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TEACHER SCRIPTS IN BIOLOGY

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1. Theoretical framework

Understanding teaching implies an understanding of the thinking and action of the teacher (Shulman, 1986), this leading to a fuller understanding when these two domains are studied together and each is examined in relation to the other.
There are several ways to understand the teacher's thought and action. For instance the teaching modelisation (Schoenfeld, 1998, Monteiro, 2006) enables the study of teacher's thoughts from its cognition (believes, knowledge, goals) and actions, which in turn are derived from scripts, acting altogether.
Scripts correspond to sequences of actions in a specific context, likewise standardised and routinised, which is conceptually marked. People have at their disposal thousands of very personal scripts (Schank & Abelson, 1995) which they put to daily use, reducing the demands on their processing capacity.
The awareness of the scripts by teachers is of a crucial importance when reflecting about their practice and may lead to an improvement in their teaching actions.

2. Methodology

To understand this complex interaction between the teacher's thought and action specifically for a biology topic – *Diversity of Plants* - a case study methodology was chosen, with the main goal of understanding the case in the question (Stake, 1998), in a naturalist research according to Lincoln and Guba (1985).
In this study, supported by classroom video recordings, we have modelised the teaching of a novice teacher, using a modelling instrument (MI) by Monteiro (2006), that allows the identification of scripts implemented by teachers in their classes.

3. Analysis and discussion of findings

As a result of the modelisation teaching process we have identified a hundred and three scripts of the novice teacher during three and a half months of classes.

Giving an example, figure 1 presents one script, which corresponds to *Organisation of subject content – Plant morphology, using a flow-chart*, consisting of three actions: [1.9.1.], [1.9.2.] and [1.9.3.].

[1.9.] *Organisation of subject content* – Plant morphology, *using a flow-chart*

Triggering event:

The teacher asks whether all the plants observed outside were the same.

Beliefs:

The subject is oriented exclusively to the acquisition of concepts.

The student interacts with the subject and T, the latter acting as mediator between the former and student.

The interaction between the teacher and student is not equal, there being a stronger flow in the direction teacher-student than vice versa.

The teacher organises the subject content to be learnt, which are transmitted via exposition, using organisational and expository strategies aimed at engaging the students.

Goal:

To organise the subject content – Plant Morphology – making use of a flow-chart.

Knowledge:

GPK – the role of the flow-chart and Socratic elicitation in organising the subject content.

SM – the role of terms root, stalk, leaf, flower and fruit in the organising the subject content.

Episode type:

Script

Part of lesson image:

The topic of Plant Morphology forms part of the lesson image.

Terminating Event:

The teacher considers that all the students have had sufficient time to copy the flow-chart into their notebooks.

[1.9.1.] The teacher talks with the students about the content of the flow-chart – Plant morphology

Specific content:
Root, stalk, leaf, flower and fruit.

[1.9.2.] The teacher draws a flow-chart representing the subject content on the board

[1.9.3.] The teacher waits for the students to copy the flow-chart into their notebooks

Figure 1. Detailed characterisation of script *"Organisation of subject content – Plant morphology – using a flow-chart"*, according to MI (Monteiro, 2006).

This script shows that the teacher intends to organise the subject content about plant morphology. Inherent to this sequence of actions implemented by the teacher, a set of beliefs was identified which condition these actions.

For instance, one of the beliefs that was recognised as activated with higher priority in this sequence of actions (and was observed in the video recordings of the classroom) is the fact that the interaction between the teacher and the student is not balanced, being more strong in the teacher-student direction than in the opposite way, as is the case of when the teacher

makes the flow-chart in the blackboard establishing that plants are composed of root, stalk, leaf, flower and fruit.

4. Conclusions

The teaching modelisation enables teachers to identify their self scripts and, consequently, to have the opportunity to access their own thought as beliefs, goals and knowledge, underlying their action.
Additionally, the teacher could construct new action sequences or even reconstruct his scripts, incorporating more innovate or desirable aspects, maintaining its compatibility for action.
For instance, the script presented could be enriched if he orients his students to construct their own conceptual relationships about the parts belonging to plants and accordingly they will give shape to their cognitive maps, following the instructions of meta-learning of Novak and Gowin (1984).
Finally, the modelisation instrument can be considered a good tool to the professional development of teachers, by the awareness of the aspects related with the action and the teacher's cognition.

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