles and areas of resistance found in these francophone trainers. Although the findings are explained in English, the accuracy of the study is preserved in the French responses included in this section.
2. The training needs of participants are summarized.
3. The competencies developed by the program are indicated.

Obstacles and Areas of Resistance

The data (Sauvé et al., 2005) indicated that, again, trainers exhibited resistance to change related to CIT. Only 35% of the subjects used CIT in their practice, and the tools used most readily were email and discussion forums.

> *Mon patron veut que j'utilise l'ordinateur pour rédiger mes rapports mais il ne me donne pas le temps et les moyens pour apprendre Word. Il pense que je l'ai appris au collège. Moi, j'ai toujours remis des travaux écrits à la main.*
>
> [My trainer/teacher wanted me to use the computer to do my reports but he did not give me the time or the means to learn Word. He thinks I learned it at college, but I always did my work by hand.]
>
> *Mon directeur pense que tous ceux qui ont 30 ans et moins connaissent l'ordinateur et se débrouillent bien. Ce sont les premiers qui ont droit aux ordinateurs les plus performants. Il s'étonne après que nous ne soyons pas motivés à l'utiliser dans notre travail.*
>
> [My director thinks that everyone under 30 knows about computers and can work it out for themselves. They are the first to get the best computers. He is amazed that we are not motivated to use them in our work.]

Many of the trainers-in-training (64%) questioned the usefulness of integrating CIT into their teaching practice; a significant proportion (35%) stated that they could not understand why their workplace wanted to offer online training.

> *Je ne l'utilise pas l'ordinateur lorsque j'enseigne parce que j'ai trop peur de montrer que je ne le connais pas bien. De toute façon, je sais que je suis une très bonne enseignante et les adultes à qui j'enseigne trouvent qu'ils apprennent beaucoup avec moi.*

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> [I don't use a computer when I teach because I am afraid of showing that I don't know much about them. Anyway, I know that I am a very good teacher and the adults I teach find that they learn a lot with me.]

A large proportion of the organizations (76%) provided the equipment to use CIT and had adequate knowledge about it. Most respondents (84%) believed that training with CIT involved an increase in workload, and 64% felt that they had insufficient knowledge of computer technology to use it effectively in their work with clients.

> *Je possède des connaissances sommaires des logiciels de bureautique, mais j'aimerais approfondir les fonctions de certains logiciels tels que PowerPoint, Excel et Access pour être plus efficace à mon travail.*
>
> [I possess a basic knowledge of software systems but I would love to know more about software functions like PowerPoint, Excel and Access to be more efficient in my work.]
>
> *Je possède de l'expérience en animation, mais je n'ai jamais animé à distance. Je ne sais pas si c'est si différent. Je n'ai jamais assisté à une vidéoconférence.*
>
> [I have experience in facilitation, but I have never done it at a distance. I don't know whether it is different. I have never been part of a videoconference.]
>
> *Par rapport à certains outils de télécommunication. Par exemple, l'utilisation des forums de discussion, du chat. Je ne suis pas nécessairement à l'aise avec ces outils. Je n'ai pas vraiment l'occasion d'utiliser ces outils, mais lorsque je dois les utiliser, j'ai besoin d'aide.*
>
> [Concerning particular uses of telecommunications, for example, forum discussion, chat sessions – I am not really at ease with these formats. I have never had the chance to use them. However, when I am required to use them, I need help.]

These responses indicated they felt their training needs had not been met despite the fact that 68% of respondents indicated that their organization allows them the necessary time to pursue training in CIT.

About half (48%) of the trainers emphasized that their organizations do not give them enough time to modify their work methods after training. They believe that this lack of time limits their opportunities to practice and integrate new competencies.

> C`est plus le manque de pratique que le manque de connaissances; j'oublie certaines fonctions, puis je n'ai personne pour me les montrer de nouveau.
>
> [It is more the lack of practice than the lack of knowledge; I forget certain functions, then there's no one to show me them again.]
>
> J`ai tout ce qu`il me faut, c`est le temps qui me manque pour bien les comprendre et bien les utiliser.
>
> [I have everything that I need, but I don't have time to understand and use it properly.]
>
> Je ne dispose pas du temps voulu pour pouvoir mettre en pratique les connaissances acquises en formation.
>
> [I do not have as much time as I would like to put into practice the knowledge acquired during training.]
>
> Le manque de temps pour réaliser les activités de mon plan de formation ne m'a pas permis d'acquérir toutes les connaissances à ce sujet.
>
> [The lack of time to do the activities in my training plan did not allow me to learn everything about this subject.]

These results demonstrate that organizations must be more aware of the need to allot personal time to practice acquired competencies in their work and to change their work methods.

To summarize these teaching and management habits, the need to attend to what is most pressing (routines, the lack of training among trainers with regard to technology, the rigidity of the setting with regard to CIT, and the lack of support from those providing services) are the principal obstacles to integrating training environments. Even for those interested in bringing their knowledge of CIT into their daily work, time constraints seemed to be a major obstacle. These results demonstrated the relevance of proposing a CIT training model adapted to the training needs of participants.

Training needs prior to the online course. To be able to assess whether the mixed training model (which employed synchronous and asynchronous communication methods) met the needs of these trainers-in-training, we had to identify those needs (please see Sauvé et al. [2005] for further details).

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Instructor competencies refer to the pedagogical skills involved in communication with, and guidance of, adult learners. Approximately half of the general competencies linked to the instructor's role had not been mastered by study participants. This included, for example, ensuring synchronous and asynchronous support for an adult engaged in a training program and exploiting the potential of teaching tools available, in relation to the objectives of the intervention.

Technical assistant competencies refer to the mastery of the various office and telecommunication tools provided to clients to help them and meet their clients' needs. Most general competencies (60%) linked to the role of technical assistant had not been mastered by the participants. They possessed weak and very weak mastery of Internet communication tools; they did not understand the functionalities offered by different online learning environments or of ways to help participants in the use of technology.

Facilitator competencies include not only the facilitation of a group in a learning context, but also those related to the facilitation of online training. Trainers possessed little online teaching experience. The level of mastery prior to training was very weak, and they wished to acquire greater competency in the facilitation of training activities at a distance, hosting information sessions by means of CIT in synchronous and asynchronous modes, and promoting online interaction in synchronous mode through teleconferences and videoconferencing.

Program manager competencies include organization of the online program and related administrative tasks. The results demonstrate that participants have little knowledge of the tools or management methods available in online environments. Their weak level of mastery before training was revealed in their desire to learn to "manage the learning activities" and to "manage the documentary and web-based resources accessed by the learners."

Training needs after the online course. During the study, we examined how the personalized training plan offered through Form@tion responded to the training needs and the learning profile of each trainer. Four findings were reported by Sauvé et al. (2005):

1. The training needs of the learners had been met by the end of the training; learners increased their degree of mastery of online training competencies from weak and average to higher levels, specifically the use of Office software in teaching/learning,

training methods and strategies at a distance, and synchronous and asynchronous facilitation techniques.

2. The course of training proposed to trainers, based on the three learning scenarios, corresponded to their learning profile. For example, learners opted for *learning objects* stimulating reflective observation as a mode of information processing, *structure* as a condition of learning, and *text* and *audiovisual* as modes of learning.
3. The participants invested an average of nine hours in their training, which exceeded the initial expectation of six hours.
4. The personalized-learning model approach designed by the researchers and offered by the Personn@lisa platform increased all the learners' motivation to continue with their lifelong learning goals.

In addition, the results enabled us to document the positive conditions of success for a mixed-model training, which supported asynchronous and synchronous learning technologies. This illustrated that:

- Most trainers considered the personalized learning course and the learning objects useful and user-friendly.
- The level of satisfaction was very high among the trainers for the synchronous workshops with regard to schedule (flexible), facilitation, length (30 minutes), and content (its connectivity to the skills to be developed).
- The mixed model of training tested during the project offers a very promising avenue for CIT training of teaching professionals. Most participants emphasized the integration of training needs, and individual learning profiles: CIT offers an excellent model for permitting individuals to increase their competence while remaining in their workplace.

Lessons Learned for the Workplace

The research notes some conditions that ease the implementation of online training in the workplace and the principles that make the online training effective. These findings are summarized below.

Conditions that Facilitate Online Training to the Workplace

Online training has become an incontrovertible reality in learning environments. However, we observe trainers' resistance to this alteration in their practice. This resistance is often due to a lack of knowledge and

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practice with the technology and the absence of training connected to their learning context. The results of our study suggest that, to ensure successful CIT implementation in training environments, those responsible for training should be:

(A) Attuned to the needs of the organization by:

- Interacting with the organization so as to establish its orientations and training requirements.
- Eliciting the organization's cooperation from the initial stages of training to validate the list of competencies and to add any other competencies.
- Ensuring the organization's support to draft personnel for the training project, provide technical support, free personnel to do the training, and provide computer hardware during training periods.

(B) Attuned to the needs of the learners (the trainers) by:

- Taking into account the workplace of the trainers when developing the training plan to ensure a match.
- Verifying the availability of trainers for the learning sequences in the plan.
- Ensuring support during and after training.
- Promoting the integration of technological tools into the professional practice of trainers.

(C) Focused on the person and not the technological tools by:

- Using course content previously developed by trainers or the organization, adapting it to the pedagogical strategies of online learning, and avoiding wholesale content changes.
- Dividing course content into small units of 15 to 30 minutes, so that trainers can fit them into their schedule.

Based on our experience, this approach should kindle the engagement of trainers who need to modify their practice, integrate online training tools for use with their clients, and adhere to the training model established by their organization for their particular clientele.

Planning Effective Online Training for the Workplace

To ensure the personalization of learning in online training environments, those responsible for its conceptualization should consider the following planning principles (Sauvé, 2001, 2004) when moving to online training.

When using Form@tion on the Personnel@lisa technology platform, it is possible to create an online training program for each participant. Trainers can then follow their self-directed training programs at their own pace. In order to do this, three questionnaires must be completed that focus on the following:

- *The learning processes* (Gauthier & Poulin, 2005) identifying the type of learning (e.g., multimedia, written, game-based, simulation) that must be provided to trainees; the learning styles (adapted from Canfield, 1980; Fawcett, 1990) that must be provided to trainees.
- *The learning conditions* (adapted from Canfield, 1980; Fawcett, 1990) that indicate the type of learning (e.g., individual, collaborative, or mixed learning) that must be available to trainees.

Together, these learning profiles are used to establish the training needs of the program. This information is then used by Personnel@lisa platform to generate personal learning programs. The platform sorts, groups, and organizes the learning objects into a virtual warehouse, and synchronous virtual training workshops produce the training program based on the learning sequence adapted for each trainer participant. In this way, the online training meets the needs and ability of each participant. Figure 3 provides a summary of this process.

This process of training development deals with the trainers' learning abilities and needs. As such, the following is built into the learners' training program. This includes:

- The personal experiences of the learner, respect for learning styles and fostering the application of newly acquired concepts.
- The aptitudes, attitudes, and specific needs of the adult learner.
- Applying learning and management strategies appropriate to the learning context.

By focusing on the learner, the online training ensures that the learner has the opportunity to:

- Work with the training content.
- Exercise, practice, complete examples and be given high quality feedback throughout the online training.
- Receive continuous progress and follow-up to transfer learning to the workplace; learning cannot be consolidated in one session.
- Use different means to learn a concept or module.
- Gain constant support and frequent interaction with support mechanisms.

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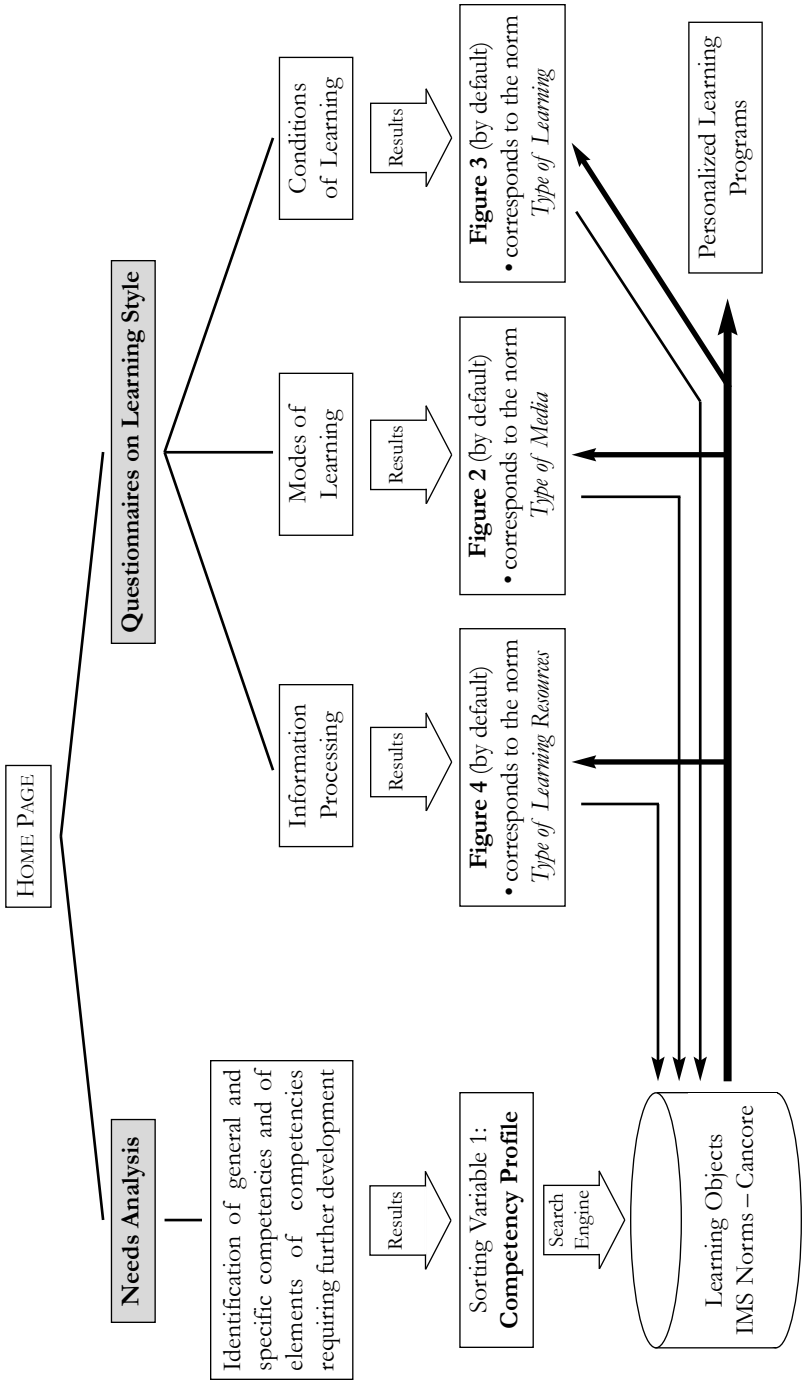

Figure 3: Schematic of Activities Involved in Generating a Personalized Learning Plan

- Access relevant, routine information which is up-to-date and applicable to the interests of each learner.
- See that workplace education is easily accessible, conveniently delivered to trainers in time and space, and provided in synchronous and asynchronous modes.
- Ensure conditions that will provide an enjoyable and effective online workplace learning experience.

A detailed checklist is enclosed in Appendix B to guide designers in the pedagogical and technological factors that need to be in place before the online training experience is planned for learners.

Conclusion

In 2002, during the launch of the International Week of Adult Learners in Canada, Michèle Jean, vice-president of the Canadian UNESCO Commission, declared:

> Lifelong learning provides us with the necessary tools to face the problems that present themselves in our personal, family, and professional life. It permits us to reinforce our competencies and understand our past in order to better seize the present and participate in the construction of the future.

To help adults invest in this approach and pursue it throughout their lives, the team conducted three studies under the aegis of a longitudinal research program launched in 1996 to test different mechanisms supporting the online training of adults in the workplace. These studies revealed that the trainers demonstrated resistance to the introduction of CIT to their practice. This resistance was often due to a lack of knowledge of and practice with the implemented technologies and, above all, to the absence of training linked to their teaching context and adapted to their learning characteristics. To respond to these training needs, we developed a virtual repository of competencies based on online instructors' four principal roles: instructor, facilitator, technical assistant, and program manager. Once the competencies were identified, we developed a training program for trainers, called Form@tion, which we tested with trainers in community settings. This testing had three objectives:

1. To assist community organizations to understand the obstacles and areas of resistance to change related to CIT as they were expressed by trainers.

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2. To assess how the system, Personn@lisa, generates personalized training plans that respond to the training needs and learning profiles of trainers-in-training.
3. To evaluate a mixed model of training for trainers using synchronous and asynchronous technologies to examine the model's pedagogical and technological adaptability.

Although the number of trainers who tested our program was not high, the results of the project reminded us of the importance of the continual struggle to provide adults with tools to enable them to:

- Develop their sense of autonomy and responsibility.
- Equip themselves to face changes that affect the economy, culture, and society.
- Take charge of their destiny through appropriate training that will help them to respond to their future challenges.

This testing also enabled us to reiterate the importance of principles related to the personalization of learning and the development of tools that measure the effectiveness of online learning. The mixed model of training clearly offered an avenue for exploration of the dynamics of training personnel using CIT in the workplace. The conjunction of training needs, individuals' learning characteristics, and CIT offer a promising model, enabling working adult educators to augment their competence while remaining in the workplace.

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Appendix A

An Online Training Program Integrating the Components of Our Educational Approach

The training program for online trainers, Form@tion, relies upon a mixed model of online learning to ensure, taking into account the learning profile and training needs of the learner, a personalized program of synchronous teaching and asynchronous distance learning. Three scenarios were developed to support this mixed model of training in our program, specifically:

1. The scenario in synchronous mode; that is, in real time and face-to-face with the aid of a videoconferencing tool, which allows individuals to offer training as virtual workshops.
2. The scenario in asynchronous mode; that is, at different times and at a distance with the use of learning objects as a function of the virtual repository of competencies in Form@tion, at the learner's pace but under the supervision of a tutor.
3. The intermediate scenario, which combines face-to-face and distance learning, according to the learning preferences of the learners; that is, a combination of virtual workshop and learning objects.

These scenarios were constructed for Form@tion while taking into account the diversity of pre-existing skills of the learners – adjusting or personalizing the training as closely as possible to suit their needs – by offering them sequencing to optimize their learning situations, the demands of their work environments, and the individuals' skills (Glikman, 2003). In order to do that, identifying the skills of online trainers was vital.

Virtual Repository of Competencies in Form@tion

Given that the target clientele of our research was trainers-in-training anticipating study in their workplace, it was preferable to organize the program according to skills, rather than by subject. This means that the learning situation was not based on a subject (e.g., collaborative learning) but on envisioned professional skills (e.g., "Facilitate a learning scenario at distance"). The approach was based on the work of Belisle and Linard (1996) since it allows for the recognition of the implicit expertise associated with the work. The individual learner was not previously aware of the specifics of this implicit expertise. In addi-

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tion, this approach allows for homogeneity in the analytical grids and the virtual repository for trainers, necessary for the development of personalized learning plans. It also promotes learner-centred approaches. Let us now examine the skills that trainers must acquire in order to succeed with online training.

According to Glikman (2002, p. 219), the role of the trainer must change along with the new forms of training. The parameters of the occupational function change fundamentally and demand difficult adjustments in terms of professional identity. A literature review geared toward drawing out the basic competencies of the online educator reveals four main roles: instructor, facilitator, technical assistant, and program manager (Hostein, 2002; Institute of IT Training's Standards, 2001a, 2001b).

The competencies necessary to perform the roles of instructor, facilitator, and program manager are similar to those needed for face-to-face education, but require new competencies for CIT. The introduction of CIT requires the adoption of a pedagogical model stressing openness, learning autonomy, and the development of competencies. This model allows for the integration of theory and practice. Perrenoud (1999) stressed that trainers adopting this model must demonstrate traditional teacher competencies in terms of the ability to transmit knowledge as well as the new competencies rooted in active learning and contemporary research in education.

With the introduction of new technology, the role of technical assistant is added to the pedagogical profile of the trainer. As early as 1990, Blandin (quoted by Glikman, 2002, p. 219) described new competencies required by trainers introducing CITs to their programs. Our research updates trainer competencies to allow them to incorporate the use of platforms and interactive tools such as forum, chat, simulation, data banks, and evaluation and multimedia tools. The table on the following pages examines the general competencies associated with the four roles of the online trainer.

This virtual repository, validated by experts and adult trainers, enabled us to develop a needs analysis questionnaire in online learning that we then integrated into Form@tion. To respond to these training needs, we developed more than 380 learning objects linked to specific competencies within the virtual repository located in 30 virtual workshops.

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FACILITATOR COMPETENCIES
Facilitate learning activities and sessions in synchronous and asynchronous modes.
Form student work groups with the help of tools offered within the learning environment.
Establish rules and procedures to follow during virtual meetings.
Manage information (résumés, transitions, explanations, synthesis) exchanged during a meeting.
Intervene systematically, or as necessary, according to the needs of the group during a virtual class (moderate exchanges through re-enforcement or conciliation, offer options, redirect exchanges, support the discussion, etc.).
Call upon facilitation techniques (discussion centred on the educator, group, or both).
Foster learner collaboration through strategies such as group projects, case studies, simulations, and role play.
Establish cooperative structures (for team and group work) as well as strategies to help the group reach a consensus.
Use online interactive strategies such as focus groups supported by "chat" or "forum" to explore content-based themes.
Employ group facilitation techniques according to the state of relations among members of the group.
Master the art of questioning.
Master the art of facilitation.
Manage virtual meeting protocols (general, audio, video, and audio-graphic).
Master voice and active listening strategies.
Create conditions to motivate learning in the electronic environment.
Create motivating conditions for a learning activity.
Stimulate participation among the learners.
Stimulate change among learners via tools such as forums, software to facilitate collaborative learning, and email.
Help students to take charge of their learning.
TECHNICAL ASSISTANT COMPETENCIES
Consult the Internet in a systematic manner, using research engines and making logical, ethical, and critical choices.
Use the Internet Explorer search engine along with associated tools.
Conduct a simple search using key words.

Table 1: Competencies of an Online Trainer

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Conduct an advanced Boolean search.
Determine the validity of information obtained on the Web in relation to search objectives.
Undertake an electronic monitoring of developments to remain current in one's teaching field.
Use networks for distance communication.
Use and manage email.
Use and manage a "discussion forum."
Use and manage chat.
Use an Internet videoconference or audiographic tool (organization, preparation, delivery, and follow-up).
Use document-creating programs such as those commonly found in Office Automation software.
Use the basic functions of Word.
Use the basic functions of Power Point.
Use the basic functions of Excel.
Use the basic functions of design software.
Transfer files through FTP.
Master the functions of the electronic environment used for the program offered.
Master the various functions of the electronic learning environment.
Personalize the learner's approach to the learning environment as needed.
Use the learning environment to monitor learning.
Assist the learner in the use of technologies.
Ensure student learning of technologies offered by the environment.
Ensure student learning of Web search tools.
INSTRUCTOR COMPETENCIES
Provide online pedagogical support to the learners in a synchronous and an asynchronous environment.
Monitor the progress of each e-learner with the help of tools such as personal learning plans and personal achievement records, while acknowledging the learning context.
Analyze the products of learning activities such as exercises, tests, notes, and assignments generated in the environment in order to support learner development.
Guide the e-learners, in the learning environment, according to their needs: clear directions, and clear and rapid feedback.

Table 1: Competencies of an Online Trainer

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Be a good communicator
Communicate effectively in speaking.
Communicate effectively in writing with the help of communication tools.
Communicate effectively in writing with the help of educational text.
Demonstrate pedagogical competencies.
Provide the adult learner with emotional, motivational, cognitive, and metacognitive support.
Provide constructive and timely feedback.
Plan the stages of online learning: presenting information, guiding the student, and applying and evaluating the knowledge acquired.
Use the teaching potential of the electronic environment to achieve educational goals.
Make full use of the environment's learning material.
Support learner progress according to their identified needs.
Use synchronous and asynchronous communication modes in support of learning.
Use the Web to potential as a learning tool for e-learners.
PROGRAM MANAGER COMPETENCIES
Manage learning activities.
Ensure administrative follow-up of learners (beginning and end of learning, grades, expenses, etc.).
Ensure that students learn to navigate in the learning environment.
Organize educational activities based on learner needs.
Establish meeting schedules with students (time, space, and materials management) with the help of management tools.
Manage documentary and Web-based resources accessed by the learners.
Contribute to the Web bibliography of the subject matter studied.
Continuously update the content offered by the environment.

Table 1: Competencies of an Online Trainer

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Appendix B

An Assessment Tool for the Effectiveness of Online Training

AT THE PEDAGOGICAL LEVEL

- Does the training offer adult learners tools for assessing their prior knowledge and competencies?
- Does the training offer the adult learner the possibility of identifying his or her learning profile (learning style, preferences for the modes and conditions of learning, learning and management strategies, level of engagement, etc.)?
- Is the content of the training presented with clear and precise objectives, goals, and outcomes?
- Does the training offer the adult learner the possibility of establishing a personalized learning sequence?
- Is the content organized in a way that facilitates its acquisition?
- Does the online training promote the sensitization of learners to the challenges inherent in online learning?
- Do the methods of evaluation permit the learners to confirm that they have attained the skills articulated for the training?
- Do the learning activities provide the learner with frequent feedback?
- Do the learning activities promote autonomy and the assumption of control by adult learners?
- Do the examples, exercises, and activities in the training render the learning task more attractive, stimulating, and varied?
- Are the activities proposed to the adult learners a realistic challenge?
- Does the pedagogical integration of technologies place the emphasis on the importance of the adult learner's effort, thus acting to develop the learner's capabilities?
- Does the online training foster greater participation by the adult learner, and more active learning where the learner can be more cognitively engaged?
- Do the suggested pedagogical activities stimulate the learner to develop his or her own learning goals?

AT THE TECHNOLOGICAL LEVEL

- Does the online training provide a simple and easy to access learning environment?
- Is the online training attractive and is the navigational system user-friendly?
- Does the online learning put in place mechanisms that promote more numerous interactions, both between the trainer and the learner and between the learners themselves?
- Does the online training offer methods that promote learners' active participation?
- Does the online training ensure conditions that promote the personalization of learning?
- Does the online training offer the learner the opportunity to learn at his or her own pace?
- Does the online training prepare the learners to employ active pedagogical approaches such as problem-based learning and project-based learning?
- Does the online training provide students with mechanisms to support their motivation and perseverance in their studies?
- Do the communication tools provided in the online training vary; do they permit both synchronous and asynchronous interactions?
- Does the online training make a wide range of resources available to learners?
- Does the online training offer a detailed calendar of the progression of the course to adult learners?
- Does the online training allow the teacher to propose a methodological approach to learners with regard to the required learning activities?
- Does the online training facilitate the updating of resources?
- Does the online training make a wide variety of resources (documents, hypertext, video clips, sound clips, animation, Internet sites, etc.) available to adult learners?
- Does the online training have at its disposal a structure of technical and pedagogical support both for learners and for trainers?
- Does the online training make provision for training the trainers?
- Does the online training constitute a supportive learning environment for teachers, thus facilitating their work as trainers?

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