The model and the didactic modelling
an analytic point of view

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Abstract

The present paper develops the Concepts of scientific model and scientific modelling, from the perspective of their functioning at the didactic, metadidactic and sequential level. The paper proposes a manner of analysing the modelling from a triple position: as a didactic strategy, method and procedure. The study allowed us to define the didactic model and modelling in its relationship with analogy as a didactic method. We demonstrate the efficiency of modelling as a didactic strategy.

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Keywords: model; modelling; didactic and metadidactic level; didactic strategy.

1. Problem statement

The modelling is a didactic auxiliary with a high efficiency in developing a modern educational system, mainly its formative power. By reducing the descriptive-static elements through esentialisation, modelling assures that the process of educational development has a dynamic character, inter-systemic, functional and operative. Modelling is seen as an operation of studying the reality phenomenon by using the practical or ideal models. Analogy goes to the form, structure, functionality of the overall system or components.

Reproducing the logic scheme of information processing in a determined context, the modelling and the model allow the realisation of auto-regulation of the information system and the improvement in didactic communication”. (Ionescu, M., 1995, p. 166-167).

2. Purpose of study and main arguments

We analyzed the terminological status of the “model” and of the “modelling” not only on the didactic aspect, the model and modelling being seen as instruments (procedures, methods or didactic strategies depending on the objective, contents or context, the context becoming an essential reference point for the modelling), but also on the metadidactic aspect. Reproducing the logic scheme of information processing in a determined context, the modelling and the model allow the realization of auto-regulation of the information system and the improvement in didactic communication. We make the difference between the didactic and meta-didactic levels of the teacher’s activity,

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taking into consideration the fact that didactic design is placed at the metadidactic level, since this assumes the application of a “didactics” of the use of functional, operational and structural of the learning process components.

If models represent didactic instruments meant to facilitate the teaching and learning of notions, concepts or phenomena through analogy to the modelled reality, the meta-didactic models are design instruments, organizational and management instruments of the very didactic activity.

Further on, we focused upon the detailed analysis of the conceptualization directions of the meta-didactic perspective, and subsequently of the didactic perspective, having in view the way the two modelling perspectives occur in the educational field. The didactic aspect refers to the level of the effective utilization of the model in formative instructive process, and the meta-didactic aspect hints at the level at which the modelling builds up metacomponents that are involved in the didactic activity (Glava, C., Glava, A., 2004).

From the metadidactic perspective, the modelling can be defined as the activity proceeded by the teaching staff (or by the specialist in the educational field) through which models are built, materialized and selected (in their broad sense of model structures or analogies) and in the same time, the activity of their didactic implementation, at the level of the didactic activity design and at the level of interaction managements in the class group. It will be concretized in a work definition for this meaning of the term “modelling”.

The metadidactic perspective includes five ways of achieving an objective of the modelling in practice. (See the fig. 1)

![Figure 1. The modelling’s didactic and metadidactic perspectives](image)

The first way of achieving an objective - the instructional model- refers to the configuration of a vision of an explicit didactic activity from the perspective of a training theory (for example, the model of training centered on the student, the model of training centered on the competences etc). The instructional model represents the practical application of a theory concerning teaching.

The second form of achieving an objective is related to the first and refers to the implementation of design models at the level of the teaching’s staff didactic practice. It is all about what the specialized literature calls (Instructional design model). Planning a lesson represents an instructional design model whose purpose and objective is the lesson. If the instructional design model proposes a principle (a set of principles) of tackling the instruction on the whole, the design model proposes a way of tackling the concrete didactic activity or of a system of didactic activities.

The realization of didactic models - the third stages of modelling-represents the design activity and the realization of didactic models, for didactic usage in current instructional activities. Usually, models are suggested or
delivered by others. However, models are possible to be created even by the teaching staff or by the student, the didactic methodology serving in this case not only to the instruction, but also to the auto-instruction.

The fourth way of achieving an objective in modelling, from a metadidactic perspective is the reconstruction of the reality. The modelling reconstructs the reality in order to make it more accessible and intelligible. A model is in its essence an element through which we try to understand a reality which either is too complex, too difficult to be perceived or it is not at ease to bring it to a didactic activity or to study it without intermediaries, by what rights it’s modelling is necessary for didactic reasons. School’s modelling on a small scale of the social reality represents a form of manifestation of the metadidactic perspective of the classical concept of model modelling. (Antonesei, L., 1996; Cucoș, C., 1996).

At the border between the metadidactic and the didactic level, the modelling can be materialized in a didactic strategy; the strategy having a special status - it is equally didactic and metadidactic (the fifth form of achieving an objective). This fact results from the double nature of the status of the didactic strategy, therefore it is situated at the metadidactic level and has the status of methodological system applied at the didactic activity level, situated at the didactic level.

The didactic strategy describes the methodological context in which the model and the modelling will be used as didactic instruments. The didactic efficiency of the model and of the modelling depends on the characteristics of this context and of the didactic strategy which includes the modelling. The elaborating process of the model is sensitive to the context. Actually, the characteristics of the strategic context are already taken into consideration as part of the process of elaborating the model. On the one hand, the one who creates the model implicitly or explicitly builds the environment, too, the context in which he could use it with maximum results. The creation of the favourable environment adequate to the teaching in the context of the use of the respective model can be a much more difficult task than the realization of the model itself. (Glava, C., 2003).

As we have already mentioned, at the metadidactic level, the modelling represents the action of creating and using the didactic design models of the educational activities. During our investigation, we have considered the modelling as a methodological environment of teaching staff abilities of didactic design and class management development, being convinced that modelling is an efficient instrument of conveying certain complex pedagogical realities, such as the learning system and each teaching situation.

At the didactic level, modelling objectifies in practice into strategies, methods and procedures.

![Figure 2. The three positions of didactic modelling](image-url)
well as the choosing of the didactic methods and procedures to be used. The consequent didactic activity will carry as a central idea the learning through analogy.

As we already proven, imposing a certain context for the application of the model, modelling has the force to organise around it a whole didactic strategy, “to regulate an entire process and not only a sequence of learning” (Cristea, S cf. Potolea D., 2000).

Sorin Cristea includes modelling in the larger area of the didactic strategies defined as “options for a certain way of approaching and supporting learning” (Cristea, S, 2000, p. 350). Consequently, modelling becomes a didactic strategy in the moment when, through analogy, the student operates makes cognitive judgements by transferring certain characteristics of an object to another, in the perspective of acquiring knowledge. Developing of analogies is supported by the involvement of other methods, procedures and didactic means that have the role of amplifying the impact of model and modelling on knowledge.

The didactic perspective: didactic modelling is a teaching method integrated to a strategy and it mediates the transmission of essential knowledge in the economy of learning developed through the model.

The sequential perspective: didactic modelling subordinates to a method, being useful into an isolated sequence of the learning activity. In this case, the goal and intentions are entirely subordinated to the method and strategy used.

This triple didactic dimensionality of modelling is not a genuine fact. Pedagogy also mentions other components of the didactic methodology that have this multiple use. Problem based learning, algorithm based learning, discovery based learning, in fact, and majority of the activating learning methods are used form perspectives that transgress their traditional status as methods.

3. Findings and results

1. Didactic modelling is an activity that includes models in designing, teaching and learning. Modelling represents, from metadidactic perspective, the way through which a set of didactic components structure into a lesson. The project of a lesson is a model of action. Its materialisation into a lesson implies its didactic use (Glava, C, 2009)

2. Didactic modelling implies selecting or designing the models, in function of the applicative context. But, equally, the specific of the model determines certain characteristics of the application context. In reality, modelling determines the application context in the same manner in which the application milieu requires certain features for modelling and model (Glava, C, 2009)

3. Modelling implies an algorithm of didactic activity. The didactic implementation of a certain model implies following predefined sets of reality modelling stages as well as the necessary steps for creating the context of model application.

4. Modelling implies an interdisciplinary milieu of learning, being given the fact that models are complex structures that require transfer abilities for their effective use for learning. (Glava, C, 2009)

References