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ABSTRACT

Twenty-three novice and 23 expert teachers were interviewed on their processing knowledge in relation to time and use of time. Three epistemological attitudes regarding time were used as categories for the analysis of the interviews: (1) time can be influenced; (2) time can be seen as a problem; and (3) time can modify teaching plans. When time is influenced, the teacher acts upon it; when time becomes a problem or when it modifies the teaching plan, the teacher passively submits to time. Analysis of the interviews indicates that the teacher's attitude toward time seems to vary according to individual profiles without being necessarily connected to experience or professional competency. However, the expert teacher was found to have greater facility in managing instructional time. In other words, expert teachers have a greater ability to improvise, modify the teaching plan, and use different rhythms as needed. Submission to time remains the most important feature for both novice and expert teachers. This finding indicates that set curricula and programs assume too much importance and are not based on teacher input about what can and cannot be accomplished in a given amount of time. Instructional design has forgotten the language of practice. Excerpts from some interviews are included. (AMH)

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Novice/Expert Teachers' Time Epistemology

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KEY WORDS : time, epistemology, expert/novice, didactics, pedagogy, teacher thinking.

ABSTRACT

This inquiry compares 23 novice and 23 expert teachers on their processing knowledge. Time, for a teacher, seems to have two dimensions. Knowledge of content appears to be evolutionary (or diachronic) because it is always anticipating the actual time of interaction. Didactics organizes contents in an ideal, decontextualized representation of possible situations. But pedagogy is instantaneous, it deals with the immediacy of interactions, and experts have some pragmatic implicit knowledge allowing improvisation. Their time involves more space.

This article presents didactics from the viewpoint of its epistemological foundations, that is meaning organization in the course of time. The article stands in line with research on teacher's processing knowledge[1], and continues the work of Gillet (1987) in search of a better definition of the "didactic" and "pedagogic" poles. It uses semiotic tools of analysis developed by de Saussure (1913), known as synchrony and diachrony. Diachrony relates to evolution in the course of time; synchrony refers to present immediacy, or a state of the system. These tools are quite accurate as regard to teaching for they differenciate two dimensions of practice improvisation.

In this context, I shall define didactics as the organization of subject-matter knowledge through time as a preactive or postactive anticipation (before or after the classroom interaction synchrony), whereas pedagogy stems from the interactive management of time devoted to the school subjects. Didactics and pedagogy constitute what Leinhardt (1986) has called the teacher's "double agenda": the former deals with content processing which implies a representational time while the latter is concerned with students relationships to knowledge and behavioral actualization of teaching, allowing the assimilation of these contents within real time.

Didactic transposition: First axiom of the double agenda

Didactics, in its role of long and mid term planning, has been dealt with for decades by numerous theorists in an attempt to codify the time granted to school contents. Its processing generalizes teaching situations to a simpler view of classroom management, through heuristics. Heuristics are abstract procedures which reduce the complexity of synchronic interactions (Tversky and Kahneman, 1974).

As far as I know, the concept of a "didactic transposition" has been brought to light by Verret (1975). For this author, scolarization implies 1) a negation and a reduction of research complexity (what he calls a "knowledge desyncretisation"); 2) a generalization of knowledge which itself cuts the knower from knowledge (what he calls a "knowledge depersonalization");

[1] Cf. Clark & Peterson (1986), Charlier (1986), Charlier & Donnay (1987), Clark & Yinger (1987), Tochon (1989a).

3) a knowledge programing in terms of controling the acquisitions. Explicit definition of knowledge implies social control procedures.

Verret's epistemological thinking is further developed by Chevallard (1978, 1985) who demonstrates that any element of knowledge has first to be distorted so that it may be taught. Conne (1981) then studies ways of transposing knowledge in teaching maths in first and second grades; works of Leinhardt (1986, 1989) on that subject are well known.

First research on didactic processing tend to denounce depersonalized reduction of academic knowledge. Presently, this content transposition seems to be perceived more as a structural and necessary dimension of teaching professional specificity. The knowledge and the knower, split up by school programing, are reconciled in a new definition of curriculum (Connelly and Clandinin, 1988). Curriculum is moulded by personal knowledge rhythms, narratives of experience (Clandinin & Connelly, 1986; Clandinin, 1988) and its story is defined by subject-matter knowledge (Shulman, 1987; Gudmundsdottir, 1988).

One reflection emerges from research on didactic transposition. Didactics is a diachronic anticipation of contents to be taught. Thus it represents contents which are themselves concept mental models. So didactics has metarepresentational features, it deals with metacomponents (Baron & Sternberg, 1987) and designs the "inner part" of teaching action, that is the first axiom of the agenda. As heuristics, it reduces context variables to develop action and decisions related to content. Didactics has representational metacognitive components: it gives words to past and future action, it "denominates" teaching and so has a metonymic function; but it does not correspond to the synchronic actual time of interaction. Like any thought is perceived when jumping into the next one, didactics is running behind or after synchrony, but it can not be confonded with the focal point of immediate interaction. Its essence is time mediatization.

Pedagogical transposing: Second axiom of the double agenda

Pedagogy is concerned by an immediate image of the teaching situation and thus it can be considered has having a metaphorical function. It is live processing developed in a practical,

idiosyncratic situation. Didactic goals can be commited to paper, but pedagogical experience cannot be easily theorized owing to its reelational and affective aspects. In other words, it appears extremly difficult to verbalize infra-informational affective ways of knowing. Though action-research and reflection allow drawing reccurences and regularities from practical classroom experience, whatever rules could be induced, pedagogy remains an adventure.

Interactive management of time, in synchrony, is "unwordy", its complexity resists to danomination. Time in space is not time in the mind. Actual world can differ from mindfull possibilities. This analysis reveals a fundamental inadequacy in the "knowledge base approach". This one confuses two orders of time processing which were traditionaly relevant. Its cognitician denomination, even soften in a knowledge-store concept (Shulman, 1988), eludes affective components which can not be transmitted through explicit paper definitions. It lacks pragmatic dimension, that is an account of teachers' intentionality at the crucial moment of facing the class. The knowledge base model is a didactic one and it relates to half of the teaching agenda.

In summary for this introduction, the practitioner organizes in a diachronic way the didactic contents and administers them synchronically within a pedagogical social relationship. Both types of knowledge take contact in a focal point of "reflection in action" (Schön, 1987; Munby, 1989) which is a conversation between facts and their representations. Language of practice (Yinger, 1987) appears as a focal moulding of two concepts of time, past being embedded in the representation of present but never able to capture its full meaning.

These definitions once elaborated, didactic time has been framed in linear and sequential models which do not reflect classroom interactions. The split between didactics and pedagogy is currently such that most teachers find training frustrating as soon they have been in touch with the field. For them, didactic theories seem to be "paper tigers". Too far from the focal point of life, the dogmatic instructional designs must return to a more concrete time.

This article considers this statement, using as a starting point an ethnomethodological research involving 46 teachers. It thus furnishes the basis for more suitable didactics. Time on paper and

time representation should approach the interactive realities of the pedagogical fact.

1. Research

This research is situated in the teacher thinking paradigm. The inquiry shows the differences verbalized by novice/expert teachers concerning time processing. The interviews were carried out during the school year 1988-1989, in Geneva (Switzerland).

Subjects

The research population is composed of 23 novices (unpromoted, untrained suppleants) and 23 expert teachers in Language Arts, at the junior high school level (12-15 olds). The novices include 17 substitute teachers starting their second year of teaching and 6 first year teachers with one of more years of experience as suppleants. These new teachers have been chosen because they lack theoretical knowledge, but have some ability to face a class, because they have gone through their "survival year", the first year of teaching being, generally speaking, badly experienced from the point of view of pedagogical management (Berliner, 1988, 1989; Hüberman, 1989).

The 23 experts have been chosen following composite selection criterias, justified in the research literature. These criterias, as well as the problematic of the definition of expert teachers are developed in Tochon (1988a, 1989b, and 1990bc). "Institutional experts" teacher educators, teachers' representatives, group presidents, trainers) have accepted under the seal of anonymity to recommend some colleagues who are very experienced in teaching Language Arts. Criterias have been applied to this population (academic education, professional education, pedagogical experience, at least 7 years of teaching) among which a random choice has been made.

Methodology

The inquiry was conducted through a questionnaire, associated with a simulation of didactic processing with four objectives of the Language Arts curriculum. The teachers referred to examples of concrete situations within their curriculum processing, the contents as well as the relationship with the students.

The limitations of the retrospective verbal report are known[2], and have been corrected by triangulation owing to prospective simulation. The conversations have been recorded and transcribed *verbatim*. Time codes have been transfered o. protocols, for interpretation.

2. Results

The results as reported here deal only with the code "time". Each allusion to time has been reported in a protocol; the whole text takes in 12 pages and cannot be fully dealt with at this time. Only a first qualitative analysis, some totals, percentages, and a cluster analysis (X^2) are given here, to justify the stand taken in the foreword and serve as a spring-board to elaborate a more flexible didactic time, nearer to the synchrony of classroom interactions within the Language Arts.

In an interesting way, the code "time" is often cross-checked to two questions of the inquiry:

1) What explains the most frequent modifications of your planning?

2) What is your biggest problem when processing the curriculum?

The results in t emself already offer food for thought. At the first onset, forseing how much time interaction will take for a content creates considerable problems for the novice as well as the expert, problems that no current didactic theory takes into account.

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[2] Cf. Nisbett & Wilson (1977), Erikson & Simon (1980), White (1980), Yinger & Clark (1982), Huber & Mandl (1984), Yinger (1986) and Calderhead (1987).

Table 1 gives the detailed results that correspond to both of the questions above. The novices and experts have been numbered from 1 to 23, so that they can be recognized in the tables which follow.

INSERT TABLE 1

The following categories (cf. tables 2a,b,c) are extracted from their context as elements of meaning mentioned in connection with time. There are statistic equivalencies among columns, but no semantic links. A reduction in the number of variables could follow the analysis; from a semantic point of view however, the reader must pay attention, for instance, to the fact that an activity which continues is not for all that slower, and that if the most frequent temporal changes are due to time (W), they are therefore not frequent (E) (this means that they can be rare whilst simultaneously being the most frequent with regard to other variables. Which explains certain differences between W and E).

The percentages of the sub-totals of tables 2a and 2b compare respectively with the reference numbers of the novices, then of the experts to a total of the novices and experts for a sub-code; in other words, the percentage of the sub-total of novices when added to the percentage of the sub-total of experts gives 100% for a sub-code. The interpretation of the sub-codes RUSGLIT is frail, because they consider less than a fifth of the whole population[3]. The most representative categories of experts seem to correspond to the sub-codes ELVW; the categories nearer to the novices are the variables BHJPX.

INSERT TABLES 2a,b,c

[3] For this reason these variables are not in table 4 of the cluster analysis.

Excerpts: Novices

The numbers correspond to those of tables 4 of the cluster analysis: the novices are numbered from 101 to 123, the experts from 201 to 223. For instance, novice no 15 is numbered 115, expert no 21 is numbered 221.

101: I have no overall view of the time required by the activities; I have some idea of what I shall do in the future: after Christmas, after Easter. I do not always prepare a lesson plan; whether or not I use one varies from one hour to the next. My preoccupation is with maintaining a certain dynamism, but there are unforeseen alteration to the class rhythm. Depending on the mood, I must interrupt and change the rhythm; this occurs frequently. My problem is managing to adapt, making my plan flexible so that it preserves both space and time.

103: It is difficult to estimate the time required by each unit. Approximations are thrown off by necessities of time and of the program. With regard to the time-table: at the end of the afternoon I am often obliged to be brief; I shorten everything that is difficult and theoretical to continue with something else. I find it difficult to project into the future, i.e. a difficulty fixing sequences and projecting myself into the future.

106: The speed of the students modifies my plans. An interest by the students for an activity can cause me to prolong it. The periods for giving out grades have an influence on me as well as, for instance, whether or not to cut out an accompanied reading. There is always a moment of suspense. There must be an adaptation to the time required by activities; I always anticipate too much and have to postpone the work. There may also be a sudden discussion which is worthwhile. My greatest problem is inestimating the time needed by each activity. I must drop objectives for lack of time. If I wanted to do everything, I would spend two hours on each activity which is impossible.

108: I have to be careful not to lose too much time. Depending on students' attitude, if they

lose interest, I might have to dedicate ten minutes for games. It does happen, that we take on exercices which are too difficult or too simple; I sometimes shorten or drop them. I have yet to really have the notion of time, a clear idea of the class as a global element of 45 minutes. Besides, if a subject is boring, there is little use in continuing. My biggest problem is placing tests at appropriate times: reaching the end of the period with a good repartition of verification. Planning in the time is always uncertain. At the beginning of the year, it is awfull You lose a terrible amount of time planning and gathering material, with atendency to concentrate on the present without having time to consider the long run.

109: The length of a teaching unit varies according to the students' rhythm. The time, how to manage it, is top priority: I try to make changes. I take the year gropingly. I take into account above all the students and their working rhythm in class. I adjust; the contents do not change, but it is obvious that I am confronted at all times with the question of the students. The time. If they don't want to work at all, I give them work for grades; if it is because they are tired, I switch over to something else. It is necessary to lighten the texts, the stencils, not to give them all the work at the same time. I lack time and experience. I have no time to think out how to deal with the subjects, how to plan them.

111: I would like to get away from every form of planning. Planning transforms itself, it is an indication; it implies the notion of the time spent over the task. The students modify the plan, in its rhythm at first, and sometimes it is necessary to change and do something else. This takes time, and afterwards one sees that the right thing has not been done. I modify quite often and since I do not write out my activities, my plans offer several alternatives. It is impossible to work normally after a difficult examination in German class, for exemple. I apply the principle of rupture, with strong and weak moments. My biggest problem is how to be done with the program.

112: It is difficult for me to work with or without planning. I am obliged to modify the detail of the plan owing to time. Planning guides the course but I never manage to stick with it. I have to adjust to the rhythm of the students. The time enormously influences my planning, for I am not at ease with the contents; I should know it better, as well as the difficulties met by the

students. Certain classes are quicker; with other, slower ones, it is necessary to abandon certain things. It could be possible to suppress one out of every two hours. Due to the general mood it is not possible to do certain exercices. Locating the adverbs took twice as long to do with some sports oriented students than with my other class at the same level. I have to adapt the time. I plan too many things, I rarely manage to do everything I had anticipated doing. Time is my greatest problem.

113: I've tried to plan several weeks ahead, it is difficult. In the first year one has no global vision of the program. If the program has not yet been run through once, it is not possible to understand the rhythm of the work, the material to produce, the reactions of the students, the time involved. I've noticed that in certain classes I did odds and ends without any coherence. It is impossible to plan in the long run. Organized planning takes a lot of time and judgement. For me, it is a frightful effort. I possess no means to judge whether one task is more or less difficult than the next. The reproach made to me was that I give instructions which are never kept in terms of the context. But I am forced to adapt, otherwise one doesn't move ahead. I have no means of branching off, therefere I tend to get stubborn. I modify within the same subject! I inadequately estimate the rhythm and the progress of work. My most serious problem is in not possessing an overall vision of the material that I have to deal with in the course of a year. I've had no time to look at everything.

122: I do not know what can be done with students in one hour, so how can I make long term plans? The length of time taken up teaching a unit depends upon the students, and wether they understand quickly. This varies completely according to subjects. The class schedule and time of day have an influence. I do more written work at the end of the afternoon. If the question of a student is appropriate and interesting, I can spend an hour over it. After a week I realized that I could not plan and respect the plan each time. I must plan consclentiously and then forget my plan once in class. It happens that time gets wasted. Time is often badly organized. My most important problem is knowing how much time to devote to each item of the curriculum, this is very difficult to estimate.

Excerpts: Expert Teachers

205: Context has a major influence. I rarely plan the lesson; I anticipate production stages, so that I am always ready to prolong an activity. The time necessary for each activity causes the most frequent modifications. The other day, I had envisaged a certain task (the lay out of their horoscopes). However, before doing this the book being studied in magisterial reading was just drawing to an intrigue and I wanted to read up to the moment of suspense and stop there in order to titilate them. The students were so interested they wanted to continue at any price (the book was "You are not dead" by Scarmetta). I improvised, we spent 45 minutes reading to the joy of the students. My biggest problem is calculating the time required for activities. For instance, when taking up a song by Renaud, if there is suddenly an interest for a problem, the plan will change, which will take more time.

207: (Certain tasks take place) at the present time; if I see that one of them is going very well (on a subject), we continue. At times, I overestimate the capabilities of the students. The consequence is a postponement of what has been planned. You never know in advance how much time the remedying will take nor which contents will be approached. My biggest problem in planning, is that I take longer than expected to finish each unit; the delay accumulates at the end of the year and I run out of time.

209: That planning does not correspond to an experienced reality is my biggest problem. I know that certain important events have to come at certain times in the year, so as to be able to complete the program. From one year to the next, I grant more time to one thing than to another, according to the students. A sense of frustration leads me to be in constant research; I put a lot of time into preparing something new and improving it.

210: The interest of the students has priority; if I notice the slightest sign of boredom, I change my system, and start to listen to the students. I modify everything, all the time. The changes are less frequent when I make the students write. I improvise all the time, for if I do not improvise, I do not respond and cannot face the diversity of requests. For instance, I have

spoken about Tolkien; they did not know the difference between history and prehistory, I had to recontitute the chronology. My greatest problem with planning is time and the absence of method. The temporal constraint opposes improvisation which can incite a smile. I think about my students all the time: Improvisation continues after class, it is a plan with multiple possibilities, like a book in which you are the hero. It is a listing of possibilities.

211: With this type of preprofessional class, I work with present day concerns. I do not plan, I have a lot of material which allows me to improvise, that is to say to go into action (to work) with what is available. At first, I look at all contextual constraints (number of hours, of weeks, imperatives of outings and holidays), then I look at what remains as working time, then I observe the class, and try to correct the fact that everything is fractioned in their time-table by working on a continuous basis: I immerse the students in the same subject for a week. The rhythm is relaxed and in depth. I follow a system of alternation: then, I need a break. These students require much more time than one would expect to produce a written work. The most frequent modification concerns the planned time. Patience consists of going along by stages, to try and think like the student and establish where his thinking is faulty. To do so, a great deal of listening and decoding is required. My biggest problem is how to manage time and its division.

220: When I was young, and attending teacher education, I used to establish lesson plans, timed out to the last minute. This produced catastrophies. Nothing worked, the children were passive. Their difficulties of comprehension needed to be taken into account. The children had a longer attention span 20 years ago. Now, they are not able to concentrate more than five minutes though they have more imagination. I have little time to do oral work (...). Especially in the last hour: they shout, they are excited, I get to the essential, to what is precise and short. I am often obliged to adapt according to what is going on. If they did not understand, if I spent too much time adjusting a scuffle between Fabien and William, or if I have wrongly estimated the time required by a lesson, the next time, I condense it. The good teacher knows how to take short cuts.

223: I plan, I must not waste time in asking myself what I have to do. I am always careful to

rhythm of work. The context plays a part. If it is necessary to adapt, if something is too difficult, if there is a change in the time-table, if something has not been understood, I make the time to take it up again. I take one hour to have a discussion, to find solutions, to bring up problems. My greatest problem is not finishing within the time frame that I have allotted myself.

The actor and time

The categories reserved for the analysis can be reduced to three epistemological attitudes regarding time: 1) time can be influenced, 2) it can be seen as a problem, 3) it can modify the plans. When the time is influenced (1), the pedagog is an actor of time, when time becomes a problem (2) or when it modifies the plan (3), the pedagog passively submits to time.

These three theoretical definitions apply to the sub-codes. The sub-codes DGHKMNOS depend on the influenced time (IT). The sub-codes IJLPQRTUVX evoke a time problem (TP). The sub-codes ABCEFW concern the modifying time (MT). The time problem inhen added to the modifying time gives the time submitted to (TS = MT + TP).

Thus it is possible to calculate the coefficient of the epistemological attitude in regards to didactic time, within the novices' and the experts' population, starting from the hypothesis of a marked group difference. The results (table 3), without entering in depth statistical analysis, seem to deny in great part this hypothesis. On the one hand, there exists an equilibrium in the three epistemological attitudes with regard to didactic time in the totals of both populations (with a slight preponderance of the novices' time problem, being 23% superior to that of the experts), on the other hand, the differences of experts/novices depend manifestly on variables other than this epistemological attitude, which could perhaps be made clear by a cluster analysis with the whole matter of the inquiry. The individual profiles do not seem to show a belonging to one of the reference populations (novices or experts), which is what table 4 seems to confirm.

INSERT TABLES 3 and 4

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3. Discussion

The time problem does not seem to differ from the experts' to the novices' population. The cluster analysis (X^2) brings to light significant differences only for the variables X (probability of 0.044) and, above all, J, with a probability of 0.007. The sub-code L has a certain power of differentiation with a probability of 0.036, but this argument is not well chosen; only four experienced teachers have mentioned it. The variable J thus discriminates both populations very distinctly, the other two variables X and L also have a certain discriminating power.

If we examine table 4[4], we find in the upper left-hand section that the novices, in this part in majority, have a tendency to function on a short term basis. We find a majority of the experts in the lower right section. They define themselves as teachers who have a long term overview while recognizing the difficulty and the relativity of planning. This could indicate the importance of long term metamemory patterns for a more contextualised and flexible didactic processing. Again, the horizontal axis (domination of time) does not seem as such to be a factor which discriminates both populations.

In short, the attitude towards time seems to vary according to individual profiles, without necessarily being connected to experience or to professional competency. The pedagogical context influences didactic time in such a way that the pedagog must derogate the sequences of the contents which the institution imposes in the form of the curriculum and which is recommended by teacher education. Time on paper does not correspond to the actual time.

The obvious triviality of this observation when confronted with the banality of the second finding of a greater facility by the expert to manage pedagogical time, takes the form of a suggestion: If the experts "can do it", it is probably because they have created a new implicit didactic time, one that is more flexible and contextual, and perhaps of which nature is not semantic or representational but pragmatic. It seems that the expert has integrated a flexible didactic time which allows his plan to branch off towards one or another path of pedagogical

[4] Table 4 has been elaborated with the care of Gianreto Pini, University of Geneva (Switzerland).

realization at any moment, to modify the rhythm of progression, to "take shortcuts and different rhythms when they are needed" (EX20).

Indeed, an analysis of the excerpts and of other parts of the corpus shows that novices do not improvise but most experts do, and experts think in terms of space (students and regulations, as noticed Leinhardt, 1986) while novices do not. Pedagogical dimension is the field of expertise while didactic organization of contents is the one obsessional thought among novices. So the growth of expertise can be described on a curve rising from calculated inner representation to spontaneous space relations (table 5).

INSERT TABLE 5
ABOUT HERE

Rhythm has a lot to do with expertise. The excerpts demonstrate that expert didactics involve conceptual rythms in tune with spatial reactions of pupils. This result does confirm those of Clandinin & Connelly (1986, in press) and Clandinin (1988), it gives a rhythmic image of the good teacher (Clark, 1989). It also shows novice time more monochronic; expert time tends to be polychronic (Hall, 1985; Hargreaves, 1989). As induced by Pinnegar & Carter (1988), time processing and reflection on time appear to define an important dimension of expertise. Obliged to juggle with time and matter, the teacher develops the aptitude to adjust the same didactic contents within a time frame and in terms of pedagogical rhythms:

"The faculty of perceiving these rhythms corresponds to the perception of the moment in which the dissatisfaction arises. It varies for each class and for each level." (EX10).

As proof that linear anticipation (for example goal-directed instructional design) corresponds only to a wholly minor aspect of pedagogical life, every rhythmic modality is absent from the sequential crystallisation of expected behaviours. Some will wait a long time.

"Time submitted to" however (TS = MT + TP) remains the most important feature for both populations. The guilt of the teacher, which is to be found in other elements of the inquiry probably arises from the excessive importance placed on curriculum and programs, as well as from the impossibility to accurately assess the results of his/her teaching: "I feel like I have been building emptiness for years". The programs are overabundant, badly quantified, without hierarchy, inflexible and not based on teachers' input as to what can be accomplished one year under the actual conditions of the school environment.

It is thus necessary to "defossilize" didactic time. Didactics have too long assumed a single definition of time resting upon the myth of rational planning and rational knowledge-base. In fact, in order to be of any use, didactic time must be multiple and adaptable. Verbal reports from teachers lead me to think that didactic time remains fictitious, unless it acquires a rhythmic and functional multivalency. Rhythm is dictated by the adaptive pertinence in a pedagogical practice.

The knowledge-base metonymy restricts the pedagogical meaning to the didactic condition. On the contrary, expert teachers act in a field of implicit complexities and I will now try to shed light on the actual way they organise time in their classrooms.

4. Conclusion

Didactical theories which take into account pedagogic management and the interactive context of the class are rare. To do this, those theories would have to organize the everyday idiosyncrasy, the spontaneous, and even the undisclosable. Consequently, theories remain such and practice has evolved beyond them. The problems faced by the experts seem to be identical to those experienced by the novices in the didactical management of time. However, the experts "get through" on the field, in pedagogy. They have developed a knowledge without words, ignored by teacher education.

Didactic representation is derived from the organization of contents, the first function of the "double agenda" (Leinhardt, 1986) of the teacher; the pedagogical fact concerns the social relation to this knowledge, which is the second function of the agenda. Teacher education should include both didactic representations and relational strategies to reflect infra-informational, affective aspects of pedagogy.

DIACHRONIC TIME:
ORGANIZING KNOWLEDGE REPRESENTATIONS

TEACHING

SYNCHRONIC TIME:
ORGANIZING SPACE INTERRELATIONS

This distinction explains why didactic theories are often inadequate in the pedagogic field. They do not include all the teaching variables and they organize only one aspect of the agenda. Furthermore, didactics and pedagogy confront each other, yet one is indispensable without the other. Pictured as parasites of the pedagogy, didactic misdeeds are recognized after preservice training, where their designs reveal themselves to be inapplicable in practice.

"We have not been taught how to assess our time-table, nor how to classify activities. The curriculum is so complex that we cannot even read it or understand how much time an activity can last, how to combine and organize activities. Instead, we get ready made recipes incompatible with our context, inapplicable theories to construct sequences from the simple to the complex, as if we were capable as novices to situate what is simple and what is complex for a preadolescent."

Didactic instructional design has forgotten the language of practice. Its discourse, decontextualised, is obsolete. Furthermore, the confusion of the institutional roles of training and evaluation, has brought about two conflicting languages for the teacher (Russell, 1987; Calderhead, 1989). The theoretical exoteric discourse is defined as the official speech. The jargon of practice, which has become esoteric, covers those "clues" which work in a specific context; it is only articulated amongst colleagues in exceptional circumstances. The knowledge about live knowledge is yet to be found.

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SUB-CODES	TEXT	NOVICES	TOTAL	%	EXPERTS	TOTAL	%	OV.TOT.	%on46
W	The most frequent modifications of planning are due to the time taken up by certain activities	1,3,5 6,10, 12,13 16,21	9	41	1,4,5,7 8,10,11 15,17,18 20,21,22	13	59	22	47,8
J	My biggest problem with planning is the time needed for certain activities	1,2,3,5,6 7,8,9,10 11,12,13 15,16,17 18,20,23	18	67	5,7,8,9 10,11,12 16,23	9	33	27	58,7

TABLE 1

Table 3	NOVICES	EXPERTS	TOTAL
Time as Modifier	60	70	130
Problematic Time	85	69	154
Influenced Time	73	66	139
TOTAL	218	205	423

SUB-CODES	TEXT	NOVICES	TOTAL	%	EXPERTS	TOTAL	%	OV.TOT.	%/46
X	Planning is difficult	1,2,3,4,5, 6,8,9,10,11 12,13,15,16, 17,18,19,20, 22,23	20	59	1,5,7,9,11, 12,15,16,17, 18,19,20,21, 22	14	41	34	74
Q	I have problems evaluating the time that certain activities take	1,2,3,5,6,8, 10,11,12,13, 15,16,17,18, 20,21,22,23	18	53	1,2,5,7,8, 10,11,12,13, 14,15,16,18, 20,21,23	16	47	34	74
B	Depending on the time of the day, I adapt or make modifications	1,2,3,4,6,7, 8,9,10,11,12, 13,15,18,19, 21,22,23	18	58	1,2,7,9,10, 11,12,13,15, 19,20,22,23	13	42	31	67
H	I must prolong or shorten certain activities	1,2,3,5,6, 8,9,10,11,12, 14,16,18,19, 20,21,22,23	18	58	1,3,5,7,10, 12,13,15,16, 17,18,20,21	13	42	31	67
N	The level and capabilities of the students influence the time taken up by activities	2,5,6,7,9, 10,12,18,19, 20,21,22,23	13	50	7,8,10,11,12, 14,15,17,18, 20,21,22,23	13	50	26	57
C	I must remain flexible	1,6,8,9,10, 11,12,15,21, 22	10	43	1,6,7,12,13, 14,15,16,17, 19,21,22,23	13	57	23	50
F	I adjust to unforseen circumstances	1,6,7,8,9,10, 11,14,19,22	10	45	2,5,6,10,12, 14,15,17,18, 19,22,23	12	55	22	48
M	Students'motivation affects the time taken up by activities	2,6,7,8,,9, 12,15,19, 20,22	10	48	1,3,5,10,13, 14,15,16,20, 21,22	11	52	21	46
O	The attitude of the students influences the time taken up by activities	1,8,9,11,13, 14,15,16,19, 20	10	48	1,2,3,5,6,9, 15,19,20,21, 22	11	52	21	46
D	I must often quicken or slow down my pace	1,2,5,9,11, 12,14,16,17, 22,23	11	52	1,2,8,12,17 16,17,20,2.. 23	10	48	21	46
P	I run short on time	4,5,6,7,8, 9,10,11,12, 13,16,23	12	63	7,8,15,18, 20,21,23	7	37	19	41
V	A plan that is too rigid causes problems	1,8,11,12, 19,21,22 20,21,22	7	39	9,10,11,12, 13,16,17,19,	11	61	18	39

TABLE 2a

SUB-CODES	TEXT	NOVICES	TOTAL	%	EXPERTS	TOTAL	%	OV.TOT.	%/46
E	Time causes frequent modifications	1,3,4,5, 6,13,21	7	39	1,4,5,7,10, 11,12,14,15, 18,20	11	61	18	39
A	The time-table influences my plans	3,6,10,14, 16,22	6	43	1,6,11,18, 20,21,22,23	8	57	14	30
K	I must often modify short term plans	1,4,7,10, 11,17,18	7	64	2,3,5,11	4	36	11	24
R	Planning takes time	8,9,13, 16,23	5	71	9,10	2	29	7	15
U	Overplanning too far ahead causes me problems	3,17,19, 21	4	67	19,22	2	33	6	13
S	I alternate my lessons, I need breaks	11,15	2	50	11,19	2	50	4	9
G	I must modify my way of teaching presenting material	6,9	2	50	1,3	2	50	4	9
L	Time does not allow for certain activities	-	0	0	4,8,14, 21	4	100	4	9
I	I lose time explaining how to work	18	1	33	3,13	2	67	3	7
T	Planning helps in gaining time	-	0	0	13,23	2	100	2	4

TABLE 2b

OVERALL TOTAL

CODES	W	J	X	Q	B	H	N	C	F	M	O	D	P	V	E	A	K	R	U	S	G	L	I	T
NOVICES	9	18	20	18	18	18	13	10	10	10	10	11	12	7	7	6	7	5	4	2	2	0	1	0
EXPERTS	13	9	14	16	13	13	13	13	12	11	11	10	7	11	11	8	4	2	2	2	2	4	2	2
TOTAL	22	27	34	34	31	31	26	23	22	21	21	21	19	28	28	14	11	7	6	4	4	4	3	2
DIFF.	-4	+9	+6	+2	+5	+5	0	-3	-2	-1	-1	+1	+5	-4	-4	-2	+3	+3	+2	0	0	-4	-1	-2

Table 2c

TABLE 4

CLUSTER ANALYSIS (χ^2)