

Cognitive effects of two opposite teaching styles: expositive and guided-participative

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This paper aims to compare the cognitive effects of two teaching styles. It's theoretical framework is Vygotsky's body of work. Hypothetically the research issues that two different teaching styles, expositive and guided participative, produce different systems of learning. The hidden or non-explicit effects of each were focused. These cognitive effects were related to the transfer of knowledge (extended learning), to the cognitive (in)dependence from teacher, to the permanence on time of learned knowledge and, finally, to the efficacy of the peer interindividual support.

Four biology teachers were invited to teach their students from secondary school the same extracurricular subject. Two teachers had to use an expositive style and two had to use a participative style.

Data was processed with SPSS. *t* was used to test differences (in quantitative variables) between the means of both conditions. Differences in the linguistic dependence on the teacher were tested with chi-square.

Individual post tests regarding learning success show that the participative style enables extended learning, which is the process by which knowledge can be used in new situations. In addition, participative style helps the student to gain independence from the teacher and to use peer individual support more efficiently.

Keywords: Teaching styles, Expositive class, Participative class, Cognitive learning, Constructivism.

Introduction

Teaching styles, teaching strategies or teaching modalities are key topics in instructional psychology. Different types of learning may be classified differently. Basically there are two types: expositive and guided-participative. Contributors to the field have referred to this dichotomy as: passive and active (Michel, James & Varela, 2009; Weltman & Whiteside, 2010), traditional and progressive (Bennett, 1979, 1998; González Peiteado, 2009; Kozulin, 2004), behaviorist/instruction and constructivist/construction (Roselli, 2003, 2007, 2010), focus on teaching and on learning (Gargallo López, 2008), autocratic and democratic leadership (Coldren &

Hively, 2009; Quiamzade, Mugny & Falomir-Pichastor, 2009), directed and inductive tutorial styles (Jones, Holland & Oldmeadow, 2008), controlling and autonomy-supportive styles (Reeve, 2009), transformational and transactional (Hood, Poulson, Mason, Walker & Dixon, 2009), intrapsychological and interpsychological learning (Aubert, Gacía & Racionero, 2009), oriented to task and oriented to people styles (Yildirim, Acar, Bull & Sevine, 2008).

In the natural settings there is no pure style but mixed occurrence of both. However it is possible to recognize a tendency to one or another style.

Many researches in this field aim to compare the effectiveness of each one of these styles in learning. Therefore the issue would be: which teaching strategy is more effective for learning? Which one produces the best results?

For us that is not the right way to address the question. From our perspective it is more pertinent to ask ourselves about the qualitative effects that each one of these styles has in learning rather than to compare their effectiveness. We believe that the problem revolves around the different cognitive effects that teaching styles have in learning. These effects tend to be hidden.

Teaching in a conceptual view is communicative interaction addressed to take notice of the symbolic social system called culture (included the scientific knowledge). Learning is the internalization in conscience of this communicative interaction.

Learning is a process that takes place in different stages. In the first stage the teacher has an active role where he instructs knowledge as an external source and he controls the activity. In the second stage the learner himself begins to control the activity.

Socio-historical theory explains that teaching strategies are not only different ways to acquire knowledge. But they are also systems of activity (social technologies) that have distinctive cognitive effects in the process of learning.

On the basis of this theoretical assumption, the objective of the research that will be presented is to compare the cognitive effects that the expositive and guided-participative teaching styles have on learners. Hypothetically the research issues that two different teaching styles, expositive and guided-participative, produce different systems of learning. The hidden effects of each were focused.

Method

Four biology teachers were invited to teach their students from secondary school (13 years old) the same extracurricular subject (“Birds”). Two teachers had to use an expositive style and two had to use a participative style.

Expositive condition: 2 teachers, each one of them delivers 1 class to 1 group:

Teacher A: 1 class to group a

Teacher B: 1 class to group b

Participative condition: 2 teachers, each one of them delivers 1 class to 1 group:

Teacher C: 1 class to group c

Teacher D: 1 class to group d

Pre and Post-test 1: individual open questionnaire. The post-test included an additional personal conversation with 7 students of each group addressed to obtain a more explicit explanation of responses.

Post-test 2 (1 month later): individual re-test/ groupal exchange and discussion/ individual possibility to improve or change the original response.

Results

Pre-test data

Table 1

Pre-test data for both conditions.

	<i>M</i>	<i>Mna</i>	<i>Range</i>	<i>SD</i>	<i>N</i>
Expositive	1.68	2	2	0.71	14
Participative	1.81	2	2	0.75	14

Note: Spread of scale 1 (down level) to 3 (high level).

Both conditions had a similar general knowledge before the experimental classes. It is obvious that these measures concern the student’s general background and not their specific knowledge on the topics that will be delivered in the experimental classes.

Learning of specific topics

Table 2

Mean and standard deviation in learning of specific topics.

<i>M</i>	<i>SD</i>	<i>N</i>
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Expositive	26.28	1.89	14
Participative	27.28	3.31	14

Note: Spread of scale 9 to 36. $t(26) = -0.979, p = .336$ (no-significative).

Results show that there are no differences between expositive and participative conditions.

Extended learning (connected topics not considered in class)

Table 3

Mean and standard deviation of extended learning.

	<i>M</i>	<i>SD</i>	<i>N</i>
Expositive	7.57	1.34	14
Participative	12.28	2.70	14

Note: Spread of scale 5 to 20. $t(26) = -5.848, p = .000$.

Five topics that hadn't been taught during the experimental classes were evaluated in the post tests. The post-test results show very significative differences between both conditions. It is clear that the participative style produces more associative learning.

(In) Dependence from teacher

a) Distance between thematic rememoration of topics and real teaching.

In order to measure the independence from teacher, the students were required after class to make a list of the main topics that had been taught. The independence can be stated by measuring the distance between what the students considered as the main topics (and their order of citation) and what the teacher had actually delivered as main topics following a certain expositive sequence.

Table 4

Distance between the students' thematic rememoration and the real development of the topics in class.

	<i>M</i>	<i>SD</i>	<i>N</i>
Expositive	3.57	1.08	14
Participative	5.14	1.70	14

Note: Spread of scale 0 to 12. $t(26) = -2.908, p = .007$.

It is clear that the thematic representation of the class is, in the participative style, freer and less dependent from the didactic sequence.

b) Linguistic coincidence with the teacher.

Another measure of the (in)dependence from teacher is the linguistic coincidence between the students (in the post-test) and the teacher. It was tested in a specific topic (“Why birds fly”), where it was possible to identify coincidences in the use of words and verbal expressions to express some concepts. In fact, the verbal ‘clichés’ used by all the teachers when teaching came from the text source that was provided to them as an epistemic reference.

Table 5

Students’ reproduction in the post-test of verbal expressions of the teacher in topic 2b.

	Expositive style			Participative style		
	Yes	Non	Total	Yes	Non	Total
“El ave no es un cuerpo material que vuela en el vacío”	10	4	14	7	7	14
“La materia puede tener tres estados”	9	5	14	9	5	14
“El aire es un gas”	12	2	14	10	4	14
“Interrelación entre un cuerpo sólido y un cuerpo gaseoso”	8	6	14	7	7	14
Total	39	17	56	33	23	56

Note: $\chi^2(1) = .9722, p > .05$.

Even if the differences do not reach a level of statistical significance, it is possible to appreciate a tendency, in the students of the expositive condition, to reproduce exact verbal expressions of the teacher.

Permanence in time of learned knowledge

Table 6

Re-test of learning of specific topics one month later (post-test 2).

	<i>M</i>	<i>SD</i>	<i>N</i>
Expositive	21.00	1.96	14
Participative	22.07	2.64	14

Note: Spread of scale 9 to 36. $t(26) = -1.218, p = .234$ (non-significance).

As expected, data show a moderate decrease of learning of specific topics in both conditions.

Efficacy of the peer interindividual support

The opportunity to ameliorate the performance of post-test from the exchange and discussion with peers is better used by the students of the participative condition, as it can be seen in Table 7.

Table 7

Improvement in the post-test responses after cognitive interaction with peers.

	<i>M</i>	<i>SD</i>	<i>N</i>
Expositive	2.35	1.44	14
Participative	4.14	1.56	14

Note: $t(26) = -3.138, p = .004$.

The logical explanation is that participative style includes all the students as a cognitive group, with their socio-cognitive interactions in the process of teaching.

Discussion

In short, both styles assure the learning of specific topics. It appears that a good learning result is more influenced by a good teacher than by a particular style.

However, there are some qualitative effects related to the teaching styles (Figure 1).

<u>EXPOSITIVE</u>	<u>PARTICIPATIVE</u>
Learning focused on the specific topics that had been taught	More extended learning, including connected topics (emergent knowledge)
More dependence on teacher	More independence from teacher
Moderate permanence on time of learned knowledge	Moderate permanence on time of learned knowledge
Less cognitive connection with peers (less interindividual support)	More cognitive connection with peers (more interindividual support)

Figure 1. Differential cognitive effects of both expositive and guided-participative styles.

Participative style produces a more extended learning, which is the process by which knowledge can be used in new situations. In addition, the participative style promotes verbal independence of the students from the teacher. It also helps students to use peer individual support more efficiently.

The following design can be a good synthesis (Figure 2).

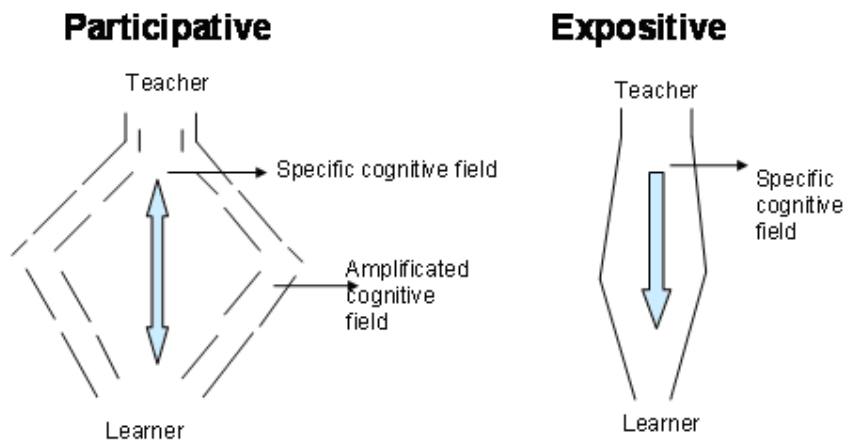


Figure 2. Differences between expositive and guided-participative styles.

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