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Didactics and ATD

E-learning is a somewhat ill-defined concept, but it is a fruitful one, insofar as it allows or even compels one to reconsider one's own views about more traditional ways of teaching and learning. Despite the title of this paper, let's make it clear from the start that we shall not indulge in comparing meticulously two hypostatized entities, "traditional" versus, say, "electronic" teaching and learning. In what ways can e-learning be regarded as a touchstone will become evident in what follows. On the other hand, we shall stick to what has come to be known, in many countries, as the *anthropological theory of the didactic* (ATD), a theory upon which we shall draw heavily in the sequel. (To go beyond what we shall make explicit hereunder on ATD, we refer the interested reader to, for example, Chevallard, 2007.) ATD defines didactics as the (incipient) science whose object is the structure and dynamics of the more or less fuzzy set of conditions and constraints that determine the controlled diffusion of knowledge and skills in society. (In this respect, ATD appears as a development program for didactics: although there can be different routes to the same state, it proposes itself as a freeway to a full-fledged scientific field in education.) A word of comment is in order here on the concurrent use of the closely related notions of "condition" and "constraint": both are to be construed as determining factors of diffusion (and of retention, seen as a limiting case of diffusion) of knowledge; but while conditions are supposed to be adjustable (they lay within the reach of the development team, a notion to which we shall return), constraints are limiting factors presumed to remain unchanged (and out of reach) under present circumstances, even though circumstances may vary in a distant future.

Didactic Organizations and Didactic Systems

The notion on which this presentation really centers is that of a *didactic organization* (DO), a notion that subsumes all the features of whatever learning or teaching scheme one might think of, be it fashionable or obsolete. A didactic organization cannot exist unless some set of

learning objectives has been determined; in ATD's parlance, these objectives constitute the *didactic stakes* on which the whole DO hinges. To make a long story short, we shall accept here the view that any didactic stake can be translated into some *question Q* to which an *answer A* has to be brought, a pursuit that the didactic organization is supposed to ensure. Although a DO has indeed a multilayered structure – essentially, it is made up of a "school" layer, a pedagogical layer, and a (purely) didactic layer –, we shall not distinguish them here, applying indifferently the adjective "didactic" to any of these layers. With this in mind, one can say that a DO should guide the makeup and functioning of a *didactic system* (DS) – another keyword of didactics. A DS is made up of three main entities. The first one will be denoted by *X* and called the *community of study*, or community of *students*, that is the "learning community", which, for that matter, is seen as a community of "peers". The second one is denoted by *Y*: it is the set of "study aides" —including the "teacher", or "instructor", or "trainer", or "tutor", or what have it— who officially engage in helping *X* to study question *Q* in order for *X* to build up some (valid) answer *A* to question *Q*. In some DOs, members of *Y* may *direct* the study process, as any teacher is used to do, which is a most traditional way of "helping" students. The corresponding DS can be denoted by $S(X;Y;Q)$, while the *outcome* of the whole study process is summed up by the "formula" $S(X;Y;Q) \rightarrow A$. Now, any DO must attend to a number of crucial issues, as for example turning a set of individuals, be they would-be "students" or potential "study aides", into a community *X* and a teaching team *Y*, two challenges in their own right. How can a DO, one must ask then, solve this problem? As concerns *X*, for instance, there exist traditional classroom solutions which consist essentially in having people gather in a "classroom" under the lead of a teacher or instructor and be made into a group through continuing, daily classwork. About the same trick can be applied to the building-up of *Y*, although traditional usage is simply to let *Y* be a singleton—"the" teacher—, a manoeuver which reduces the problem to nought. Such "solutions" have come to look natural to most of us, unless face-to-face teaching—sometimes called "presential teaching" in the international literature on the subject—was ruled out by some peculiar, compelling situation, thereby giving rise, in a case of force majeure, to "distance teaching" seen then as a makeshift.

From distance education to e-education to "new" education

At this point, it is necessary to clarify one important point of terminology. As anyone knows, distance teaching (or education) existed well before the Internet was born—it should be enough, in this respect, to mention Descartes' "snail mail" correspondence with Princess

Elizabeth of Bohemia. But e-learning has rejuvenated distance education by providing scores of fresh tools to a job that, until not long ago, looked didactically depressed. Distance education has thus entered a second life, in which snail mail education gives way to e-education. Now it will be our main contention that the many solutions recently brought to old-fashioned distance learning by e-technology give rise to a tremendous opportunity for unprecedented development—through the definition and diffusion of "hybrid" or "blended" DOs—, not only of distance learning, but also of the existing face-to-face, traditional ways of studying. Provisionally, in this paper, we dub "new didactics" the field of study devoted—within the framework of ATD—to "new education", that is to the panoply of actual or as yet potential "hybrid" DOs thus marked off. New didactics thus essentially boils down to exploring—both theoretically and empirically—new didactic organizations resulting from the changes e-technology enables us to bring to plain, unadorned didactic organizations.

The didactic hyperspace: its multifarious resources and unexpected pitfalls

Probably the main *new* concept of "new didactics" is the notion of *didactic hyperspace*. In traditional teaching organizations, one can distinguish the *principal* didactic system (PDS), in which the whole community X meets at regular intervals in order for everyone to find one's bearings, from *auxiliary* didactic systems (ADS), in which the class is usually divided into smaller groups, as happens in homework, tutored group work, lab sessions, etc. By contrast, in new education, for any given didactic system, one can think of a multitude of types of sessions, made possible by the embedding of traditional didactic space in what will be aptly called a didactic *hyperspace*, that is, a space having *more "dimensions"* than the traditional didactic space. (The name "hyperspace" draws on a mathematical metaphor, exactly as Ted Nelson did when, back in the 1960's, he coined the word "hypertext" to label a "higher-dimensional" text.) Considered in the vaster hyperspace brought about by e-devices, any didactic organization, supposed (often implicitly) to be optimal (or close to an optimum) with respect to traditional didactic space, *will no longer be so*—it becomes suddenly sub-optimal. Ways to upgrade it, at least slightly, never fail to come to mind readily, like having students e-mail their homework assignments to the teacher before some prescribed deadline, to quote just a *minor* example. In keeping with the standards of didactic engineering, the design of "new", that is "mixed", DOs is here supposed to rest on a development team T which should at least include a specialist in didactic engineering and a technology expert, and whose intersection with Y is usually non-empty (the teacher or instructor generally belongs to T). Now, although the aim of T is to create *more optimal* DOs, it does happen that changing a

timeworn DO into a brand-new one sometimes moves it farther away from the optimum. It may be, for instance, that the teachers' commitment to their role declines, because they have interiorized the belief in the erroneously supposed quasi-autonomous functioning of digital technology in education. The didactic hyperspace abounds in potential "new" solutions to the fundamental issues of education that remain to be ascertained. In this respect, "new" education (as we term it here) is the new frontier of education; and "new" didactics is a field of endeavor open to new scientific and engineering energies. But care should be taken not to fall into the next trap.

The problem with e-tools

It is sound to remember that "new" education is in beta-testing—or maybe alpha? One of the main problems teaching institutions meet in this respect relates to the gamut of available e-tools and their broad range of complexity of use. To take just one example, in its "25 Tools Programme", *The Centre for Learning & Performance Technologies* Web site puts forward the following list of 25 e-tools: 1) Web browser; 2) Email tool; 3) Instant messenger; 4) Social bookmarking tool; 5) RSS reader; 6) Real-time messaging tool; 7) Online Calendar; 8) Office suite; 9) Mind mapping tool; 10) Start page tool; 11) Blogging tool; 12) Web authoring tool; 13) Wiki tool; 14) Photo hosting and sharing tool; 15) Presentation hosting and sharing tool; 16) Video hosting and sharing tool; 17) Collaborative presentation tool; 18) Podcasting tool; 19) Screen capture/casting tool; 20) Polling and survey tool; 21) Web meeting tool; 22) Live broadcasting tool; 23) Social networking tool; 24) Course authoring tool; 25) Course management tool. A small number of remarks are in order here. Firstly, it is striking that most if not all of these tools are *not* specific to education, and that their relevant *didactic* uses remain to be conquered. Secondly, it is very likely that many people in the field of education will not make sense of each and every item on the list: "new" education is really new (see also Neidorf, 2006, chap. 1). Thirdly, as concerns functionalities, there is some overlapping between all these tools: for example, forum discussion tools, which often showed up in the literature on e-learning at the turn of the twenty-first century, have been since then subsumed within tools like course management systems (CMS) or learning platforms. Fourthly, if all members of *T*, *Y*, and *X* must have some working mastery of these and other tools, the right knowledge of them will depend on whether they act as developpers (*T*), "study aides" (*Y*) or students (*X*). This indeed is a crucial point. Beyond the "material" organization, which is first and foremost the development team's responsability, the proper functioning of any didactic organization requires the "enactment" of some sort of *contract*, that will make

clear what the distinct roles connected to the DO are, and that regulates the doings of every kind of "participants" to it. Now, observance of this contract entails a shared world of meanings and a collective (though differentiated) mastery of the devices on which the DO draws. In too many cases, it seems, insufficient care is given to this problem, which can be conducive, to say the least, to confusion on the part of the students, for instance. One formerly "traditional" instructor, so the story goes (Ko & Rossen, 2000), had simply added in his course syllabus for some academic year the words "This course is delivered completely online." But the syllabus still referred to "class sessions", to take place once a week. While some students conjectured this alluded to real-time chat, others made sense of it by believing that "their asynchronous communications should be posted only once a week, on the particular day named in the schedule." But the real problem, from a didactic point of view, is all the other way round (Nichols, 2003).

Didactic (hyper)time

It is a common problem of education (and maybe of human activity in general) that structure is often given precedence over functions: e-tools come first, while the consideration of didactic (functional) needs lag behind and often comes too late. Much to the contrary, a sound view of didactic engineering calls for the reverse: didactic *functions*, not structures, must be considered first. Indeed, this always happens in some measure, but implicitly—and not always for the better. In fact, most designers of e-tools, who are high-tech people, usually are (unconsciously) stark traditionalists when it comes to the didactic world, so that many available products covertly and naively lend support to antiquated views about course-based learning. The main problem then is no longer to list the possible uses of a given e-tool, but to determine *how* a given didactic function can be ensured by resorting to a given (although extensible) panoply of tools. In passing from the "traditional" toolset to e-tools, some didactic features may be blurred, or even more deeply altered; but there are didactic *invariants*, and these should be prioritized. The first main didactic function that we tackle here is that of *didactic time*. Any DO, as designed by T, must allow Y and X jointly to generate didactic time. Didactic time is a segmentary—not continuous—time, made up of (oriented) "segments" or pieces of knowledge that are usually marked out by Y—the teacher, in classical DOs—for study by X. Depending on the concrete study process that will take place, a didactic segment can be divided into many "subsegments". But a standard segment of didactic time begins—in the didactic paradigm we adopt here—with a question Q, or more precisely with that *didactic moment* in which X encounters some new question Q, then recognized by Y as a question

whose study will be devolved on *X*. Such a symbolic and substantial enactment originates new progress in didactic time. While the initial endpoint of a didactic segment consists in a question *Q* (or rather its devolution on *X*), its terminal endpoint coincides with an answer *A*, or more precisely with that didactic moment in which the answer worked out by *X* under the supervision of *Y* is duly *institutionalized*, i.e. made officially into a part of *X*'s knowledge. The march of didactic time thus provides the study process with its essential framework: didactic time is didactic history reduced to its basic constituents. Now the big problem that arises is this: in traditional teaching, both the devolution of *Q* and the recognition and institutionalization of *A* are face-to-face events; how can that be achieved differently, taking advantage of the potential of didactic hyperspace? Many answers may come to mind, for example answers that do not yield to the tyranny of being there physically: one can think of a (synchronous) half-hour Web conference to assign *X* work that will lead them to encounter question *Q*, followed some time later by an online (asynchronous) synthesis "session", using a Web forum on which contributions from students (or teams of students) will be posted, in order that a synthesis circumscribing question *Q* might soon be established. For lack of space, we shall not delve any longer into the detail of this process. However, it is of utmost importance to emphasize that didactic time is thus reduced to a small number of (synchronous or asynchronous) "gatherings", which fix the collective pace of study, while all the clock's time left (in the preceding example, the time elapsed between the Web conference and the Web forum deadline) can be freely allotted to self-paced study (which, in this particular case, has to open the way to the collective formulation of question *Q*). The structure of didactic hyperspace transmutes didactic time into a somewhat more complex notion, which can be termed didactic *hypertime*. Mastery of didactic hypertime is one fundamental aspect of mastery over didactic hyperspace.

Didactic ambiguities in e-learning

Much more remains to say about the didactic process and how it can draw on the resources of didactic hyperspace. Beyond the so-called *chronogenesis* of *X*'s newly shared knowledge (which correlates with the flow of didactic time), two major features organize study. The first one, the so-called *topogenesis*, has already been touched upon implicitly: at any point in time, both *Y* and *X* must know what they have to do *next*. They must understand what their part is, what their role is made of; in other words, they must know what their "place" is—Greek *tópos* meant "place." The answer given to this issue will draw a sharp dividing line between competing didactic paradigms. Some course management systems seem to be—at least

unintentionally—conservative and to suit surreptitiously old-fashioned teaching and learning styles. This shift toward the past can be described in terms of topogenesis, using the "variables" T, Y, and X. In most course packages, every detail seems to have been decided upon by T—by the "instructional designer", or the "topic expert", or even the software developer, notably—with almost nothing left to Y to determine. Such a "teacher-proof" course would make Y into a (collective) underling. But one must go further in this respect: in classical teaching, it is even more usually the case that every detail of a learning "program" is fixed by Y, with little or no place left to X's initiative. In the following, we adopt a quite different view, for which we need to supplement the formula $S(X;Y;Q) \rightarrow A$ to arrive at this: $[S(X;Y;Q) \rightarrow M] \rightarrow A$. Here, M denotes the didactic "milieu", i.e. the set of resources to be used to "develop" answer A. In the most traditional teaching styles, A is brought ready-made before X by the teacher, so that the problem of M can be altogether ignored. By contrast, in the didactic problematic we refer to here, the elements in the milieu M have to be selected and arranged to serve as the tools and materials needed to "erect" A. In classical teaching, *mesogenesis*—Greek *mesos* meant "middle"—could rest on Y entirely, so that Y used to provide M ready-made to X. In contradistinction, we shall advocate yet another step forward to give X a larger *topos*, according to which students will play a central role in the construction of both M and A. The DO set up to get $S(X;Y;Q)$ working must therefore allow X to carry out, under Y's supervision, this crucial didactic function. In this perspective, it now transpires that the list of e-tools given above, which is typical of current literature on e-elearning, fails to include one major category of learning tools—Web search tools, and notably search engines, which in our view should be part and parcel of a reasonable e-equipment. Let us conclude by asserting unequivocally that one cannot earnestly assess any e-tool without referring explicitly to some definite didactic model, in order to raise didactically relevant questions about its potential functionality and usefulness as an organizational ingredient.

The world around e-learning

Many more aspects would be worthy of careful consideration. Stress has thus been put on the role played by apparent trifles in the success or failure of a determined e-DO. For instance, one author (Wymer, 2006) narrates how her efforts to use instant messaging (IM) to better comunicate with her students—who found e-mail "dinosaur-ish"—rapidly proved unfruitful, because these students still regarded IM as pertaining to youth culture and therefore as inappropriate for academic communication. In the opposite direction, another author (Young,

2008) emphasizes the relevancy of microblogging, that is sending very short notes (up to 140 characters) to a whole class of students. Referring to an assistant professor of emerging media and communication's experience, Young states that, in this case, "the immediacy of the messages helped the students feel more like a community." Although these facts cannot be ignored, they are but circumstantial expressions of otherwise permanent cultural traits—youth's defensive attitude towards the world of adults, on the one hand, and taste for novelty, on the other. Some other facts, which are less conspicuous, have more far-reaching consequences. School is still predominantly a world of orality, i.e. a world in which writing only *complements* speech, by providing *aide-mémoires*—"memory aids"—, memorandums, reminders, and records of live utterances (Ong, 1982, p. 84). The written word is thus a secondary character lending support to the real protagonist of the play, the sounded word. Now, notwithstanding the indisputable remark that "the electronic medium is neither exactly like speech nor exactly like writing" (Crystal, 2006, chap. 24), the e-world has inevitably shifted the ordinary oral culture towards some form of *written* communication—even if Carl Carlson, the fictional character in the animated television series *The Simpsons*, could still define an e-mail as "a quiet phone call". The point is that, save for a minority, teachers were never fully "men of letters"—they are *lectores*, not *auctores*, "lecturers", not "authors". But personal writing is a necessity of sound e-teaching; and this may repel many a traditional teacher or instructor from coming to grips with e-tools. On this point, some form of silent, cultural revolution is still pending.

References

Centre for Learning & Performance Technologies. *Short Course Unit. 25 Tools Programme*. Retrieved May 30, 2008, from http://c4lpt.co.uk/25Tools/Tools/about.html

Chevallard, Y. (2007). Readjusting Didactics to a Changing Epistemology. *European Educational Research Journal*, *6*(2), 9-27.

Crystal, A. (2006). *How language works*. London: Penguin Books.

Ko, S., & Rossen, S. (2001). *Teaching Online: A Practical Guide*. Boston: Houghton Mifflin. Chapter 4 retrieved May 30, 2008, from
http://college.hmco.com/instructors/ins_teachtech_foundations_teachonline_practguide.html

Neidorf, R. (2006). *Teach beyond your reach*. Medford, NJ: Information Today.

Nichols, M. (2003). A Theory for eLearning. *Journal of Educational Technology & Society*, 6(2), 1-10. Retrieved May 30, 2008, from http://www.ifets.info/journals/6_2/1.pdf

Ong, W.J. (1982). *Orality and literacy. The technologizing of the word*. London and New York: Methuen.

Wymer, K. (2006), The Professor as Instant Messenger. *The Chronicle of Higher Education*. Retrieved May 30, 2008, from http://chronicle.com/jobs/2006/02/2006020701c.htm

Young, J.R. (2008). Forget E-Mail: New Messaging Service Has Students and Professors Atwitter. *The Chronicle of Higher Education*, *54*(25), p. A15. Retrieved May 30, 2008, from http://chronicle.com/free/v54/i25/25a01501.htm