Change in teachers' practice: An experience using reflective processes

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SUMMARY

Preparation of experienced teachers to implement a new curriculum or to use new teaching materials involves change in their practice. This can be obtained through a learning process where a new construct system is created. This paper presents a teachers training process based on Kelly's "constructive alternativism" idea. It emphasizes reflective processes as a way to promote conceptual change. The preliminary results highlight the importance of theoretical models embedded in curriculum materials and the difficulty of changing teachers' practice without support during their classroom activities .

Introduction

The possibility of changing experienced teachers' practice is the basis for promoting in-service training. This activity can be organized in different ways but generally involves the presentation of new ideas or methods to teachers. It places them in a learning situation where they are asked to integrate a new body of knowledge into their existing ones. The expected result is an improved practice containing the good aspects of old teaching style embedded in a more theoretically coherent and well organized way of teaching. In this aspect this situation is similar to that faced by students supposed to undergo a conceptual change when in contact with scientifically correct concepts.

As students do in relation to everyday life, it is possible for teachers involved in in-service training to develop parallel construct systems to deal with circumstances in training or in their classrooms. In this case, however, since "the iterative and social nature of teaching allows and encourages revision, postponement, elaboration or abandonment of yesterday's plan in response to today's experience in classroom" (Clark, 1986) the problem of parallel systems becomes critical and change in teachers' practice can only be achieved if a new construct system involving old and new ideas is created.

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Kelly's "constructive alternativism" is an idea that considers individuals capable of changing their lives by changing the way they see it (Pope and Watts, 1988). For that, they should become aware of their current ideas and try new ones as hypotheses. After testing these hypotheses, individuals can adopt them as their individual world views. This possibility of change has led to instructional processes where students' preconceptions are considered to be challenged during "experiments" that introduce scientifically accepted concepts. Conceptual change towards the "correct" concepts will occur as a result of a reflective process of contrasting results obtained with both sets of concepts.

The importance of reflective processes to enhance changes is stressed by Ben-Peretz, 1983, concerning teachers' views about their practice, and by Pope and Scott, 1983, concerning student teachers formation.

This paper will present a teachers training process that emphasizes reflective processes. The results obtained may contribute to a better understanding of conditions for conceptual change and, in this aspect, may be useful to in-service training and to teachers formation.

Description of teachers training process

A set of workshops and group discussions was planned to discuss ideas concerning teaching and learning processes. These activities involved two experienced teachers, two physics student teachers and me, during one semester. The themes for discussion were distributed in two sessions a week. In the first one, participants' views about the theme were elicited through different activities and discussed afterwards as a way to make them aware of their current ideas. During this phase, student teachers participation brought an intermediate point of view to discussion in addition to giving them opportunity to observe the backstage of classroom teaching.

In the second session someone else's view was presented by me and participants were encouraged to discuss as well as point out advantages and disadvantages between this view and their own. This phase was planned to create a conflict which solution, expected to be obtained through reflective thinking, would change participants' construct systems.

After this first "theoretical" stage of training, we started a more practical phase where the teachers and myself prepared each one a teaching sequence involving different topics of an introductory course in Mechanics. This was a fifteen week course attended by physics student teachers as well as by engineering and chemistry first year students. The intention now was to give participants an opportunity to try their possible new hypotheses concerning teaching methods. It was also an occasion for me to observe and for them to reflect about the difficulties faced by teachers when using new materials developed either by themselves or by others.

According to Pope and Scott 1983, "teachers views on knowledge and theories of

learning will affect practice in the classroom". Ben-Peretz ,1983 highlights the importance of curriculum materials : 'much of teacher thinking goes on in relation to curriculum materials, their interpretation and transformation into lesson plans and class realities'. So, to explore participants' construct systems about teaching and learning I decided to interview each one four times, at the beginning and at the end of whole process, using repertory grids focussed on teaching-learning process and nature of knowledge, curriculum materials, teacher' s roles in the specific course analysed and students' roles in this same course. These last two grids were included to complete the main aspects involved in teaching and learning as well as to provide a specific context within which the teachers could construe. This would avoid the "problem suggested by Yorke ,1987 connected to looseness in specifying the context - 'the outcome is almost inevitably a construct of such generality - or vagueness - as to be of minimal value to the researcher"

The sessions during the first semester, the interviews and some classes were tapere-corded. These included situations where teachers used new materials and some where they applied their usual way of teaching. A confrontation between their views and an external one about what happened during implementation was conducted during small discussions inmediatly after the classes. It was very useful to give them feedback and to highlight specific points in instructional process that they were not aware of having missed or changed.

Conclusions

Since I am still doing the analysis of data collected during this period, I will present preliminary results containing some notions of teaching and learning held by one of the teachers. These were obtained from eight repertory grids responded by this teacher and from observations made in his classroom.

The grids started with a broad theme - teaching-learning process and nature of knowledge, and then evolved to more contextualized ones like teacher's roles during the course under study. In all occasions elements and constructs were not given but elicited. This teacher has more than ten years of practice in teaching to physics student teachers and to students in secondary school. It is the second time he participates in a study where his practice is discussed and where some innovation is tested.

During the first grids I told the teacher not to constraint himself to what he thought reality was but also to say what it should be. So, the first results are a mixture of the way he perceives teaching and learning as it occurs and his thoughts about an ideal situation.

The elements elicited in the grid about teaching-learning process and nature of knowledge are centered on teacher and may be grouped in three different categories: 1- conditions, 2- procedures and 3- constraints. The constructs involving these elements reveal a model where the teacher, who transmits knowledge, has direct connection to re-

sults of process. The student must have the necessary pre-requisites to acquire this knowledge. Moreover, the idea of improved learning is related to student's interest, questioning and valorization of process.

In the grid about curriculum materials the elements appear scattered in seven groups with no more than two elements in each. The textbook is seen as an isolated element while laboratory and audiovisual aids form one group. Students' notes are also isolated. The teacher's voice is considered as an element forming a group with the blackboard. Extraclass elements like scientific publications, everyday life objects, nature's phenomena are also considered. Knowledge is seen as acquired information (used to motivate the process). Activities connected to school precinct depend on teacher.

The elements elicited during the grid about teacher's roles in the specific course analysed show the teacher as the giver that controls the whole process. He stimulates student participation, provides texts and exercises, links content to life applications and evaluates learning. This evaluation process occurs during the whole course and gives students opportunity to reason.

Students' roles involve some mechanical activities like making precise laboratory measurements, attendance at classes, awareness of course's importance and content and adoption of a study scheme. The active roles played by students involve relating classes' content to everyday life, discussing their doubts and giving emphasis to concepts before starting solving problems. Activities in the classroom or in laboratory give access to information. The use of it is made outside classrooms.

The results obtained in the second series of grids present a change towards a more practical dimension. The constructs are more related to procedures adopted during teaching than to theoretical aspects involving teaching and learning.

Although the majority of elements remained the same at both series of grids, they appeared at different groups and even at different grids (some elements from teacher's roles and students' roles grids were elicited in teaching-learning process grid) . The teaching model, however, did not change and did not correspond to verbalized ideas presented by the teacher during the first phase of training as well as to ideas contained in new material.

The observations made during classes revealed no difference between teacher's approach in his traditional way of teaching and the approach adopted when he was using material developed by others. Even when the material indicated some specific methodology, the teacher just continued in his usual way without making sense that he was not following the plan.

When a teacher is presented to curriculum material developed by others, he needs to integrate the theoretical models embedded in this material into his own construct system. In so doing, it is impossible to anticipate how he will use it.

These previous results suggest that presentation of new ideas or even use of them in a theoretical situacion can not be taken as a guarantee that a conceptual change has occured, but that, at least, a structure containing these ideas has been developed. The in-

tegration of this structure into the main construct system can only be detected by observation during teacher's practice. This can be used to provide feedback to teacher, giving him opportunity to go a step further and really undergo a conceptual change.

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