

Scholastic Leakage in Professional Schools at Bagheria (Palermo, Italy) (Pupils aged 13-15)

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The experience that is presented on "Scholastic leakage" in the Professional Institutes concerns work done in the school year 1995/96 (Professional State Schools for Industry and Trade of Bagheria) with four groups of teachers.

The methodology, the same for the four groups, consisted of a simulation of a class council with the presence of Tutors in the logic-mathematics, linguistics and psycho-affective areas. Nearly all the groups of Tutors have different cultural experiences except for the logic-mathematics area which was represented by me. In the experience that is presented, the logic-mathematics area and the area of linguistics were found to be of support to the problems coming out of the professional discipline which was mechanical and technological in general.

The unifying aspect of the work was tied up with the research to put in place an "a-didactic situation" significant for the scientific-technological area that might involve a major number of teachers in "simulating" class councils and, at the same time, perhaps help the pupils who have difficulties. The "a-didactic situation" put in place by the four groups has also had as support the seminars of Dr. M. Ferreri in the role of learning and in emotions in situations of conflict².

In this work only one of the experiences will be presented - the most significantly emblematic³.

1.0 Some theoretical references for "scholastic leakage"

Scholastic leakage has been much studied in these last 10 years in the province of Palermo⁴. The contributions are more theoretical than experimental. In this brief note I will try to explain the theoretical model suggested by the Directorate of Education of Palermo to try to formulate some integrating proposals above all with regard to separate disciplines.

The approach proposed by Maurizio Gentile⁵ is an ecosystemic approach that embraces, in a global vision, more a personal than a social reality:

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² M. Ferreri - F. Spagnolo, L'apprendimento tra emozione e ostacolo, Quaderno di Ricerca in Didattica n.4, Palermo. F.Spagnolo (1995), Thèse de l'Université de Bordeaux I (Obstacles épistémologiques: The Postulat de Eudoxe - Archimede, *Quaderni di Ricerca in Didattica*, Supplemento to n.5, Palermo).

³ The articles concerning the four experiences of scholastic leakage are published in n.6 of "*Quaderni di Ricerca in Didattica*" of GRIM:

- A hypothesis of work on scholastic leakage (Agata Cospolici, Maria Of Cesare, Luciano Gulino, Francesco Rappa, Angela Rizzo, Rosalia Tranchina, Paola Gennaro, Antonio Raffaele, Filippo Spagnolo) [pagg.115-128].
- Working for leakage (Arrigo Lina, Belladone Concetta, Ceresia Francesco, Conti Onofrio, De Rosa Roberto, Gallà Rosalba, Li Vigni Mauro, Lo Presti Giuseppe, Morrocchi Cristina, Filippo Spagnolo) [pagg.129-153].
- A voyage into leakage! (Michele Aiello, Rosa Aiello, Francesca Cappadonna, Vincenzo Giordano, Michele Pintacuda, Rosalba Romano, Filippo Spagnolo, Sebastiano Vecchio) [pagg.154-169].
- In order to leak ... the scholastic leakage. A school also for experimentation: an experience of research for containing scholastic leakage. (Loreto Amenta, Renato Di Giovanni, Anna Licia Gagliardo, Antonio Gancitano, Francesco The Paglia, Maria C.Sciortino, Placido Sole, Filippo Spagnolo, Gianfranco Tудisca) [pagg.170-214].

⁴ The work was coordinated by Dr. Maurizio Gentile from the Directorate of Education of Palermo.

⁵ Children and adolescents at risk: scholastic leakage, Proceedings of the International Seminar OCSE/CERI held at Palermo from 3.12 to 5.12 1991 (edited by M. Gentile), Edizioni Europa, Palermo 1992.

- “The individual exists as a "subject in interaction";
- The environment comes conceived as a complex and significant reality, organised in a structured set of one thing inside another (different ecosystemic levels).”[Crf.M.Gentile, note 2, pag.36]

The theoretical-methodological model can be summarised in the diagram below:

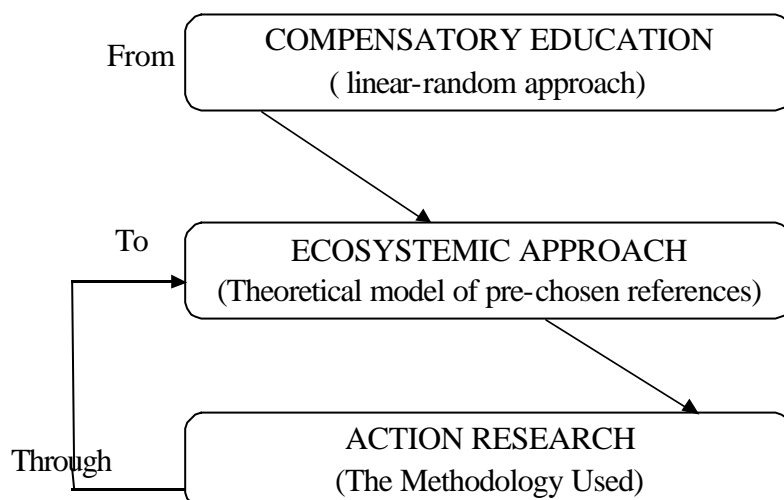


Fig.1

We agree with this position due to the fact that Compensatory Education through the putting in place of a “recuperative” intervention looked at only for the person will not be sufficient, rather it could mislead in not taking into consideration all of another series of scholastic and extra-scholastic factors that are, on the other hand, important for a “complete” development of the pupil's personality. The theoretical terms of reference regarding the Ecosystemic approach is certainly very interesting and the “observers of area” and the “teams of territorial animation” in the province of Palermo are a positive testimony. In this table the relationship Pupil-Knowledge is never compared. This dimension is forgotten by everyone, therefore the principal role of the teacher is to encourage non-curricular activities that are above all involved in the psycho-affective variables. The cognitive area is an “accident” that is used in the analysis of ends made use of by standardised tests for an undefined scholastic population. What is a little mortifying is the research on the discipline. This is made evident in theoretical terms of reference with regard to methodology in the form of Action Research

The more important problems that are not dealt with by Action Research are those regarding epistemological analysis of the discipline, all of the problems regarding the “communication of the discipline” and the checks relative to “repeatability” of experience and lastly a significant growth of “meta-cognition”⁶. The “theory of didactic situations” might try to respond to these questions above all with regard to the re-discovery of “sense” on the part of the pupil, curriculum content, the syntactic-semantic re-construction of the discipline, and the proposal of a-didactic situations that may thwart through conflictual situations either with regard to content in itself or with regard to the emotional state of the pupil (the a-didactical situations as paradoxical injunctions)⁷.

M.Gentile, Scholastic leakage: a model of dynamic and ecosystemic intervention, CxU, anno XIV, nn.5/6, 1995, Via Galileo Galilei n.159, Palermo.

⁶The meta-cognition comes into consideration through generic activity of (auto)-reflection. It will be opportune however to place in evidence the specific activities that may bring about the meta-cognition.

⁷ G. Brousseau, *Théorie des situations didactiques*, Grenoble: La Pensée Sauvage.

1.1 Reference to some experiences in a zone at risk because of mafia influence

From 1986 to 1989 in collaboration with the Directorate of Education of Palermo there was formed a work group consisting of a psychologist (Dr. M. Gentile), an expert in the linguistic area (Professoressa S. Ferreri), an expert in the logic-matematical area (Prof. F. Spagnolo). This team, with the help of other experts in other areas conducted training of teachers in 13 elementary schools. The choice of schools was directed towards particularly grave situations of socio-cultural disadvantage in which was present the '*mafia influence*'.⁸ On that occasion two important models began to be used in the experimentation:

- The methodological model of action-research;
- A approach to a model with regard to disciplinary work in the three areas: linguistic, logic-mathematics, psycho-affective. This approach also carries with it interesting considerations regarding the cognitive area of the three areas.

1.2 The experience in the Professional Institutes in the 1990s

In 1994 the Ministry of Public Instruction (General Professional Instruction Section) proposed a training activity to try to stem the scholastic leakage in the first two years of the professional institutes. The cause behind this abandonment and scholastic failure was identified as a deficit in linguistic-espressive and logic-mathematical ability and moreover in the lack of methodology tied to learning. Also identified moreover were other indicators of the abandonment, that is the hardship of socio-economic conditions and affective-motivational problems. The experiences of the years 1994-1996 in the province of Palermo have been the most varying. The structure of the training predicted "tutorials" of the experience with the possibility of continuing feed-back on theoretical aspects. The experiences conducted in the province of Palermo have been the most varying. We have had experiences in each of the areas socio-affective, psycho-affective, linguistic-expressive, and logic-matematics.

1.3 Our experience: the simulation of a class council

In this place we expound the experiences regarding the simultaneous checking of three areas, those of linguistic-expressive, logic-matematics and psycho-affective. This check makes possible the approach used: the simulation of a class council⁹.

The groups of teachers, with whom the Tutors of the three areas had worked, were each of total 6 and represented teachers of almost all the disciplines of two years in the Professional Institutes (Italian, English, Mathematics, Physics, Mechanics, Mechanical Laboratory). The teachers in reality were not part of the same class council and therefore it was quite useful to conduct the simulation of the class council in particular "cases", the pathology, the situations more at risk compared with the "cases" of situations of pupils particularly gifted in a particular discipline. The profiling of the initial data of the classes taken into consideration then provides the individualisation of "cases" that could be objects of subsequent analysis and of proposals of "remedial activity".

We do not report all the preparatory parts of the experience, in this place we shall limit ourselves to explaining the remedial activity.

One of the "strong" hypotheses buried in the class council has been that of "remediation" of proportional thought. This remediation came to be significant, on the part of the class council, for activities tied to the particular profession.

F. Spagnolo (1998), *Teaching mathematics in the secondary school*, Firenze: La Nuova Italia.

⁸School and Disadvantage: from the planning to action-research, Edizioni Europa, Palermo, 1988.

⁹For a more complete exposition of the experience see n.6 of Quaderni di Ricerca Didattica. (See note 2)

We report as a whole that part of the activity for the remediation and the consequent description of the experimental phase and its collection.

2.0 HYPOTHESES FOR THE REMEDIATION

The following hypotheses for the remediation were formulated:

- the necessity of prioritizing the study of the “case”, intended as a model for reducing the leakage.
- the putting in place of an a-didactic situation (that is imposed on a paradoxical injunction) possibly recovering the proportional thought.

The study of “cases” was supported with the attention to the psycho-affective area and with the subsequent focusing and interpretation of those recurring behaviours of the pupils. In the name of a guided example, it was sought to delineate the characteristics of an apathetic youth in the face of a didactic activity. The members of the group are compared with respect to the individual problematic levels and the definition of a lesson scheme of problematic cases, with constant attention to the necessity of looking deeper into the problems of the psycho-affective area on more levels and the individualisation of the prevalent problematic area.

It is required moreover to assume the second hypothesis (a-didactic situation) as motive towards remediation and, currently with that assumption, an experimental activity was planned in the first class of OPMEC (**machine operators**).

2.1 THE EXPERIMENTAL PHASE AS A STRATEGY FOR REMEDIATION

The experience proposed for the first class of OPMEC, that was done completely in the inside of the Mechanical Laboratory, had the scope of activating the pupils under the aspect of cognitive conflict and of communication, through the installation of an a-didactic situation, in which the teacher disappears in a way and assumes the function of mediating and of organising the class and of its activities; the teacher therefore assumes the role of referee to guarantee respect for the rules of the game, placing the pupils in a condition of achieving the gratification derived from the discovery.

At that end the class is divided into two large groups.

- group AB
- group CD.

Each of the groups was formed by the teacher using a random process to avoid over-representing one or other cultural or formative aspects.

The experience was carried out in the following phases:

the teacher presented to the pupils the project from experience:

“A TWO-DIMENSIONAL DESIGN FOR A METAL TOOL”;

the group AB formulated the theme and explained it to group CD;

the group CD activated themselves to carry out the design using a real scale as requested in the theme;

the teacher gave the opportunity for group CD to formulate a theme for group AB;

the group CD formulated the theme and explained it to group AB;

the group AB began to develop the theme as requested;

the groups chose the instruments adapted to carry out the project;

the two large groups AB and CD split up into sub-groups AT, B, C, D;

the subgroups AT, B, C, D proceeded to complete the practical part of the project, with the use of the traditional mechanical utensils (not computerised) of the Mechanical Laboratory department.

2.2 Description of the phases

1st Phase: The teacher gathered together the large group AB and presents the project (Fig. 1), that is represented in real scale but without any information about the purpose of the two illustrated components in the design. Moreover the group are asked to formulate for the group CD a theme in which they were asked to make the two illustrated components in the design using a scale of 3.5:1,

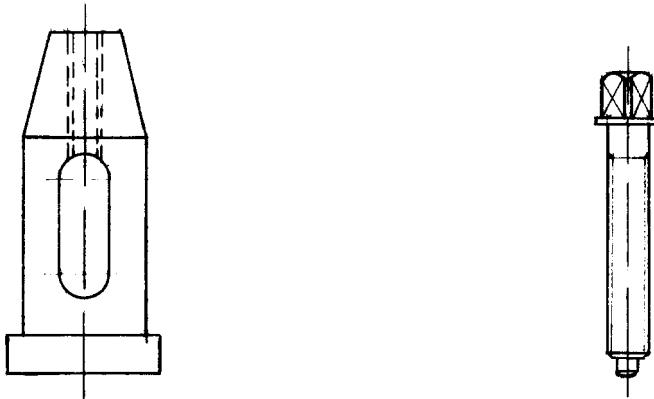


Fig 2.

2nd Phase: The group AB takes a look at the design and formulates the following theme for the group CD: “Make the particular things represented in the design using a scale of 3.5:1, making ready all the tools that you know, in respect of the UNI norms”.

3rd Phase: The group CD goes ahead and makes the design as requested in the theme, that is a design in real scale increased by 3.5 times with respect to the original cited in the theme (Fig. 2).

4th Phase: The teacher reunites the group CD and gives them the opportunity of formulating for the group AB a theme in which they were asked to make the same illustrated components as designed by the group CD using a scale of 1: 2.2.

5th Phase: The group CD proposes to group AB the following theme:

“MAKE THE PARTICULAR THINGS REPRESENTED IN THE DESIGN USING A SCALE OF 1: 2.2, MAKING READY ALL THE TOOLS THAT YOU KNOW, IN RESPECT OF THE UNI NORMS”.

6th Phase: The group AB goes ahead and makes the design of components using the scale 1:2,2 (Fig. 3).

7th Phase: The groups in complete independence, before passing to the executive phase of the project, make ready all that they know of: assessed designs, working groups, choice of materials, list of tools and implements .

8th Phase: The groups AB and CD split up freely into subgroups AT, B, C, D, forming the four groups that operate the machines of the department.

9^a Phase: The pupils make the components of the project completely independently, profiting from there own knowledge and experience (Fig. 4).

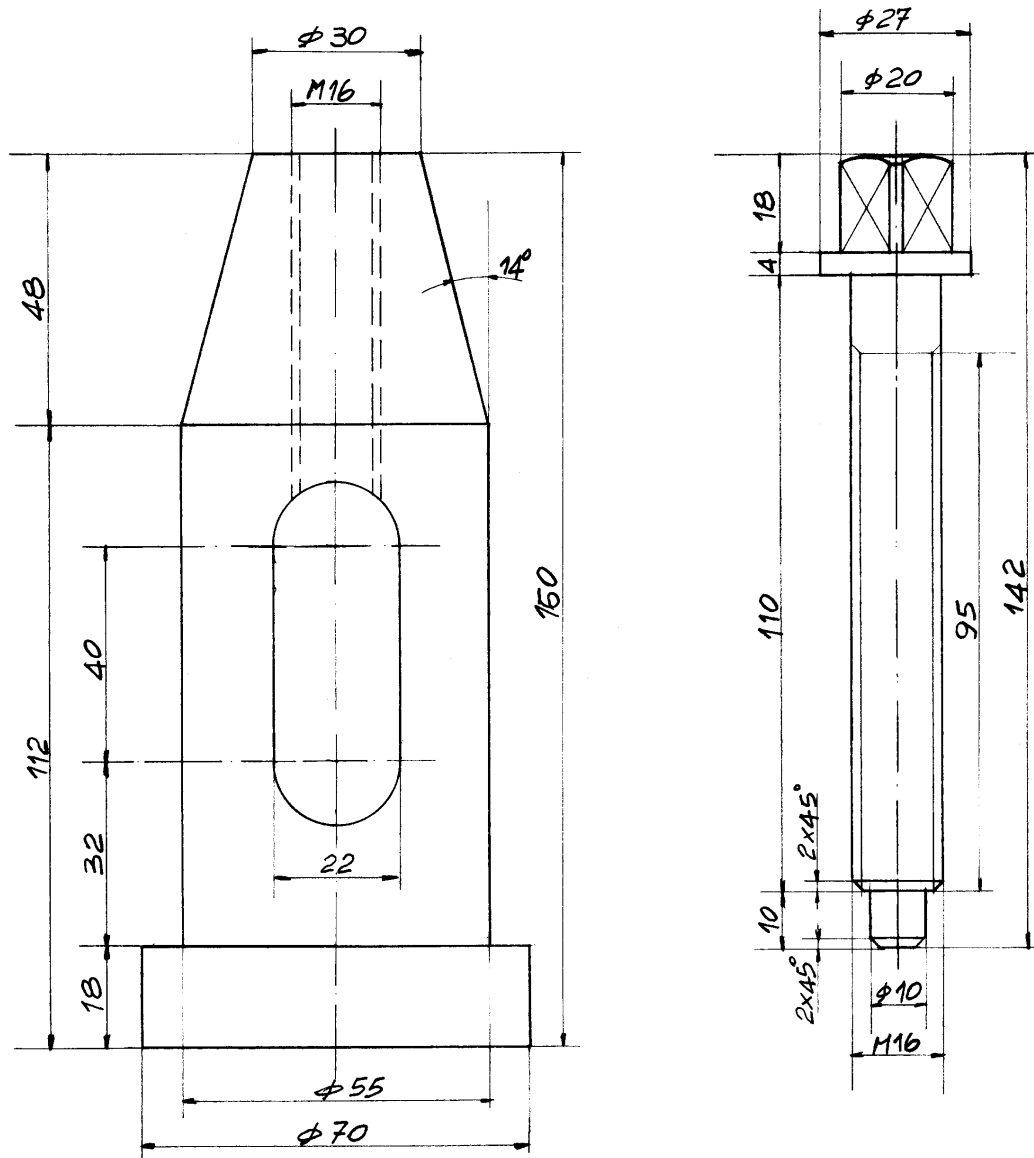


Fig. 3.

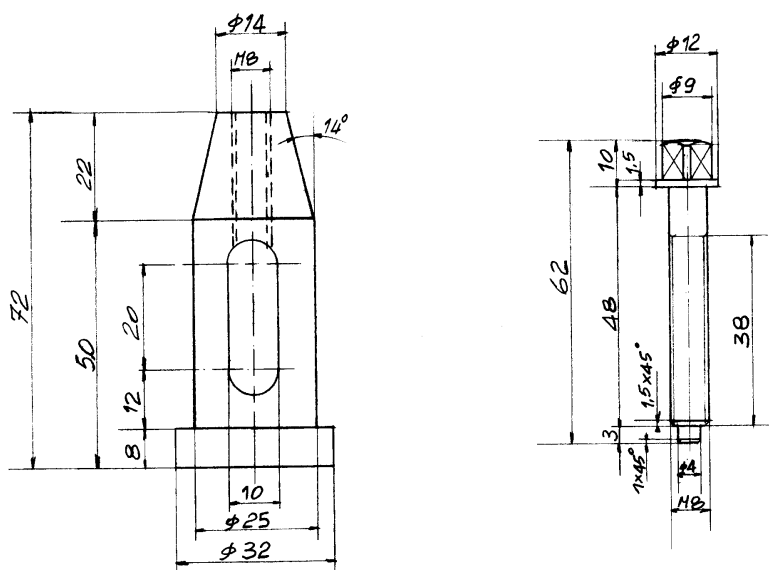


Fig 4.

One is dealing here with the most significant phase of the entire experience, because in the course of it the students are activated to use their entire knowledge and experience of their technical-operative experiences from the beginning of the scholastic year. From the comments of the pupils, in fact, one gets the impression that they have remembered the types of working collectively shut away¹⁰; all of them remembered that they were dealing with types of working already acquired and used.

The varied groups showed security in as much as they already had in mind the working cycle to develop and to be carried out to the end even if they did not lack, amongst themselves, disagreement about the order of things in the cycle of work.

Every pupil tried to succeed with their own idea as they wished to leave their well defined mark on the complex task that waited to be realised; the discussion grew and grew, but never reached a solution that satisfied everyone.

The disagreements were dealt with by the intervention of the teacher, who indicated the best solution, with the consequent satisfaction for someone and the awareness of their mistake on the part of someone else; this allowed the doubtful situation in which the group found itself to be overcome and to proceed promptly with the next operation.

The experience reached the highest point of didactic interest when the various groups, giving practical actualisation to the theoretical process, passed to the executive phase, in which the components of the complex task began to take on form and dimension.

The pupils, in complete autonomy, managing the machine, completed their cognitive process passing from the theoretical phase to the practical, with all the difficulties implied in the voyage of this significant formative passage. It also made clear, in fact, numerous modifications to the theoretical plans hypothesised at the beginning of the work, with the consequent taking into account of new operating situations springing out of the real practicum.

This has produced between the members of the groups new discussions, around the machine, and the necessity to get ready new solutions, that it was never possible to imagine at the purely theoretical level.

These unforeseen things, during the various phases of the work, made the pupils understand that it is not possible, in the state of their training process, to plan everything with the maximum precision, because error is always possible: it is important to utilise error as information and proceed with the appropriate correction.

3.0 Concluding Considerations

At the conclusion of the experience of carrying out the project, already concretely tried out in the planned three first classes in which it was operated, the final evaluation of the validity of the product and the effectiveness of its application was strongly positive, it still remains that only in the medium to long term the results of the present work may emerge fully in their evidence.

But already, in reply to the proposed didactic stimuli, encouraging returns have been collected that confirm the effectiveness of the teaching strategy adopted, that is based on the installation of cognitive conflict within the scope of didactic situations.

Under this heading, the experimental trials in physics and in the laboratory were cogently revealed really because they provoked an emotional response in the pupils, that which induced a full involvement. In particular, the trials in the laboratory obtained an enthusiastic participation, probably because, after the initial phase of the project, there was an increase in the manual ability

¹⁰ for collectively we mean the assemblage of the various components which have a precise function, in the case of the "metal tool".

and the practical spirit of the pupils, so that at the end these same pupils spontaneously asked to formulate a new hypothesis to carry out another experimental programme.

Without doubt involvement in the ambit of the more "abstract" disciplines was revealed to be more problematic, in which to create the cognitive conflict it was necessary to return more often to the stimuli, to revise them, reinforce them or to substitute them. In particular the pupils were found to attribute a "sense" to the discipline apparently foreign to their experience in the discipline's area and to agree to a communicative code which functioned to represent concepts and ideas.

In certain cases the intervention may be considered satisfactory also if it was only able to "agitate" the apathetic and demotivated subject and to capture their interest and their willingness to learn, also if their production was only on a minimum level of profit. It is evident that it is not possible to overcome certain serious cultural deficiencies except by prolonged work over the years; what is important is to arouse real motivation in the pupil and to decisively launch them towards a path of integral personal growth which contemplates the human and professional aspect.

The reflections on the infrastructural resources and the deficiencies of the Institute, looking deeply into the functions and the modality of the work of the principal organs of the school (Class councils, Teacher Councils and the Institute Council), not that the initial surveys on the pupils (about the local socio-economic and cultural environment, family situation, the most urgent socio-affective needs, expectations, the ability and knowledge present, the previous scholastic experience, means of transport and time taken) allowed us to work from a quite complete and objective database and to prepare to intervene to prevent scholastic leakage. In particular it was activated at three levels:

- observation of the situation of the pupil, to particularise methods and content to provoke interest and to reinforce faith in the possibility of success.
- auto-observation of the group of teachers, to jointly elaborate and revise didactic strategies and unambiguous and coherent rules of behaviour.
- The reflection on the second level of intervention, that which concerned the teachers, was found to be particularly useful, in as much as they were induced to consider the actual function also in the light of the new acquisitions of the psychology of learning, and therefore projected towards an idea of permanent requalification of the profession.
- The "proportional" thought comes alive in a context relative to the professional knowledge of the teachers.
- The situation proposed is an a-didactic situation in the sense of the theory of the situations and this for the following motives:
 - Involving the pupils: they take responsibility for the problem, didactic devolution is attained to them it is a situation of conflict above all in the situation of "communication" that at the same time involves an active situation: "the pieces must be then possibly be brought together perfectly".