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Information and communication technology: models of evaluation in France

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Abstract

This paper aims at analyzing the evaluation of information and communication technology (ICT) in educational settings in France. First, it focuses on some characteristics of the French educational system and analyzes the trend towards a more decentralized management of education, which raises several important issues, including the trend for central evaluation to evolve from control to communication. Secondly, we define our view of ICT and evaluation. Then we present an overview of evaluation at the national level and European level and discuss some of the main research approaches in France concerning students' learning, learning instruments, and teachers' communities. Finally, some perspectives for the future of ICT evaluation are proposed.

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1. Introduction

As information and communication technology (ICT) keeps spreading in educational systems of industrialized countries, different stakeholders (local and national authorities, school boards, parents, etc.) have a growing interest in the issue of evaluating its uses. However, evaluating ICT in education is a complex issue, which raises many questions. What is the purpose of the evaluation? Who demands it? What should be evaluated: software, student learning and educational projects? What will the evaluation be about: learning with ICT or from ICT, assessing learning using ICT or assessing learning with ICT (Mc Dougall, 2001)? What are the stakes? How can a reliable evaluation be conducted, especially in complex situations such as technology use supporting collaborative learning?

Any evaluation of ICT usage in education depends on its educational uses as defined by society. In France, two main aims can be identified: (1) educating students to use ICT in responsible ways and to become fully active citizens, aware

of the social and cultural implications of the new technologies; and, (2) ensuring that the development of ICT in education contributes to the modernization and improvement of society (Eurydice, 2001a). The first aim leads to providing students with new types of situations and learning activities embedded in the curriculum. The second aim deals with educational technology and poses instructional design problems. In practice, there is often confusion between these aims, which obfuscates the problem of evaluating ICT use in education. The concept of ICT evaluation in education is deeply anchored in the cultural tradition and educational organization of a country. This implies going further into the analysis by taking into account issues specific to French culture.

2. Main features of the French educational context

French tradition is anchored in a complex web of historical facts and traditions and the education system is still rather centralized. Teachers (especially primary teachers) played a very important political role in the late 19th century and in the beginning of the 20th, contributing to the creation of a national education system and a secular

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113 republic. After having passed a competitive examination,
114 teachers become civil servants of the state and receive
115 tenure. Curricula and syllabi (for each level and for each
116 subject matter) are determined at the national level, and
117 each teacher, as a civil servant, has a responsibility to
118 respect these guidelines. However, teachers traditionally
119 have the freedom to adopt their own pedagogical style.

120 Teachers have been trained and prepared in specific
121 institutions called Instituts Universitaires de Formation des
122 Maîtres (IUFM) since 1991.¹ When they pass their
123 examination, a position is proposed on a national basis for
124 a secondary teacher and on a regional basis for a primary
125 teacher. It can be considered that the country has a tradition
126 of central control but a recent and rather fragile culture of
127 evaluation.

128 There is a complex teacher-evaluation system with
129 several hierarchies, responsible for overseeing school life
130 and teachers' pedagogical activities. Every year, a second-
131 ary teacher's administrative performance is evaluated by the
132 school principal. A second assessment, based on the
133 pedagogical style, is carried out by an individual evaluator's
134 (*inspecteur*) observations. The stakes are relatively low,
135 since the vast majority of teachers have tenure. In fact, for
136 many secondary teachers, inspections are probably like a
137 ritual happening sporadically, about every 5 years. The
138 mission of the *inspecteur* has evolved in the last 20 years,
139 from playing the role of an evaluator to a facilitator actively
140 participating in teacher training and teacher community
141 development. *Inspecteurs* serve also as guarantors of the
142 correct functioning of the educational system.

143 During the past 30 years there has been a steady move
144 towards a more decentralized management of education.
145 Local authorities are financially in charge of educational
146 buildings and materials, but have no responsibility for
147 pedagogical activities. For example, they pay for computers,
148 networks and Internet access. This implies important
149 investments in education and the local authorities naturally
150 want to understand the impact of these investments. They
151 are in fact not only interested in schools but also in
152 hospitals, employment and so on. They favor infrastructure
153 solutions responding to perceived needs. The Internet and
154 the sharing of resources provide indicators of ICT usage in
155 schools (e.g. access to services, CD-ROMs, and so on), but
156 no indications of pedagogical renewal are available.

157 Local political authorities are now in a position to decide
158 the amount of funding they will invest in educational
159 reforms and the kind of infrastructure they will install. From
160 a governmental point of view, evaluation tends to evolve
161 from control to communication in order to bring new
162 stakeholders data about what is really going on and,
163 hopefully, to convince them to move forward.

164 France is a country with a long tradition of debate and,
165 sometimes, confrontation, particularly in educational mat-
166 ters. Often, central governing bodies have to take practical
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168 ¹ <http://www.iufm.education.fr>

169 decisions on matters where the law gives no clear answers
170 and where no consensus exists. Successive secretaries of
171 state for education (*Ministres de l'éducation nationale*)
172 have asked prominent personalities to lead temporary
173 missions on controversial points. For example, Antoine
174 Prost, a famous historian, recently headed a task force about
175 research in education, which proposed new orientations,
176 recommending in particular that survey-like research be
177 developed. One of the rather peripheral remarks proposed
178 that ICT research should not have priority, which exerted a
179 real influence on the National Institute for Pedagogical
180 Research policy (INRP—Institut National de Recherche
181 Pédagogique) (Prost, 2002).

182 A recent report (Pair, 2002) distinguishes between three
183 aims of evaluation: for diagnosis, for training and forecast-
184 ing, and for assessment. It should be noted that even though
185 individual assessment is well developed, there is no
186 tradition for assessing the administrative units that make
187 up the educational system in France.

188 One of the characteristics of the current situation may be
189 the emergence of different *observatoires* and institutions
190 devoted to evaluations; the different directorates of the
191 government install *observatoires* to evaluate different
192 aspects of the educational system. A High Council of
193 Education Evaluation was also created in 2000. Quite
194 interestingly, this council is not in charge of evaluating the
195 French educational system, but of evaluating its evaluation
196 system.²

197 3. ICT and education

198 It should be mentioned that France is, along with the UK
199 and the USA, among the first countries to introduce ICT in
200 education; public policies regarding audio–visual aids were
201 launched after World War II and policies concerning
202 informatics were introduced in 1970. Uses of ICT in
203 education may be classified in four categories: as a subject
204 area, as a support system for subject areas, as an educational
205 technology, and as information management. The first three
206 categories are elaborated below.

207 3.1. ICT as a subject

208 About 20 years ago, *informatique* (information technol-
209 ogy or informatics) emerged as a school subject and played
210 an important part in the integration of ICT in schools (Baron
211 & Bruillard, 1996). Now, the necessity for students to
212 acquire competencies in information management is widely
213 acknowledged but, apart from some specific courses in
214 vocational schools, ICT is no longer considered a school
215 subject. However, at the lower secondary level (grades 6–
216 9), ICT is emphasized in two subject areas: technology and
217 documentation.

218 ² <http://cisad.adc.education.fr/hcece/>

The first one is an heir to a subject called educational manual work (*travaux manuels*) that was completely renewed and renamed ‘Technology’ in 1985. Technology teachers then received special training. Computers and specialized equipment were allocated by the government to schools and a new curriculum was defined. This curriculum explicitly proposes information technology with a wide spectrum of activities, including carrying out collaborative projects (Lebeaume & Martinand, 1999). The technology curriculum is now the main place where most French youngsters are introduced to computers.

Documentation has a special status in France. *Centres de Documentation* (similar to resource centers) have been in existence for a long time. Before 1989, school librarians were considered pedagogical assistants. In 1989 a teaching specialization in documentation was created and a national competitive examination was defined. Documentation teachers were then recognized as having a special responsibility for teaching students information retrieval and management literacy. However, they do not benefit from specific time slots in students’ schedules.

When no specific courses are offered, other forms of ICT competency evaluation are recognized. For example, in 2000 the French government created a Computer Science and Internet certificate (*Brevet Informatique et Internet*, or *B2i*), aimed at providing a formal recognition of the extent to which pupils use multimedia tools effectively. This certificate is available to three target groups: pupils ending primary education, lower secondary education (*collège*) and upper secondary education (*lycée*).³

It is interesting to compare this certificate with the European computer driving license (ECDL). This license sets an internationally recognized standard of competence to certify that the holder has the knowledge and skills needed to use the most common computer applications efficiently and productively. To gain the ECDL, the applicant must pass one theoretical and six practical tests, which are administered in Europe at accredited test centers.⁴ This license is intended to provide international certification.

By contrast, *B2i* is not an exam and has no real aim of official certification. *B2i* is intended to give teachers and parents signals about what is expected from youngsters. Quite interestingly, social issues of ICT are rather well taken into account. *B2i* is, in a way, a lever for change. Teachers are encouraged to implement situations allowing students to acquire and demonstrate their ICT competencies.

3.2. ICT as an educational technology

According to this orientation, ICT is considered to be a tool or a set of media for teaching and learning other subjects like mathematics, history, literature and so on. In fact, French teachers have complete freedom to integrate or

not integrate any educational technology into the curriculum. No educational technology can be prescribed by the curriculum—it can only be recommended.

The question of assessing the efficiency of media has given birth to a host of publications in the past 50 years, without producing stable results. One of the main limitations of studies is to compare groups using and not using a given type of media for instruction in contexts where the use of technology was only one of the many factors encountered by students. A recent doctoral thesis (Chaptal, 1999) has established an interesting synthesis of these different studies. Chaptal stresses the methodological weaknesses in research design while looking for unique factors that may account for learning efficiency.

3.3. ICT as a set of disciplinary instruments⁵

Every classical school subject is deeply transformed by ICT: mathematics with dynamic geometry software, problem solvers, formal calculus packages, and so on; music with electronic music software; literature with the possibility to access digitized sources and launch queries; sciences with experimentation assisted by computers and various kinds of computer simulations; foreign languages with translators, easy access to authentic documents, communication and exchange with foreign students, and so on. In each case, technology becomes an integrated part of what is to be learned and has a deep impact on the subject. New ways of learning have to be invented. For example, in music, what is called sound landscapes can be an approach to produce interesting sounds and music for young students without any mastery of a musical instrument.

To sum up, ICT is not only a means to improve delivery of instruction. Its main impact is elsewhere. ICT is changing the working environment of teachers and students. Although ICT is often mostly viewed as an educational delivery technology, ICT acts as a technology that supports the work of educators and students and provides an environment allowing for new educational settings. In this context, very general questions such as ‘does ICT improve learning?’ are of limited interest and need to be replaced by more precise contextual questions.

4. National and European involvement concerning ICT evaluation

This section presents a panorama of studies concerning the evaluation of ICT in education at either a national or a European level. Two main types are considered. The first one corresponds to studies carried out by institutional

⁵ We use here ‘instrument’ rather than ‘software tool’ for two main reasons. The first is that software instruments have a dual aspect (as action agents and as perception devices); the second is linked with a psychological tradition coping with instrumented action (Rabardel, 1995).

337 initiatives (national or European) with close links to policy
338 makers. The second type consists of academic studies,
339 which generally focus on narrower issues and have fewer
340 links with decision makers. Consequently, the biases of
341 these two types of studies are not the same.

343 4.1. National evaluations

344
345 As explained in Section 2, there is a tension between the
346 national level (that prescribes curriculum and takes strategic
347 decisions) and the regional and local levels (that buy
348 computers and implement infrastructures). The ministry of
349 education administers a periodic questionnaire called *ETIC*.
350 *ETIC* is a national online application available to primary
351 and secondary schools with Internet connections. The goal
352 is to provide, twice a year (October/November and March/
353 April) statistics on ICT equipment (materials, networks,
354 Internet access, web sites, electronic addresses) and on the
355 technical staff needed to maintain and manage the school
356 network and equipment.⁶

357 The result of such studies allows for aggregated, general
358 comparisons. For example, concerning upper secondary
359 education (*lycées*), between 1997 and 2001, the ratio of
360 students per computer went down from 12:1 to 6:1 and the
361 rate of connected upper secondary schools went up from 32
362 to 100%, whereas for primary education (K-6) figures are,
363 respectively, 100:1–23:1 and from <1–50%.

364 These statistics may be interpreted in several ways: as
365 evidence of the efforts of different decision makers, as current
366 standards to achieve for regional or local policy makers, or as
367 a signal that more funds must be devoted to ICT (to insure
368 equity of access). However, they shed no light on the
369 differences between schools, which are known to be
370 significant. Furthermore, these figures say nothing about
371 actual ICT uses in classrooms. Therefore, the government
372 seeks to encourage ICT use as well as communicating
373 information about ICT in many diverse ways.

374 One intention involves communication of the following
375 messages to teachers as well as to a broader public: ICT is
376 being used more and more; teachers use ICT in very
377 interesting ways; and, ICT investments are worthwhile. A
378 second intention is to prepare for controlled innovations
379 sustained by the national administration and implemented in
380 the different regions, which might be a way to prepare for
381 future change.

382 General *inspecteurs* regularly produce reports on differ-
383 ent aspects of the educational system. Some ICT reports
384 have recently been made public.⁷ The education department
385 also has a specialized directorate (DPD, or Directorate for
386 Programs and Development⁸) that is in charge of producing

388 ⁶ <http://www.educnet.education.fr/equip/chiffres.htm>

389 ⁷ See, for example, the report of Guy Pouzard about the use of
390 multimedia in teaching practices, available at: [http://www.ac-amiens.fr/
391 college60/afrance_montataire/rapportpouzard1.html](http://www.ac-amiens.fr/college60/afrance_montataire/rapportpouzard1.html)

392 ⁸ <http://www.educatin.gouv.fr/dpd/>

393 global indicators about the system, often using surveys. The
394 integration of ICT in schools is now being seriously taken
395 into account at the national level. These initiatives and
396 reports correspond well to the international scene.

397 4.2. International and European evaluations

398
399 International studies have several important impacts.
400 One of them comes from the interest of mass media
401 (newspapers, radio, television). The idea of being late or
402 behind other countries is traditionally used in politics as an
403 argument for change. For example, recent studies from
404 OECD, the PISA 2000: assessment of reading, mathemat-
405 ical and scientific literacy,⁹ have been widely discussed. In a
406 report to the French Senate, before the publication of the
407 results of this study, it is noted that evaluation methodology
408 is far from being completely reliable, partly because of
409 linguistic biases (implied by the translation of evaluation
410 protocols), partly due to cultural biases inherent in this type
411 of study, and partly due to the geographical diversity of the
412 concerned countries. “An endeavor taking better into
413 account these factors, in the narrower context of the
414 European union, would doubtless be desirable” (Gouteyron,
415 2002, p. 175).

416 The European community occupies a very specific place
417 in the landscape of educational evaluation. Even if each
418 European Union (EU) member state keeps its prerogatives
419 in education, the activities of the European commission
420 (EC) to facilitate mobility and promote education and
421 research are driving forces. Several observatories of ICT
422 exist at the European level. For example, the European
423 experts’ network for educational technology (EENet) was
424 founded in 1997 by representatives of various organizations
425 from 12 EU member states. Its purpose is to promote an
426 exchange of experience—oriented towards educational
427 policy—with regard to new media and schools in Europe.¹⁰

428 *Eurydice* (the information network on education in
429 Europe) gives basic indicators concerning ICT in education,
430 including the number of pupils per computer, the number of
431 pupils per computer with an Internet connection, the
432 inclusion of ICT in the curriculum, the percentage of
433 teachers who use computers and/or the Internet in the
434 classroom, and so forth.¹¹

435 These studies give valuable international indicators, but
436 they introduce several problems. It is difficult to compare
437 different national situations. For example, it is stated that:
438 “National statistical data available regarding the purchase
439 and maintenance of ICT equipment, or the ICT budget are
440 hard to compare. No standardized database as yet exists”
441 (*Eurydice*, 2001b, p. vii). However, more profound
442 difficulties exist. On the one hand, single indicators such
443 as ratios are not sufficient to capture the main features of

444 ⁹ <http://www.pisa.oecd.org/>

445 ¹⁰ www.eenet.org

446 ¹¹ <http://www.eurydice.org>

449 a multifaceted situation. The reliability of the figures may
 450 also be an issue. For example, the European source
 451 *Eurydice*, on the basis of surveys made in 2001 over the
 452 telephone on the use of computer and the Internet for French
 453 primary education in November, reported an average of 14.1
 454 students per computer, compared with 23 for the national
 455 French study.

456 *Eurydice* also reports a percentage of French teachers
 457 who use a computer in the classroom to be 76% in primary
 458 education and, 52% in secondary education, and 27% in
 459 primary education and 34% in secondary education have
 460 Internet access in the classroom (*Eurydice*, 2001b). These
 461 figures do not concur with our own qualitative studies that
 462 suggest far lower rates than either source.

463 This discrepancy may be linked to several issues. The
 464 notion of regular use is in fact rather fuzzy. The samples
 465 may not be representative. Furthermore, short telephone
 466 interviews with school headmasters and teachers tend to
 467 give only surface indications. Thus, in the same study, the
 468 main reasons for not using the Internet are related to
 469 problems of access for a majority of countries. For the few
 470 countries in which access to computers or to the Internet is
 471 no longer an issue (Denmark, Finland and Sweden), the
 472 most frequently given reasons are those having to do with
 473 the lack of relevance of the Internet or the information
 474 available on it (*Eurydice*, 2001b). On the other hand,
 475 context factors allowing interpreting situations are seldom
 476 given.

477 For example, in France, new and temporary positions
 478 have recently been created in schools: *aide éducateurs*
 479 (teaching assistants). Teaching assistants have 5-year
 480 contracts (they are not civil servants and are not allowed
 481 to teach). Observations show that assistants play an
 482 important part in the use of ICT in a great number of
 483 schools, sometimes taking care of students in specialized
 484 classes, but they have little or no connection with main class
 485 work.

486 A series of research studies, aiming at getting more in
 487 depth explanations of what is going on and at obtaining
 488 elements of intelligibility of common practice, have been
 489 conducted for several years, with a prevalence of qualitative
 490 investigations. Section 5 presents some of the results of
 491 these studies.

492
 493
 494 **5. Research results**

495
 496 Researchers are involved in many different kinds of
 497 studies connected to different ICT roles in education
 498 discussed in Section 3. Traditionally, in the French context,
 499 academic disciplines play a major part and are a key
 500 dimension of secondary teachers' identity. Several research
 501 fields (called *didactiques*) expressly devote themselves to
 502 the study of the best teaching methods for a given discipline
 503 (the English 'didactics' may not reflect the full dimensions
 504 of *didactiques* and may convey an inappropriate negative

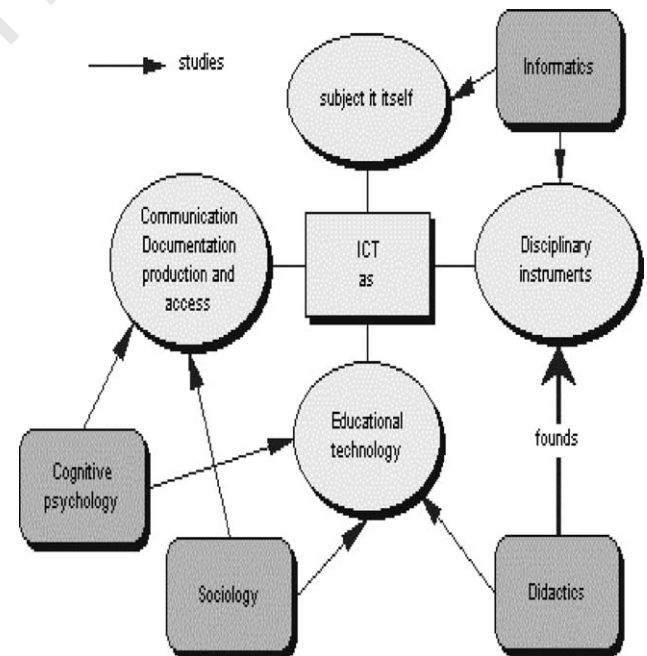
505 connotation). The orientation is somewhat different from
 506 what is called 'instructional design' in the American
 507 literature.

508 Fig. 1 associates research strands with these roles.
 509 Informatics is the main basis for ICT as a subject and for
 510 its use as disciplinary instruments.
 511

512 *5.1. Evaluation of students' learning and opinions*

513
 514 Because ICT has recently been introduced into edu-
 515 cation, only a few relatively large-scale studies have so far
 516 been carried out in the French context. For example, *Baron*
 517 *and Harrari (1995)* studied the attitudes and opinions of
 518 eighth graders concerning informatics. The subjects were
 519 divided in two groups; one ($n = 1544$) was composed of
 520 students learning in standard high schools, and the second
 521 ($n = 311$) of students attending schools that are part of the
 522 network of a national innovation project.

523 The results showed similarities in representations
 524 between the two groups (e.g. the prominence in represen-
 525 tations of external parts of computers: video display unit,
 526 keyboard, mouse, etc.), but there were also differences. The
 527 software theme was significantly more present in the
 528 experimental group. This latter group manifested a better
 529 knowledge of software tools and generally held more
 530 positive views about the utility of ICT. A series of questions
 531 were aimed at determining how students rate their own
 532 competencies regarding common information processing
 533 tasks. Interestingly, students in the experimental group did
 534 not rate themselves significantly higher. However, in
 535 contrast with the group in standard settings where a
 536 correlation existed with the possession of a personal
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 560 Fig. 1. ICT roles and related research strands.

561 computer and self-ratings, no such correlation could be
562 established in the experimental group.

563 In France, evaluation of students' learning, is mainly
564 performed by teachers within schools. Some standardized
565 national evaluations of all students are performed at the
566 *beginning* of certain grades (3, 6, 10). They mainly have a
567 diagnostic purpose for teachers and are aimed at facilitating
568 remediation. The main national examination, the *bacca-*
569 *lauréat*, comes at the end of grade 12. It is not a mere
570 certificate of secondary education but also opens a right to
571 undertake university studies (currently more than 60% pass
572 it). At the end of grade 9 there is also a certificate (*brevet des*
573 *colleges*), but a passing grade is not required to enter senior
574 secondary education. None of these examinations has the
575 form of standardized test.

576 None of these large scale surveys gives any hint about the
577 influence of using technology upon some standardized test,
578 as did Wenglinsky (2002) in the USA. Wenglinsky studied
579 the results of several thousand fourth and eight graders on
580 national assessment of educational progress (NAEP)
581 standardized tests, examining variables such as social
582 milieu, personal use of computers, classroom use of
583 computers, teacher training in ICT, and so on. Wenglinsky
584 discovered some interesting relationships. For example,
585 learning games was positively related to academic achieve-
586 ment for fourth graders; for eight graders, the use of
587 computers to teach lower-order cognitive skills was
588 negatively related with academic achievement as well as
589 with the social environment of the school. Overall,
590 Wenglinsky concluded that whether and how technology
591 made a difference in learning depended largely on how it
592 was used.

593 Cognitive psychology researchers typically construct
594 experiments in order to try to find the best among two or
595 more situations. Another classical research goal is to
596 determine what can be called a cognitively compatible
597 technology—a technology well suited to human abilities
598 that takes into account age and other factors. For example,
599 several experiments highlight the difficulty of 10 year old
600 children with non-linear texts (Rouet, 1997). A fundamental
601 problem with these studies is that laboratory results only
602 transfer with difficulty to standard school settings, where it
603 is hard to control key variables. The interest of researchers
604 in systemic analysis—that takes into account real contexts,
605 that emphasizes 'ecological' approaches, and that makes use
606 of ethnographic methods—is, therefore, generally
607 acknowledged.

609 5.2. Evaluation of learning instruments

611 ICT provides instruments, which require time for
612 appropriation and to deeply change activities. These ICT
613 instruments allow new forms of experimentation and offer
614 tools for exploration and modification of artifacts while
615 providing traces of student activities, which is most useful
616 for evaluation purposes, because they allow monitoring and

617 assessing student progress. However, student progress is
618 commonly still assessed by traditional exercises and exams
619 with routine tasks where the use of computers (and
620 sometimes even pocket calculators) is generally forbidden.
621 It is, therefore, difficult to evaluate the real educational
622 interest of ICT on the basis of these assessments. Yet,
623 studies generally describe changes happening in the nature
624 and the focus of learning activities and invite reflection
625 about new professional competences required of teachers
626 (Baron & Bruillard, 1996, 2000).

627 Two recent doctoral dissertations were devoted to in-
628 depth study of computer assisted experiments (CAEx)
629 activities at the secondary level (grade 10–12): Faure--
630 Vialle (2001) in biology, and Ayçaguer-Richoux (2000) in
631 physics. CAEx activities have been widely developed
632 according to the view that technology will support low-
633 level activities while also providing time for much high-
634 level cognitive activities. Faure-Vialle's (2001) empirical
635 study suggested that this view may not quite correspond
636 with reality. Though CAEx actually allows a new kind of
637 emphasis biological phenomena (e.g. photosynthesis,
638 breathing, and experiments impossible with classical
639 methods) the presence of a computerized device tends to
640 change the focus of lab work activities. The new focus
641 involves following software instructions and analyzing
642 quantitative data, whereas the traditional focus was on the
643 collection of qualitative data. Some students had the feeling
644 of being kept away from biological materials. Ayçaguer--
645 Richoux's (2000) work showed the importance of the
646 ingenuity needed from teachers in order to organize
647 successful computerized lab work sessions, with several
648 groups of students performing in parallel different tasks. Her
649 work also emphasized the importance of planning activities
650 needed in a field where the stability of tools is often an issue.
651 She suggested that the teachers' competencies are a critical
652 factor in the organization of students' work.

653 As far as the formal calculus systems (such as Derive,
654 Maple or Mathematica) are concerned in mathematics, the
655 history is almost the same as for CAEx. First, there were
656 initially optimistic discourses about computers performing
657 low-level calculations and allowing time for students to
658 focus on higher-level thinking. The first classroom exper-
659 iments and observations showed that many students spent a
660 lot of time in low interest and non-productive activities
661 (Artigue, 1996). Researchers also compared computer
662 activities and corresponding pen and pencil activities,
663 showing each time that the transition is not straightforward.

664 One conclusion is that it is important to engage in a
665 continuous process of educational activity design and then
666 disseminate research results so that they find their way into
667 teacher education and contribute to innovation (Jaffard,
668 Rolet, Capponi, Clarous, & Hachelouf, 1999). However, an
669 issue remains: what has to be changed in evaluation
670 procedures in order to evaluate new student activities? To
671 address this issue, the problem of researchers is not to
672 directly evaluate specific ICT software; rather, the problem

is to engage a community of researchers and practitioners in the process of creating interesting classroom situations while trying to determine whether these situations are productive in educational terms. One aim for ICT evaluation, then, is to support and advocate ideas that may lead to change and reform. A consensus seems to have been reached that technology will not by itself change educational practices and that progress cannot occur without the involvement of teachers. Thus, teachers' opinions and values become an important issue.

5.3. Teachers' opinions and culture

Surveys have been carried out to study teachers' attitudes and opinions regarding ICT. For example, Baron and Bruillard (1996, 1997) conducted a longitudinal study of pre-service teachers, between 1991 and 1996, in one IUFM. This study showed the increase of personal equipment and competence in word-processing but not in the management of spreadsheets and database systems. The study also revealed that younger teachers were not more positive toward the use of ICT in education than older teachers; however, people who have held another job before becoming a teacher were the most positive (Baron & Bruillard, 1996, 1997).

Concerning teachers, large surveys are difficult to manage. French teachers are reluctant to give their position and the return rate is often very low, introducing biases which are not always simple to identify and balance. It is difficult to conduct surveys with regular teachers.

There is, however, one segment of the teaching community that readily responds to questionnaires asking about their practices with ICT—namely, innovators. Drot-Delange (2001) analyzed the use of online forums by teachers of technology, using questionnaires and message analysis. Analyzing simple indicators (e.g. the evolution of the adoption rate of discussion lists and the number of messages exchanged), Drot-Delange showed that the Internet is a dissymmetric exchange place, with typically 80% of the messages being issued by 20% of the authors. However, the Internet nevertheless constitutes a new and powerful means of constituting a culture among teachers.

Those studies give insights into how a community of teachers can collectively learn about ICT tools and which transformations will be produced by ICT usage. Currently open questions are related to teachers' ICT competencies, to the genesis of these competencies in teacher training institutions and later during their careers, and to the construction of teachers' professional identities.

6. Concluding perspectives

We have reviewed different modes of evaluation with different intentions: diagnosis, communication and innovation. They also have different functions and uses.

Evaluation can be used as a management tool of the educational system, as a communication tool to show progress, as a design tool for educational situations including ICT instruments, or as a tool of self-representation for the members of a group. The evaluation of ICT projects (managing and evaluating educational technology initiatives) is certainly a difficult task. Nash, Plugge, and Eurelings (2001) identify several classical misconceptions in evaluating projects: (a) there is not a common goal among the actors; (b) there is not a common problem; (c) there is a tendency towards simplicity; and, (d) there is a tendency to overlook the usefulness of traditional research paradigms.

In this respect, according to Denis Meuret, France has a unique perspective: "French policy makers have chosen an original regulation process based more upon exhortation than upon sanction or reward, more upon processes than upon objectives, more upon actors than upon users".¹² The system is regulated by ethical injunctions. Therefore, values, beliefs, practices and opinions put forth by teacher communities become essential in the planning process of how to use ICT. In this perspective, it is not questions with yes/no answers or quantitative measures that are at stake. Rather, the interesting questions are how-to questions: how to create interesting scenarios? how to integrate ICT into the curriculum of different subject matter? how to identify useful practices and approaches?, and so on.

In this context, both quantitative and qualitative methods are in order. Quantitative indicators can provide a general overview of a system but more qualitative data are needed to interpret what is happening in specific, real-life situations. Nevertheless, whatever type of research may be carried out, it will have to take into account cultural and international considerations (Baron, Bruillard, & McNergney, 2001).

A last issue deserves mention. We are experiencing an apparently overwhelming trend towards globalization and liberalism, with a growing focus on accountability. In countries like France, the educational system has mainly had for more than a century an obligation to *serve every child*. Now, there is a change of perspective with the growing idea that the system has *an obligation to produce results*. The modes of evaluation needed to achieve this new goal are not yet defined. Changes are slowly occurring. Technology may be a means to develop these two forms of evaluation: (1) evaluation for training and forecasting, and, (2) evaluation for advocating and facilitating change.

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