ANALYSIS GRID FOR AN IT-BASED LEARNING ACTIVITY

A researcher who lands in a professional community interested in research results may seem like a lawyer arriving in court, with confidence in, and full knowledge of, her or his dossiers. Both researcher and lawyer arrive wheeling in their briefcases filled with documents to support their conclusions and to help in responding to any objections. But a professional community is not a courtroom: it does not call upon a specialist to deliberate on methodological questions; the community invites the specialist so that it can benefit from the light she or he can shed, and thus guide the actions of its members as quickly as possible.

For the past few years, this has been the spirit governing a collaboration between, on one hand, Christian Barrette, ARC (Association pour la recherche au collégial) project manager heading up the metaresearch on the conditions needed for the successful integration of IT into pedagogy – the theme of this thematic dossier – and, on the other hand, the educational advisors responsible for CEGEPs' integration of IT, who are members of the Réseau des répondantes et répondants TIC (Réseau REPTIC).

To meet the needs expressed by these educational advisors, an analysis grid was created for use in their work with teachers to improve CEGEP student achievement. This instrument can be used by anyone looking for an easy way to evaluate whether, based on the findings of the metaresearch, a learning activity making use of IT is optimal. The objective of this article is to introduce the grid and to provide directions and suggestions for making it user-friendly.

AN ANALYSIS GRID: *WHO* FOR? *WHAT* FOR?

The analysis grid is intended first and foremost for teachers and educational advisors looking for an easy way to check whether a learning activity making use of IT reflects the best possible conditions, based on the results of the metaresearch.

For this reason, the grid consists of a questionnaire that can easily and quickly be filled in by both teachers (whether individually or in small groups) and educational advisors (whether responsible for IT or not). It presents a series of statements requiring responses on a graduated scale; an overall score is then calculated based on the responses. The score[1] is an indication of how and to what extent the learning activity incorporates IT. The effectiveness of the learning activity is weighted by the number of "Don't know" responses, which indicate aspects of the activity that remain to be determined and choices that have yet to be made. Thus, responding to the statements in the grid corresponds to applying to a specific experimental pedagogical case each of the principles presented in the Christian Barrette article in this thematic dossier (see "A Voyage to the Realm of IT").

The grid can also be used as a tool for reflection, in Schön's sense (1993). It allows for evaluating five subjects connected to teaching practice and invites respondents to reflect on their answers, position themselves in relation to the statements presented, and define their methods and choices. If respondents answer the questionnaire for the sole purpose of checking their scores, they will miss out on an opportunity for enrichment, that of reviewing their professional choices and linking them to their own conceptions of learning and technology. But if use of the grid opens up discussion of one's teaching-and-learning strategies, one can take a stance on methods promoting content transmission, students' individual management of their learning, and cooperative learning. Finally, the grid can be used by educational advisors as an animation and exploration tool when working with teachers. For example, at the time of implementation of an IT integration plan, it presents exceptional potential for motivating discussion among colleagues in the same department. Its use also helps educational advisors discover and promote teaching-and-learning practices that make use of technologies to their full potential.

The printable version of this instrument is reproduced here as it originally appeared in French in an issue of the newsletter *Clic* (Barrette 2009). To facilitate calculating the overall score, Nicole Perreault, the REPTIC network coordinator, arranged for a member of the REPTIC community to convert the instrument into a dynamic Web page which can now be found among the documents available to all on the REPTIC Web site.[2]

[1] This score serves as an indicator. However, it has not been validated by means of a retrospective evaluation of a large number of activity plans, nor has the relative strength of the various determinants reflected in the questionnaire been established yet. It is possible that the weight of some determinants is more important than others in calculating the effectiveness score for an IT-based activity plan, but so far we do not have research data allowing this to be determined.

[2] REPTIC Web site. n.d. [http://www.reptic.qc.ca/grille/] (accessed April 20, 2012).

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ANALYSIS GRID FOR IT-BASED EDUCATIONAL ACTIVITIES

Conditions and statements	Don't know	Not at all	Very little	A little	A lot
1. Teachers are motivated by the activity.					
a. They perceive or anticipate benefits for their student:					
• They expect to see better academic results	-	0	1	2	3
• They expect to see better academic motivation	-	0	1	2	3
• They expect to see more in-depth learning	-	0	1	2	3
b. They perceive or anticipate benefits for their workload	-	0	1	2	3
c. They perceive or anticipate that they will be capable of learning to make effective use of techno-pedagogical tools (technology-based devices used in teaching)	-	0	1	2	3
2. The activity scenario is characterized by finely-tuned coordination between the teaching methods used and the objectives pursued.					
a. The objectives of the scripted activity are consistent with the course objectives	-	0	1	2	3
b. The objectives of the scripted activity are consistent with the program objectives	-	0	1	2	3
c. The teaching methods used are appropriate for the objectives of the activity	-	0	1	2	3
d. The methods and focuses of evaluation are helpful in verifying whether the objectives of the activity have been attained	-	0	1	2	3
3. The teaching methods used in the scripted activity focus mainly on...					
A. The transmission of content by assigning a reactive role to the student and assigning to the teacher the role of instructor, of specialist in the subject-matter					
B. Conscious proficiency in cognitive skills by assigning a proactive role to the student and assigning to the teacher the role of facilitator					
C. The co-construction of socially meaningful knowledge by assigning an interactive role to the student and assigning to the teacher the role of moderator.					
As you chose A, answer the questions below...					
a. Techno-pedagogical tools lead to performance learning or facilitate training, the way educational games or drills can do	-	0	1	2	3
b. Techno-pedagogical tools have characteristics that stimulate motivation in students • Techno-pedagogical tools are differentiated and adaptive, so that they allow individual students to progress at their own rate, offering both challenges and successes at the same time	-	0	1	2	3
c. Techno-pedagogical tools are used mainly on an individual basis in the classroom or lab	-	0	1	2	3

Conditions and statements	Don't know	Not at all	Very little	A little	A lot
As you chose B, answer the questions below...					
a. Techno-pedagogical tools call on the students to use meta-cognition, to reflect on their learning strategies and methods, the way tutorials or intelligent simulators that provide feedback can do	-	0	1	2	3
b. Techno-pedagogical tools are used primarily on an individual basis in the classroom or lab, but outside these settings as well	-	0	1	2	3
As you chose C, answer the questions below...					
a. Techno-pedagogical tools support collaborative learning, the way virtual training environments can do	-	0	1	2	3
• The teaching methods used are in keeping with a project-based approach or a problem-based approach	-	0	1	2	3
b. Techno-pedagogical tools provide access to outside resources and people (experts, mentors)	-	0	1	2	3
c. Techno-pedagogical tools are used to extend group activities outside the classroom or lab	-	0	1	2	3
4. The organizational conditions are favourable to the unfolding of the activity.					
a. The institution where the activity takes place has a plan for integrating IT into teaching	-	0	1	2	3
b. The institution assigns someone the role of techno-pedagogical consultant for a significant portion of that person's workload	-	0	1	2	3
c. The hardware and software used are appropriate for the techno-pedagogical tools used in the activity	-	0	1	2	3
d. Users (teachers and students) have a sufficient level of competence or skill so that they can benefit from the techno-pedagogical tools used in the activity	-	0	1	2	3
• If the need arises, training in how to use the devices is provided	-	0	1	2	3
e. Users (teachers and students) have access to support for technology-based teaching	-	0	1	2	3
f. If teachers are not very familiar with the teaching methods involved in the scenario, they benefit from pedagogical support	-	0	1	2	3
5. The techno-pedagogical tools used in the activity help reduce sociocultural differences (sex, social class, ethno-cultural status) among those who use them.					
a. The activity proposes responsible civic use of the technologies	-	0	1	2	3
b. The activity helps bridge the gap between students' and teachers ability to use the technologies	-	0	1	2	3

ADAPTING THE GRID TO DIVERSE PEDAGOGICAL APPROACHES

The statements in the instrument attempt to reflect as concretely as possible the principles emerging from the meta-research. For example, the idea behind questions 3, 4 and 5 is that, at the heart of every learning activity, there exists an optimal match between IT media and various aspects of the teaching-and-learning strategies used. The statements in the questions present these aspects through the roles played by students (reactive, proactive, interactive) and teachers (purveyor of knowledge, facilitator, moderator) as part of a learning activity. Our typology of roles, or models of behaviour, is based on the work of Marcel Lebrun (2007) for roles



played by students, and Guy Archambault (Raymond 2006, 101-104) for roles played by teachers. In an article published in *Clic*, Barrette (2009) describes these roles in detail. We will review them here briefly, focusing on the correspondence between them.

- A teacher who plays the role of *purveyor of knowledge* will elicit *reactive* participation from students. Knowledge-purveyor teachers can be identified by their content mastery and by teaching-and-learning strategies that present this mastery and set up activities designed to transmit it to their students. The students find themselves in an environment created and controlled by their teacher; they react to the teacher's planned stimuli and are assessed based on their degree of conformity with the ideal behavioural model defined by the teacher.

This instrument can be used by anyone looking for an easy way to evaluate whether, based on the findings of the metaresearch, a learning activity making use of IT is optimal.

- Another type of teacher plays the role of *facilitator*, inviting students to take charge of a process for taking ownership of knowledge in which metacognition plays a significant part. The learning environment set up by these teachers is open and the teacher sets specific goals to be met and presents resources for achieving them. However, students are *proactive* in working out a well thought-out personal strategy for meeting the targeted goals. Their assessments will take into account both the strategies they have developed and the results they obtain.
- Last, there are *moderator* teachers, who can be identified by their discreet yet expert approach, which calls on students to work in teams and to connect with the non-academic world, in order to reach well-defined objectives in an original way. This type of teacher's students, constantly *interacting* with each other, define both the strategy and the resources required for meeting the targeted goals. Students' assessments will deal just as much with the processes for knowledge acquisition and human interaction the students have employed as with the results obtained.

Table 1 presents an overview of this optimal role match-up between key players, IT and pedagogical strategies.

TABLE 1 - OPTIMAL MATCH-UP OF IT MEDIA WITH THE VARIOUS ASPECTS OF DIVERSE PEDAGOGICAL STRATEGIES

Students' Roles and Cognitive Operations according to Lebrun	Teachers' Roles according to Archambault	Typical IT-based Media	Activation Modes and Locations	Predominant Pedagogical Approach
Reactive Inferring and memorizing performances	Purveyor of knowledge	Differentiated and adaptive teaching software for repetitive exercises, such as educational software	Individual; mainly in class or the lab	Behaviourism
Proactive Metacognition about development of individual competencies	Facilitator	Tutorials Exercises with feedback	Individual; in class, in the lab or elsewhere	Cognitivism and constructivism
Interactive Coconstruction and development of collective competencies	Moderator	Virtual learning educational environments and digital learning environments	Active communities: mainly outside both the classroom and the lab	Socioconstructivism

EXAMPLES OF USE AND FUTURE PERSPECTIVES

The objective of making accessible the results of the metaresearch on integrating IT at college level would not be fully achieved without a report on the work done in connection with this grid, whether already completed, underway or still to come. To date, the grid has been used for:

- ***retrospective*** **analysis of pedagogical situations, such as those reported on in the narratives at the *SavoirFaireTIC* Web site[3];**
- ***a priori*** **analysis of pedagogical situations as part of a master's degree program offered to CEGEP teachers by PERFORMA[4];**
- **semi-directed interviews with teachers in the process of conducting experiments, or with completed experiments behind them, on incorporating IT into teaching and learning.**

Additionally, several years ago, a REPTIC work group began the process of defining both the contents and the implementation strategy for an institutional plan for integrating IT. This committee's report Web site (Bilodeau, de Ladurantaye and Martel 2007), entitled *La conception d'un modèle de plan d'intégration des TIC au réseau collégial*, contains a section which proposes a pedagogical design for integrating IT into the teaching process. This section also suggests tools for reviewing and analyzing in depth the objectives and standards (OS) for better integration of IT into teaching practice. However, despite the relevance of the tools and procedures suggested for implementing quality education, nothing on the Web site for the IT integration plan deals with an examination of the pedagogical activities used by teachers. The analysis grid emerging from ARC's metaresearch corrects this absence, and now provides teachers with the opportunity to reflect on their practice, whether on their own, with colleagues or with an educational advisor, using an instrument with real heuristic value.

Furthermore, use of this instrument will promote continuation of the study begun by ARC. At present, the grid only reflects the dimensions and variables brought to light by the metaresearch data.

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Studies and experiments conducted over the next few years may lead to a better estimate of the relative significance of the various determinants reflected in the questionnaire. They will also add new data, which will provide novel principles to take into consideration in carrying out an effective integration of IT into teaching and learning.

EXAMPLE OF AN ALIGNMENT BETWEEN RESEARCH AND PRACTICE

Beyond the results of the metaresearch itself and the form the analysis grid will ultimately take, the process of creating and taking ownership of the instrument that we hoped to achieve appears to be especially rich with lessons linked to the position presented in 2006 by the Conseil supérieur de l'éducation, namely the importance of working on a better alignment between educational research and practice. The Conseil deemed it necessary to revisit the linear model of knowledge transfer and work toward processes focusing on, among other things, popularization, monitoring, networking between researchers and practitioners, and the setting up of systems for transfer.

The analysis grid for IT-based learning activities for improving student achievement is a productive and practical outcome of ARC's metaresearch. It can make educational advisors' and teachers' professional activities easier at the time of diagnosis or prognosis for a given learning activity plan. However, the analysis grid is not an end point; rather, it serves as the first stage in a process of professional research and reflection on the conditions for effectiveness in incorporating IT into teaching and learning.

In short, far from the image of a courtroom where lawyers face off before judge and jury in their search for the truth, the space for reflecting on and strengthening professional practice is more like a Greek agora, where each individual is encouraged to express and construct their vision of reality. This is just as true for those who produce expert knowledge, i.e., researchers, as it is for those who receive it – all too often in a superficial and passive manner.

In that perspective, the process undertaken by REPTICs for taking ownership of the results of the metaresearch brings to mind the paradigm shift in education: from teaching to learning and from transmission to coconstruction.

[3] This site is now discontinued.

[4] Stratégies pédagogiques et TIC (TIC803), Université de Sherbrooke.



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