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A Guide for Integrating ICT into a Program



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Whether you're integrating IT into a course, a program or a college, forethought and organization are musts. This report explains why this process is worth the effort and gives examples as well as an overall plan of action.

Table of Contents

The Issue

> [Why integrate ICT into a program or course?](#)

Practical Applications

> [Getting Started](#)

> [Network Examples](#)

> [Building on Your Experience](#)

The Issue

IT integration into education requires planning. This report begins in this section with a look at the motivation for this choice for a growing number of teachers in the network. The '[In Practice](#)' section gives concrete examples of this process and discusses a typical integration plan. At the end is the '[Useful References](#)' section with links to documents which provide more detailed information. We hope you find this text interesting and above all thought provoking.

As a further introductory note to the English version, IT has a growing number of titles which can cause confusion. The term IT stands for Information Technology and that of ICT is short for Information and Communication Technology. The two are synonymous. In French the most commonly used term is TIC which stands for Technologie d'information et communication.

Why integrate ICT into a program or course?

Teachers often adopt ICT into a program out of a perceived obligation to follow a trend or meet the requirements of an academic environment. As information and communication technology has already become part of daily life for both teachers and students; why introduce it into the classroom?

In fact, ICT is already there! Who hasn't used overhead projectors, videos, whiteboards, and printed material? Technology has been helping educators and students in academic activities for a long time. Why then does it seem so difficult to adopt or integrate newer technologies into an education plan - whether they are related to the access and processing of information, communication, the Internet, the Web, or specialized software?

The following text will examine the issue in three steps. First we will see how, within the framework of a competency-based approach, ICT can foster knowledge-building and enable students to be active participants in the process through the implementation of active learning. Secondly, readers will be invited to review their program. Finally, we will address the question of colleges' responsibility to train students in the use of ICT, both according to the requirements of post-secondary education and from a civic perspective.

To support active learning

A competency-based approach requires educators to modify their relationship to students and knowledge acquisition. More than ever, students must take their competency-development into their own hands and be active at the cognitive level. In order to do this, they must process information through research, analysis, making connections between concepts, experimentation, organization, and communicating the results of their inquiries. Students are no longer note-takers; they are researchers who must understand in order to progress.

Consequently, educators are no longer the custodians of knowledge who then transmit that knowledge to their students.

In this new context, educators accompany, support and guide students in the learning process. Information and communication technology has greatly facilitated this supportive work for several years now. Since then, ICT has been providing unparalleled support when it comes to feedback, follow-ups, peer collaboration, research and processing of information, to name but a few.

This change in model is very well suited to ICT. Here are some examples of educational practices putting it to use:

- Digital feedback through the creation of MP3 or video allows you to provide students with constructive comments regarding their learning process.
- Discussion forums and testing software such as Netquiz become invaluable, as do all other tools that facilitate feedback and allow students to progress and work outside the classroom.
- Training environments like [DECclicII](#) provide resources to facilitate exchanges between course leaders, to file documents for consultation, and to make information available.

In brief, ICT contributes greatly to the success of active learning by encouraging exchanges between students, research and document consultation, and knowledge-building.

To meet ministerial objectives

Since 1994 the collegial network has implemented the competency-based approach, and since then programs have been developed with this in mind. Certain factors are considered during the program-development process, including the integration of ICT. However, after several years of implementation, ICT still has not been granted its proper place. This might be explained by the fact that pedagogical approaches based on cognitivism and constructivism, which better incorporate technology, were relatively late in penetrating the college network. A review of programs' "objectives and standards" to see where ICT might be integrated into the program and, ultimately, into the courses is definitely now in order.

Even if, while revising, ICT is not specifically mentioned in the list of competencies, it may be an opportune time to inquire about its use for achieving a greater mastery over these competencies. Here are some examples:

- Educators in Science claim that a mastery of word-processing software results in better formatting of laboratory reports, that the use of an electronic calculator favours mathematical data processing, and that using computerized data acquisition tools allows for a more profound study of natural phenomena.
- In Outdoor Recreation programs, accounting may be learned on paper; however, accounting software

allows students to concentrate of the fundamental theory of accounting rather than the writing of data. What's more, using e-mail makes communication more efficient in the planning and organization of activities. Finally, using a database facilitates the management of outdoor recreational equipment.

- In all programs, students are required to search for information and communicate the results of their research. More than ever, these tasks may be accomplished with the help of ICT. Simply think of the wealth of material on the Internet or the use of databases.
- In several pre-university or technical programs, graduates entering the workforce or university will be required to write up reports, manage a budget, communicate information to others, and lead conferences - all tasks in which the use of ICT is becoming the norm.

In summary, far from being removed from the college training environment, ICT is part of the ministerial objectives and might even be deemed by educators as an indispensable training tool if it helps students acquire their competencies. However, this is more easily applied if educators' pedagogical practice is based on strategies inspired by cognitivism and constructivism.

To instill mastery of IT in students

But how far along are our students in their command of ICT? To learn more about this, we might refer to the NetAdos 2004 survey, which reveals the following:

- 90% of adolescents 16-17 and older use the Internet on a regular basis
- 92% of users use the Internet more than books or magazines as a research tool
- 90% of those using the Internet as a research tool claim that it helps them to a "great" or "fair" degree in their work
- 97% of adolescents are comfortable using a search engine for research purposes
- 92% are very comfortable using word-processing software to produce written work
- 79% use e-mail as a means of communication
- 72% chat, e.g. on MSN
- 65% claim to be able to learn new software on their own

Most adolescents, male or female, entering into college from secondary school are at ease in a virtual environment and use the Internet for research, e-mail communication, and live chats. This assessment confirms that ICT is currently integrated into the lives of our college students. However, the study referred to above does not specifically reveal ICT users' ease and competency regarding the more advanced functions required in the regular use of electronic resources.

Our daily contact with college students corroborates the statistical data provided in this study. Our own experience confirms that adolescents regularly use ICT for entirely personal ends. In addition, we no longer need to convince students of the usefulness of ICT in daily life or on the job market.

It is crucial, however, that students also be able to conduct precise research, respect copyright laws, and question the reliability of their information sources. The use of word-processing software is indispensable, not only for producing written work, but also for respecting formatting and presentation rules and for transmitting information using modern communication support systems. The *profil TIC et informationnel des élèves* (ICT and informational student profile) is a guide for meeting the requirements of research, information processing and communication within the collegial network.

This profile was developed with a view to training college students in the a sophisticated use of ICT. After having analyzed several college vocational programs, and having assessed the requirements of technological training in various anglophone and francophone education systems, a college network [team](#) of ICT representatives produced an ICT and informational student profile.

As with any program exit profile, this one sets standards, in this case to train students in mastering information technology, and to use ICT for learning purposes. This will initiate students into document research using proven methods and will encourage them to process information, thus steering them away from the "copy/paste" method that often leads to plagiarism. Students will present the results of their research by using modern communication tools. Finally, the students will communicate and collaborate at a distance in order to benefit from peer support. These are the principal steps in the process.

This is not a question of adding new competencies, but rather of more precisely defining the tasks already required of students. It is a matter of building on competencies students have already acquired, in order to attain the highest standards regarding the use of electronic tools and processing information and communication.

In addition, from a civic perspective, colleges are training students who will pursue their studies at the university level or enter the workforce. By incorporating information technology into our programs, we are contributing to the development of citizens who are aware and competent in their use of ICT for processing information and communication.

A model for ICT integration into a college or program has been developed which takes the three elements discussed above into account. The following section discusses concrete ways to get involved in your program or college.

Practical Applications

This section presents a practical approach for ICT integration in colleges with a few examples and a model plan for integrating ICT that might prove inspiring.

Getting Started

Here is a simple involvement strategy in which ICT can be integrated in two distinct steps. First, the program must be reviewed in order to give ICT its proper place. Next, an inventory must be made of the human and material resources available at the college. Although this kind of work is ideally a team effort, an individual initiative may set an example for others to follow.

Integrating ICT into a Program of Study

You and your colleagues train young men and women who will become technicians or university scholars. The "Objectives and Standards (O/S)", framework plans, graduate profiles, and course outlines are tools that guide you in making your program a coherent and relevant training framework for attaining these goals.

The project of integrating ICT into teaching and learning involves a review of these tools. The O/S are usually the object of the first step in this initiative; which consists of determining, in a concrete way, the proper place of ICT in the program. Below are a few examples.

- In Outdoor Recreation programs, the competency Management of Material Resources in Recreation requires students to carry out several tasks relating to inventory management, reservation grids, material expenses budgets, etc. The program team quickly realized that technicians would be far more effective if a spreadsheet were used to accomplish these tasks. Knowledge of the software might even be useful in internal financing or activity-planning courses. Students must also be able to lead meetings and produce different types of reports. A mastery of word-processing software would be valuable in this instance, as well.
- In Social Sciences, the competency To recognize, from a historical perspective, the fundamental characteristics of Western Civilization was understood by one psychology teacher to be a means for students to study the different schools of thought throughout history, thereby learning the basis of human behaviour and mental processes. In line with innovative pedagogical strategies that require students to process the information in order to better understand it, she decided that the students themselves would define the basic vocabulary, find the principal characteristics of the various schools of thought, and research the cognitive and emotional biological processes to be mastered. Inspired by this challenge, her colleagues used a similar approach in their classes, requiring students to research relevant information, process it, and format it using communication and information-sharing at a distance.

Both examples show that in order to make better use of information and communication technology, instructors must move toward a pedagogy that gives students more space and in which educators assist as professional guides. Once this change has occurred, the pedagogical design of courses and perspectives on

the O/S will be modified. Reviewing the ministerial objectives allows us to define which pedagogical situation students should be placed in, in order to acquire their competencies. By doing so, ICT becomes a tool that promotes learning at a deeper level.

In your review of your program, you will certainly see where ICT might be integrated, whether it is explicitly stated in the O/S or not. Afterward, it will only be a matter of modifying the framework plans and incorporating use of ICT into the exit profile.

Creating the Conditions Required

Once this step is completed, the need for software, equipment and rooms must be addressed. For example, more computers might be needed in classrooms since the pedagogical approach has changed, and students are devoting more time to building projects or practical simulation exercises.

At this stage, ICT integration probably involves not only your colleagues, pedagogical approaches and course planning but also requires computer services for the resources that must be made available for the project to move ahead. You will need to approach your administration more often than you might have in the past, in order to obtain the necessary resources.

This situation also involves pedagogical counsellors, whose mandate is to support you in the technopedagogical creation of this new training environment. This support could include consultations, program team activities and training, as well as research and development projects.

Network Examples

Nothing compares to a real-life picture of what is happening on the ground. Even if each college must adapt to its own context, here are some examples from the college milieu that might provide inspiration for your own initiative.

Cégep de Trois-Rivières

While putting the new Social Sciences program in place, the program team established the technological dimension underlying certain aims of their new program. Educators in each discipline of the program were given the responsibility of teaching intellectual habits and methods as well as information and communication technology, which was incorporated into course framework plans.

However, beyond the revision of the program, it became essential for pedagogical activities to take place in a laboratory dedicated to Social Sciences. Take a moment to read the account of their experience, which notably features a proposal made by a committee constrained by budgetary operations. The story by Daniel Pagé of the cégep is in French.

An ICT integration plan at *Cégep Lévis-Lauzon*

We often mention that it is much easier to make a plan of action for ICT integration if the college is geared toward the change. In a [Profweb column](#) (in French) Jacques Belleau presents a few of his college's initiatives. A pedagogical day, hiring a pedagogical counsellor, evaluating students' ICT competencies, participation in the *Cégep en réseau* project: all are excellent occasions for furthering the move toward ICT integration.

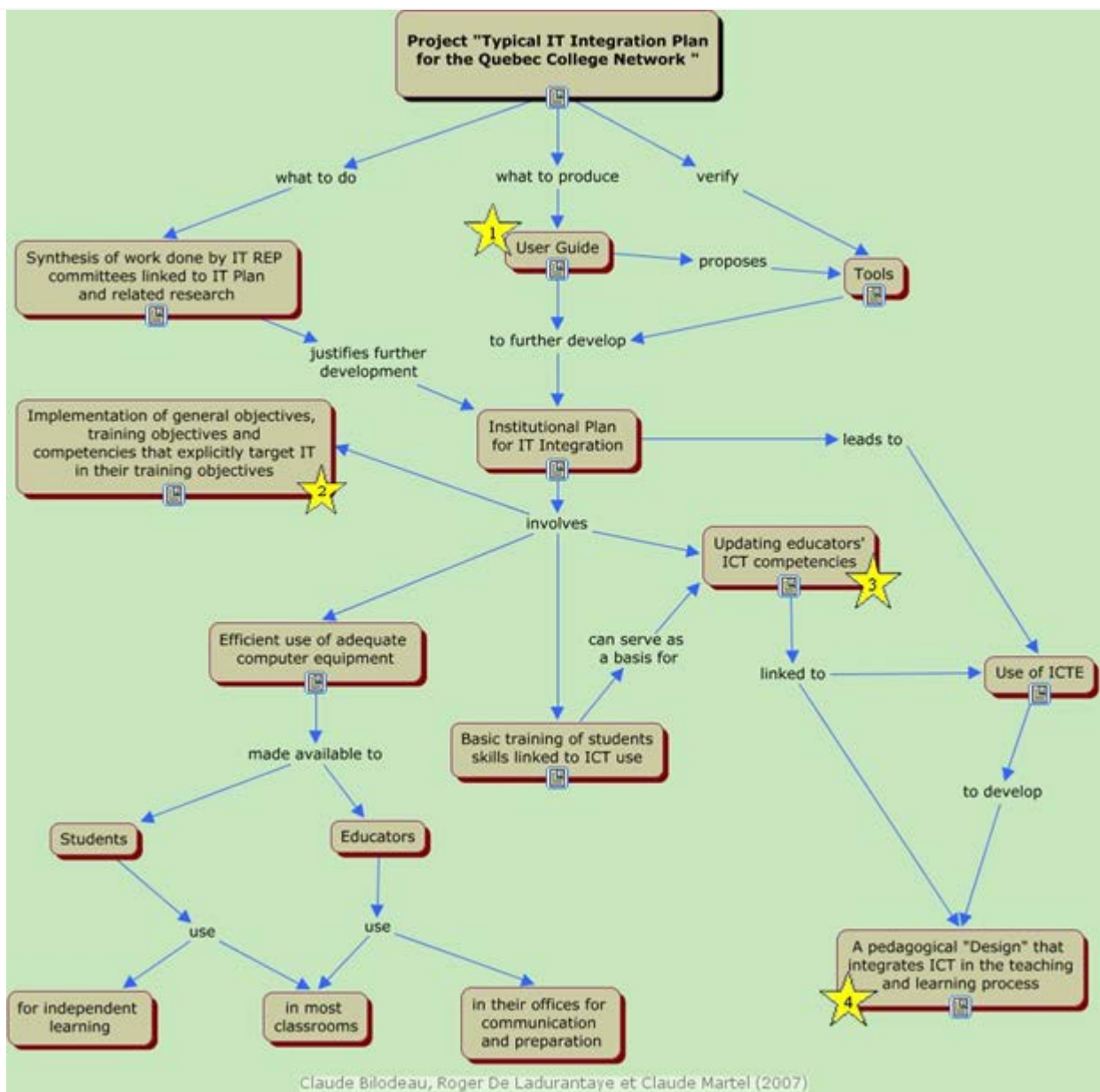
Building on Your Experience

It is too often the case that individuals try to reinvent the wheel rather than build on the experience of others. This is not to say that it's possible or even relevant to fully reproduce what is being done elsewhere; however, these initiatives provide a solid base for further efforts, and more quickly. Naturally, each time someone shares information about his or her experiences, others benefit from it. In this spirit, we invite you to use the "commentaries" section of this dossier to share your experiences or any new resources linked to ICT integration.

An ICT Integration Model

A contribution by the collegial organisation PERFORMA enabled one team (Claude Bilodeau, Roger de Ladurantaye and Claude Martel) to create a model plan for ICT integration for the collegial network. This model, presented on the following page, involves everyone concerned with ICT integration in a college.





[Model plan](#) for ICT integration for the collegial network

Although it is static, this illustration gives us a good idea of the elements to consider in ICT integration. Feel free to explore [the Web version](#) by whichever path you like. To help you better understand it, here are certain elements you can access by clicking on an item with a star next to it in the interactive Web version.

Before embarking on this journey, it must be pointed out that the path is paved with conceptual maps which were developed using [CMAP](#) software. Thanks to this tool, we have been able to collaborate at a distance to build our knowledge model and link concepts, documents, and outlines. Let's examine the different elements that should light the way as you consider integrating ICT into your program:

Star 1

No one will argue the necessity of a college setting out clear objectives regarding ICT integration. This done, teams can then more easily determine the nature of ICT for their respective programs. Under the "Operational

Guide" tab, you'll find the development process of an institutional plan which was designed along these lines. The process and its principal steps are presented in the *modèle de plan d'intégration des TIC pour le réseau collégial* (Model ICT Integration Plan for the Collegial Network).

However, even where there is no institutional planning regarding ICT, teaching staff in a program will benefit from working out an action plan for ICT integration. Here is a quick look at the documents most relevant to this aim.

Star 2

Under the heading *Mise en œuvre des buts généraux, des buts de la formation et des compétences qui ciblent explicitement les TIC dans les devis de formation* (Implementation of General Objectives, Training Objectives, and Competencies that Explicitly Target ICT in their Training Objectives) are five conceptual maps that present a five-step planning process. The fifth map is the most relevant for educators. In fact, the concept of *activités d'apprentissage intégrant les habiletés TIC à développer chez les étudiants* (Learning Activities Integrating ICT Skills to be Developed by Students) (Step 5) found in this map merits special attention.

In this fifth step, you can also consult a variety of strategies, results of old information technology, accounts, and other resources under the heading "Resources of Links with ICT Partners in the Collegial Network". These might provide inspiration for your learning activities.

Star 3

In Updating Educators' ICT Competencies you will find three documents, one of which is a short text titled *L'enseignant comme facteur déterminant d'une intégration réussie des TIC* (Educators as Determining Factors in Successful ICT Integration). Few can be indifferent to this argument for ICT integration. You may also refer to a chart presenting the elements to be mastered by educators in the collegial network.

Star 4

Planning and pedagogical design go hand in hand. Planning a course that integrates ICT means, above all, taking into account the means by which information can be processed, student interaction, and making course documents available for consultation or for training exercises. In order to think methodically about planning a course that integrates ICT, steps are suggested under the heading "A Pedagogical Design Integrating ICT into the Teaching and Learning Process". We especially suggest reading the document found in step 4, which asks you to consider the type of knowledge-base you will be using and the technological methods by which students might best improve this knowledge.

Now we have reached the end of your guided tour. We hope these tools will help you better integrate ICT into your program and into your teaching and learning strategies. Do not hesitate to approach your pedagogical counsellor to help you use this model to determine the process that best suits you.

In order to advance even further in your ICT integration planning, you can also consult the section on useful references. Reading these resources should enable you to make enough connections to pique your interest in information and communication technology.

Useful References

- [BÉRUBÉ, B. et B. POELLHUBER \(2001\). *Un référentiel de compétences technopédagogiques pour le personnel enseignant du réseau collégial*, PERFORMA, Montreal, Collège de Rosemont](#)
Bernard Bérubé's and Bruno Poellhuber's *Référentiel de compétences technopédagogiques destiné au personnel enseignant du réseau collégial* gives a global view of the competencies related to educators' use of IT. This information is discussed in French in [another Profweb report](#) which helps educators to evaluate their skills and become acquainted with various resources. By reflecting on your practice, you will realize that ICT can help you before, during, and after your pedagogical interaction with your students.
- On behalf of [ARC](#), Christian Barrette developed a metasynthesis of the impact of ICT on teaching and learning in the establishments of the Quebec collegial network. [In a short text](#) (in French), Dominique Forget presents nine observations related to the analysis of various researches and a model for association between variables. Along the same lines, researcher Christian Barrette published four articles in the *CLIC* bulletin:
 - BARRETTE, Christian (a). « *Vers une métasynthèse des impacts des TIC sur l'apprentissage et l'enseignement dans les établissements du réseau collégial québécois. De la recension des écrits à l'analyse conceptuelle* », [Clic, no 55](#), October 2004.
 - BARRETTE, Christian (b). « *Vers une métasynthèse des impacts des TIC sur l'apprentissage et l'enseignement dans les établissements du réseau collégial québécois. Parcours méthodologique* », [Clic, no 56](#), December 2004.
 - BARRETTE, Christian (c). « *Vers une métasynthèse des impacts des TIC sur l'apprentissage et l'enseignement dans les établissements du réseau collégial québécois. Mise en perspective* », [Clic, no 57](#), March 2005.
 - BARRETTE, Christian (d). « *Réussir l'intégration pédagogique des TIC. Un guide d'action de plus en plus précis* », [Clic, no 63](#), January 2007.
- NAULT, Geneviève, « *Encadrer des étudiants à l'aide des TIC* », [Clic, no 63](#), January 2007.
- In this *CLIC* article, Geneviève Nault presents seven tools for better supervising students with the help of IT.