University teaching: didactic expertise reflected by metacognitive abilities and emotional control

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Abstract

The present study assesses the impact of cognitive, behavioral and emotional factors on university teaching performance. The qualitative and quantitative analyses have been made by selecting expert and veteran university professors and considering a variety of methods and instruments. The results revealed: the teaching expertise is clearly dependent upon the type and level of metacognitive abilities and reflexive practice (frequency and content) ($t = 3.14, p< .01$), personality profile ($t=1.98-3.08, p< .05-.01$), frequency of using efficient teaching strategies ($t=2.45-2.78, p< .03-.01$), and emotional control ($t= 2.25, p<.05$). The outcomes are very useful in designing faculty professional development programs.

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1. Introduction

A major shift could be noticed in the educational research domain starting with 1990. More exactly, we have identified a translocation of the emphasis from the study of behavior to the investigation of the way in which ‘the teachers give meaning to teaching and learning’ (Richardson, 1994, apud McMeniman, M. et al, 2003). According to the new paradigm, the majority of the research studies on educational practices focus on the analysis of the reasoning, knowledge, beliefs and actions that a teacher uses in the context of normal teaching. One general conclusion that emerges from those studies is that the practitioner acts as a mediator on the information that he is using, by building meaning and new knowledge, and being in a permanent interaction with it. Palincsar (1998) emphasized that cognitive structures are typically viewed as individually constructed in the process of interpreting experiences in particular contexts. Practically, the behaviorist approach on teaching and learning is replaced by cognitive and social cognitive approaches. Contemporary interest in teaching moves beyond the teacher’s
observable behaviors, and targets the exploration of the way a teacher thinks (knowledge, beliefs and personal theories) and the way he develops teaching competencies. Assuming this new perspective, the present study aims to make a multidimensional analysis of the university teaching expertise. More precisely, we focused on two central aspects: a. the identification of the key factors which determine or facilitate teaching performance; b. the elaboration of some development strategies of teaching expertise by manipulating/modifying the determining and facilitating factors (which we first identified).

Our large research project had four major goals:
1. The identification of different factors that influence the teaching performance in higher education.
2. The evaluation of the impact of these factors on teaching performance.
3. The elaboration of a university teaching expertise model.
4. The designing of a professional development program according to this model. In the present paper we will present the methodology and outcomes for the first two objectives.

2. Study 1.

Study 1 (a qualitative one) is presented in an expanded form in another scientific paper (Procedia SBS) that is issued. Here we offer just a short version of it in order to have a pertinent prerequisite for study 2 that is the core of the present paper.

The main objective of study 1 aimed at the identification of key factors that influence the teaching performance. In order to fulfill this objective we imply, principally, a qualitative research strategy. We used the study case method to compare an expert teacher with a veteran teacher in higher education in order to identify the different characteristics between these two categories. The veterans are teachers who have a teaching experience of more than 5 years. They have numerous hours of practice, along their career they have come into contact with formal knowledge, yet, despite these, their teaching achievement is not excellent, as is the case of the expert. We opted for a comparative analysis expert – veteran, to the detriment of an exclusive analysis of expertise or of the relationship between the expert and the novice, since, in the specialized literature there are relatively limited studies which investigate deficient teaching at a university level, most of the studies focusing on the success stories in teaching, that is, on the experts. In the expert literature, we can mention only two studies that examined the problem of deficient teaching, as it is perceived by the students – namely, the studies conducted by Hativa in 1998, respectively, 2001. Perhaps one of the reasons for the lack of these studies lies in the fact that veterans are more sensitive to the aspects of their teaching activity and, as such, more reticent about participating in studies that examine their teaching (Hativa, 2001). Most of the studies that investigate the teachers’ personal theories about teaching include, as a rule, 2, 3 or more participants with similar characteristics (either all of them experts, or novices / veterans), carefully chosen so that the anticipated results should be as similar as possible (literal replication, Yin, 2005). In our case, the participants’ characteristics are different (an expert and a veteran), and were chosen as such so as to make it possible to obtain different results, but out of predictable reasons (theoretical replication).

In this stage of the research project, we examined the teaching strategies, knowledge and personal theories about learning of an expert teacher in comparison with those of a veteran, in their university teaching practice. We aimed at providing answers to the following questions:
1. Are there differences regarding the teaching strategies employed by the expert, as compared to those used by the veteran, and if so, what do the differences consist in?
2. What is the connection between the teaching strategies of the expert and the veteran and the psychopedagogical knowledge they have, respectively, their theories about teaching?
3. Are there verifiable differences between the expert and the veteran regarding the content of their reflections upon the courses they teach?
2.1 Method

2.1.1 Participants

Two university professors: an expert and a veteran. They teach similar courses (in terms of content) in two different faculties of a public university. They were selected on the basis of the following criteria: the results obtained on the student course evaluations (very good results – the expert, very poor ones – the veteran), the subject they teach (statistics, a mandatory course for 1st and 2nd year students; approximately the same number of students), their accumulated teaching experience (over 5 years in both cases), the psycho pedagogical module they completed.

2.1.2 Instruments

In order to reach the goals of this study, we made use of several methods of investigation that imply specific instruments: the individual interview, video recordings of the classes, the stimulated recall technique, students’ course evaluations, the self-evaluation questionnaire. The individual interview provided the participants with the opportunity to speak about their own teaching activity and about teaching in general. The interview questions were varied, ranging from general ones about the participant’s backgrounds, their teaching experience, to more specific aspects linked with the study. The questions targeted both the preparation and actual teaching of the course and the identification of positive reflection practices over teaching. The question-grid was devised starting from the analysis of the results of the studies conducted by Hativa (1998, 2000, and 2001). The video recordings of the classes consisted in recording five course activities with each participant. All these activities were part of the same logical unit. The stimulated recall consisted in the participants’ analysis of the video recordings of two of the courses taught. Stimulated recall is a useful and appropriate technique for explaining, in teacher’s own words, the reasoning behind teaching (Ethell & McMeniman, 2000; Meade, McMeniman, Wilson, Kanes & Davez, 1991). The students’ course evaluations (Opre, 2000, 2010) required from the students to evaluate the teacher from the perspective of the three dimensions of efficient teaching: organization, clarity in communicating ideas and their relation with the students. The self-evaluation questionnaire addressed to the teachers (Opre, 2000, 2010) has a structure similar to that addressed to the students, focusing on the dimensions of organization, clarity and relation with the students. Together with the four open questions at the end, these aim at obtaining information about the teacher’s perspective upon utilizing efficient teaching strategies along the classes which the investigator attended.

2.1.3 Procedure

The data was collected through investigations conducted in a Romanian public university over a period of five months. Each method, mentioned and described above, followed the standard application procedure.

2.2 Results and discussions

Question 1

We answered the first question by using the results of the analysis of the video recordings and of the students’ course evaluations of the two participants in the study. By analyzing the results obtained, we can conclude that the differences between the expert and the veteran consist both in the number of efficient/inefficient strategies involved in teaching and in the intensity (frequency) at which these strategies are employed. Thus, the expert, unlike the veteran, uses a large number of efficient strategies, but he also uses them with high frequency. There are certain efficient strategies in which case he is appreciated at a medium level. By contrast, the veteran usually employs very few efficient strategies, which he uses with medium frequency, resorting in exchange to inefficient strategies. He is in a way a mirror image of the expert. You may not excel in using all efficient strategies, but you can still be regarded an expert in your field, just as it is possible that on the whole your teaching may be considered deficient while you may nevertheless be good at using certain efficient strategies.
Question 2

In order to answer the second question we correlated the results of the analysis of the interviews (audio and stimulated recall) with those of the video recordings, respectively, of the students’ evaluations (the results of question 1). Our research approach revealed that the presence of certain erroneous theories about teaching and about the students, in conjunction with meagre knowledge of general pedagogy leads in the case of the veteran to the use of inefficient teaching strategies but also to the deficient application of the teaching strategies he is familiarised with. By contrast, the possession of solid knowledge of efficient teaching strategies, complemented by healthy theories and convictions regarding teaching, increases our efficiency in the teaching act. We may conclude that efficiently solving problems in a field presupposes mastering a great deal of declarative and procedural knowledge specific to the respective field, acquired through intentional learning or by implicit, unintentional learning.

Question 3

The answer to the third question is based on the analysis of the content of the interviews of stimulated recall upon three courses taught by the expert, respectively, the veteran. We resorted to this technique in order to make it possible for the study participants to explicitate part of the knowledge and theories lying at the basis of the decisions taken during the preparation and the teaching of the recorded courses. The interviews that made use of stimulated recall were conducted 48 hours after the video recording of the course. They were organised in such a manner as to allow the participant’s and the researcher’s intervention in the analysis or the recorded courses. By analyzing the results, we observe that the veteran’s reflections, in comparison with those of the expert, are more infrequent and are poorer in content. Indeed, the studies on the subject (Chi, Glaser, & Farr, 1988; McAlpine et al, 1999) show that the experts have more frequent reflections and are more capable than the non-experts in articulating these reflections. It is well-known that constant reflection over one’s own practice is essential for developing expertise in any field. Furthermore, the reflections of the two participants are dependent on the knowledge and theories they have about teaching. The fewer their knowledge of teaching and more erroneous their personal theories, the poorer their reflections over teaching. Therefore, we can claim that a teacher’s developing of knowledge and the validating of his theories about teaching may lead to improving his ability to use reflection efficiently and, eventually, to improving his own expertise. Specialized studies (McAlpine & Weston, 2000) show that, at least in the case of the novice teachers the formal acquisition of knowledge about teaching is essential, since any reflection over teaching could be extremely difficult in the context of some minimal knowledge of the subject. Another important condition for reflection to produce expertise is that a teacher should intentionally focus on his practice and experience and plan his future actions on the basis of this reflection. In other words, the valorization of the act of teaching and the motivation to be good in your field are essential for reflection to be useful and efficient. Developing teaching expertise is, in consequence, conditioned by the teacher’s motivation toward reflection, but also by the level of his knowledge in his field of expertise, which should provide the content of these reflections.

3. Study 2.

Based on the data collected and interpreted in study 1 we designed another study. The main objective of the second one was to assess the impact of the factors identified in the previous stage (cognitive and metacognitive, behavioral) on the teaching performance. More exactly, we intend to find out if the differences between expert and veteran can be identified in the large population. We also propose to evaluate the impact of the emotional and personality factors that affect teaching performance. In order to fulfill our goals, we implied a quantitative research strategy that was expressed in an experimental design.

Hypothesis: There is a statistically significant difference between experts and veterans regarding: a. metacognitive abilities and reflexive practices; b. personality factors; c. personal theories about teaching and teaching strategies; d. emotional control abilities;
3. 1. Method

3.1.1 Subjects

Our study sample was comprised by 92 subjects, university professors (experts and veterans) from 14 different faculties. The participants were selected from a database which included 460 university professors which were evaluated with the questionnaire we developed in the first phase of our project. We selected our participants considering the course-evaluations made by students. Using this criterion the sample was divided in the two groups: (1) 47 Experts and (2) 45 Veterans. (The overall score for each professor was formed by calculating the mean of the average scores for the first 25 items (general and specific) from the course evaluation questionnaire for students.

3.1.2 Instruments

Our decision in choosing the research instruments was influenced by: a. the diversity of factors which influence university teaching performance (factors indicated by the research literature and verified by our first study, the qualitative one); b. the need to diagnose those influences. Therefore, we used two different sets of instruments: a. adapted instruments; b. an ad-hoc developed instrument.

a. adapted instruments:
- “Metacognitive Awareness Inventory” (Schraw & Dennison, 1994) - which evaluates the reflection on teaching capacity (metacognitions) (we translated it and adapted it)
- “Cognitive Emotion Regulation Questionnaire” CERQ (2006) - which evaluates the capacity for emotional cognitive control (we translated it and adapted it)
- ZKPQ (Zuckerman Kuhlman Questionnaire, Zukerman, 2004) - which evaluates personality profile. This instrument is adapted and normed for the Romanian population by our team (Opre, 2004; Opre & Albu, 2009).
- NEO PI-R (NEO Personality Inventory), Revised – age: 14+ years / Class B Test.

b. Our own instrument (elaborated by our team members):
Teaching Theories Questionnaire (Opre, D 2006, 2010).

3.1.3 Procedure

Considering the variety of instruments (adapted and developed), the quantitative analysis have been made over a large time interval: April- June 2010; October-November 2010. In the process of data gathering, we have been supported by the University Quality Management Center, secretary offices from faculties and by a group of master students.

3.2. Results

The data obtained were computed by SPSS and the statistical method that we used for testing the significance of difference between the means of the two groups, for each factor, was the t test.

a. metacognitive abilities and reflexive practices
We found significant differences between expert and veteran teachers. The experts had higher abilities for cognitive, metacognitive and motivational regulation (t = 3.14, p < .01). These results are very important because studies about educational reforms have shown that the self-regulation ability in learning is essential for the teachers’ professional development, and also for the promotion of these abilities among students. When we compared experts’ and veterans’ reflection about teaching, the veterans had fewer reflections (only 10, when experts had 20), and their content was more deficient. Our analysis revealed that the teaching reflections where knowledge and theory about knowledge dependent. When there is little knowledge about teaching, and the personal theories are false, the reflections about teaching have a poor content. To conclude, we can state that the development of teaching expertise is conditioned by the teacher’s motivation for reflection, and by the knowledge level of his expertise domain which would offer the content of these reflections.
b. personality profile.
After we reviewed the literature, we noticed some contradictions between the reported results. So, Abrami, D’Apolonia and Rosenfield (2007) affirmed that there are no significant correlations between a teacher’s personality characteristics and the evaluation of the teaching activity. According to them, the teacher’s personality profile has no influence on the quality of teaching. On the other hand, other studies reveal exactly the opposite, students consider that personality traits such as agreeableness or openness as essential for a good teacher. Therefore, for the qualitative segment of our research we evaluated the teacher’s personality profile by using ZKPQ (Zuckerman Kuhlman Questionnaire, Zukerman, 2004) and NEO PI-R (NEO Personality Inventory). ZKPQ was translated and normed for the Romanian population by one of our research team members (Opre, 2006). Data analysis revealed important differences, as we expected. So, comparing the veterans (teachers who had more than 5 years of teaching experience, but had a low class performance) with the experts (teachers who had more than 5 years of teaching experience, but had a high class performance), the experts had significant results for the following scales:
1. Sociability (t= 2.15, p<.05) - tendency toward interaction and intolerance of social isolation.
2. Activity (t =3.08, p<0.1) - preference for sustained and varied work; high level of energy for daily activities routines
3. Sensation-seeking (t= 1.98, p<.05) - the general need for sensation and challenges; the preference for new and exciting situations; the need for change and novelty.
4. Consciousness (t=2.87, p<0.1) - organization; self-discipline and need for achievement (see NEO PIR).

C. personal theories about teaching and teaching strategies.
The literature and the case studies in the previous stage allowed us to identify a series of differences between experts and veterans in what concerns their strategies and teaching theories. To test if these differences are relevant to the entire university teaching stuff we elaborated an ad-hoc self-evaluation questionnaire that was applied to all the subjects in the study. The questionnaire comprised 3 to 4 statements regarding teaching strategies (both efficient and inefficient) and theories on teaching (both correct and erroneous) as they have resulted from the case studies. The subjects were asked to tell (by using a one to five scale) to what degree they are in agreement with the 34 statements in the questionnaire.
Significant differences were obvious just in the case of 6 out of the 34 questionnaire items (t=2.45- 2.78, p< .03-.01). Four of these items fall into the category of efficient teaching strategies whereas the other two fall into the category of teaching methodology. In the case of the other items although there are differences between the averages they are not significant. Taking into consideration both the qualitative and quantitative research we underlined important differences between the student evaluations and experts evaluators on one hand and self-evaluation on the other hand. All things considered, we can conclude that the veterans overrate themselves in what regards the use of efficient strategies whereas the experts are more pragmatic regarding their own teaching competencies. In what the teaching theories are concerned there are significant differences between experts and veterans at the level of items number 28 and 34. Analyzing the averages scored by the two groups for these items we could notice that the experts prefer the good quality teaching theories (m2 < m1 at item number 28) and reject the erroneous teaching theories (m2 > m1 at item number 34). Although statistically unsignificant this tendency is also present in the case of the other items that reveal the teaching theories of the investigated professors. Moreover, the tendency pattern replicates the one resulted from the case studies. Therefore, we can say that there are enough pieces of evidence to show relevant differences between veterans and experts regarding their teaching theories. To sum up, the veterans predominantly have erroneous teaching theories whereas the experts have good quality teaching theories.

d. emotional control abilities
Our results indicate that the teacher’s class performance is dependent on their emotional control ability. Actually, the results from Cognitive Emotion Regulation Questionnaire (CERQ) have indicated significant differences in favour of the expert teachers (t= 2.25, p<.05). In other words, emotional regulation abilities are an essential prerequisite for developing teaching expertise.
4. Discussion and conclusion

To sum up, we can state that this study has revealed that the presence of some mistaken theories about teaching and students together with little knowledge of general pedagogy make the veteran professor to use inefficient teaching strategies, or to apply in a wrong way the strategies that he knows. Also, the teaching expertise is dependent upon the professor’s emotional control abilities, personality profile, metacognitive abilities, and reflexive practices. Any form of evaluation would become efficient only if it could lead to reflection about one’s own teaching and motivate the permanent improvement. As Ory (2000) said, evaluation means learning, development and construction. If we do not learn from the permanent feedback that we get for our work, than we can’t talk about expertise development. In other words, the evaluation doesn’t meet its final aim: to help us in our own development.

The correct interpretation of the significance of feedback and the knowledge about efficient teaching strategies are necessary for teaching expertise development. We think that reflexive practice, and not repetitive practice, is the expertise marker in any domain.

We consider that our investigation results are a necessary support for those who are interested in the development of teaching expertise. These results are strong arguments which can be used by university professors who are preoccupied by their own professional development, but also by the instructional development consultants who could elaborate intervention models for teaching development. With all these, we still need a logical and standardized perspective. Without an integrative and coherent approach to evaluation strategies, analysis and development of teaching expertise, the development of a program that aims at optimizing the teaching process remains a utopia.

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References


