Teaching psychology in an innovative way. A report of an experiment[*]

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Abstract

As an alternative to traditional teaching, we present the results of teaching three undergraduate psychology courses which incorporate three educational innovations: a) Making learning visible; b) Best teaching practices and c) Learner-centered teaching. The aim is to prove the effectiveness of teaching by comparing the results obtained at the start of courses (pre-test) with those achieved at the end (post-test) to identify quantitative and qualitative differences in learning. The findings reveal significant differences between pre-test and post-test of less than .05 in the three groups. Almost 66% of all students claimed to have accomplished all their course goals, in addition to acquiring other academic and personal results. The accomplishments are attributed to the teaching methodology used, but limitations are recognized. Although the experiment used psychological content, it may also be used to teach other kinds of subjects. The findings reported provide an example of how a non-traditional approach to teaching can get better results.
Keywords: university teaching, psychology teaching, making learning visible, good teaching practices, learner-centered teaching.

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[*] Translated into English by Padraic Arthur Smithies.

"Teacher, know the effects of your teaching"
J. Hattie, Visible learning for teachers.
Maximizing impact on learning, 2012

INTRODUCTION

In this article, we present the results of an experiment which taught, using an innovative approach, psychological content in an undergraduate psychology program. The aims were three: identify teaching practices which have a positive impact on students' learning; assess success in achieving established teaching goals; and share an experience which may help other professors interested in improving the quality of their teaching, because they constitute important actions to make excellence in teaching visible (Bolivar and Caballero, 2008).

Innovating in teaching, especially in higher education, has posed a considerable challenge in view of the overwhelming predominance of expository teaching at this level of education (Hativa, 2000), which can be explained by its centuries-long tradition in universities (Friesen, 2011); it is how most of us have been taught; it is a deeply rooted teaching model, with which we are completely familiar, which makes it difficult to supplant (Dewey, 2006).

We acknowledge the advantages of this teaching model (it allows for organized presentation of content; it helps the student identify the key points of the subject taught; it is economical, in the sense that it reaches large numbers of students (Cruz, Huarte and Dalponte, 2000), and can be engaging, clear, and amenable), but we must also recognize its limitations: it serves above all to acquire theoretical command of a subject above other kinds of learning outcomes, such as skills and attitudes (Zabala, 2000); the main instructional activities are performed by the teacher, leading students to adopt a receptive and passive role, which does not favor the construction of knowledge (Coll, 2001), by denying them the opportunity to fully engage in their learning process; for that reason, it is said that good exposition will not necessarily ensure that students acquire a command of academic content (Weimer, 2002). The mere act of teaching does not produce learning (Hattie, 2012).

On the other hand, traditional forms of evaluation are also problematic because, in general, they similarly fail to focus on bolstering and correcting the process of acquiring knowledge, concentrating instead on achieving accreditation (Zabala, 2000). Also, they usually use a single kind of instrument, like the examination or objective test, with questions which, in most cases, require the student to repeat information given by the teacher or in textbooks. Such evaluation causes the knowledge acquired by students to remain at the most elemental cognitive levels (repetition and reproduction) rather than complex levels like problem solving, creativity, and critical thinking, which are the most prized aims of teaching in higher education (Hativa, 2000; Ramsden, 2007).

Consequently, there is a clear contradiction between the desired aims and the means of pursuing them, since students are unlikely to achieve them through traditional teaching and evaluation alone. This in turn underscores the need to test other teaching practices to improve students' chances of fully acquiring the intended knowledge and help them achieve the ends of higher education.

As regards teaching of psychology, students consider it excessively theoretical and verbalistic (Carlos and Guzman, 2007) and focused more on disciplinary aspects than on the needs of professional practice (Covarrubias, 2008). Although students

have a positive opinion of their teachers, they also report having received traditional teaching, using almost exclusively expository methods, with scant support and didactic aids, as well as use of objective tests as the predominant instrument of evaluation (Castaneda, 1999; Covarrubias, 1997; Carlos and Guzman, 2007).

The negative consequences of the use of traditional teaching methods are documented in a study by Carlos, Castaneda and Cardoso (2015), in which 479 undergraduate students participated, who were evaluated to ascertain what they had retained after completing two psychology courses, one given one year before and the other the previous semester. They found that 76% of subjects did not recall the core concepts covered in those courses; in other words, a large part of the students had forgotten what they had seen in the courses in question.

The findings reported underscore the need to teach differently, but innovating becomes difficult when it involves changing teaching practices which are highly internalized and familiar for other, new ones, which require the teacher to act differently, a task which can be hindered by a lack of models or guidelines to follow to effect such change; at times, even though the teacher is convinced of the need to teach differently, she/he does not know how to go about it.

To address the problems we have identified, we present the results of teaching psychological content with an innovative approach, which, in our view, can be used in other areas and at different educational levels, with appropriate adaptations. Also, we support the idea that teaching can be a kind of research focused on understanding how students learn and evaluating the influence of teaching on such outcomes (Bolivar and Caballero, 2008).

Theoretical basis for innovating in teaching

What does educational research suggest to us about the factors to consider so that teaching fosters learning in students? There is substantial accumulated knowledge on the subject, but in this article we will focus on three approaches, because they have proved effective to promote learning in students. They are: *making learning visible, good teaching practices, and learner-centered teaching*. We describe their main features below.

Making learning visible

John Hattie, an Australian researcher, summarized fifteen years of research on factors which affect students' learning, by means of 800 meta-analyses covering 52,637 studies conducted with approximately 240 million students (his results were published in Hattie, 2009). Later, he published another book to help teachers use the findings from his research and improve teaching practice (Hattie, 2012), in which he states that to make learning visible we need to explain teaching goals and make them transparent, expressing them in a way makes achieving them a challenge, and allow both teachers and students to determine to what extent they are accomplished. He observes that the greatest effects on learning occur when teachers become learners and students their own teachers.

To achieve this, the teacher needs to create an atmosphere to stimulate learning; adapt to the traits of students and the teaching context; and be critical to identify the effectiveness of his strategies and change those that do not work, in other words engage in a process of ongoing improvement of her/he practices. It is especially important to offer frequent feedback and not punish mistakes.

Good teaching practices
Another point of departure was a study on the practices of distinguished tea-
chers considered outstanding by their students and colleagues (Bain, 2004;
Blanco, 2009; Carlos, 2006 and 2014; Ibarra, 1999). Below, we divide their most
salient qualities in categories.

> a) Didactic ability
> These professors teach with clarity and link topics to other areas of knowledge;
> their classes are enjoyable and dynamic; they give student constant feedback;
> they use different didactic strategies; they create a propitious climate for learning;
> they motivate students and awaken their interest; and their priority is to advance
> their learning. Likewise, they pose challenges and maintain high expectations for
> their students; they use evaluation to foster learning and not only to accredit stu-
> dents. They plan and prepare their lessons, and above all adapt their teaching to
> the type of content to be taught and their students' characteristics, and they have
> a highly-developed ability to simplify abstract content.

> b) Attitudinal factors
> They display a favorable predisposition toward teaching, students, and their sub-
> ject matter. They enjoy teaching and want to have rewarding personal relations-
> hips with students. They are respectful toward them and value knowledge and
> their profession. They are autocritical in what they do, constantly strive for profes-
> sional improvement, are open to feedback from students, and have a strong sense
> of commitment and responsibility in their teaching practice.

> c) Command of area-specific knowledge
> They show a strong command of the subjects they teach, clearly distinguish core
> elements from secondary points, and are experts in their fields.

> d) Personal qualities
> The most frequently used to describe them are kind, courteous, willing to help
> students, consistent, empathetic, fair, patient, congruent, leaders, creative and
> innovative, humble, and sensitive to interpersonal issues.

Learner-centered teaching (LCT)
The third point of departure is distinguished by placing the student at the center of
instruction, making her the protagonist of the process and her learning its primary goal
(Carlos, 2011). To that end, teaching seeks to link subject matter to students' needs
and interests and imbue learning with social value (Weimer, 2002). When curricular
content is connected with issues critical to students' life, it is called *culturally relevant
content,* and has been found to favor learning (Na`ilah, 2016). In LCT, knowledge is not
covered, but used (Zabala, 2000); content is not acquired on a purely theoretical plane,
but above all experientially, posing challenges as a means of motivating students.

Weimer (2002) emphasizes the importance of making students responsible for
their learning. For that purpose, it is necessary to stimulate their interest in the con-
tent to be learned, helping them to self-regulate their process of acquiring knowledge
and achieving intellectual autonomy. The author mentions that evaluation should not
be used only to accredit; it is most effective when the teacher uses it to foster learning.

LCT is based on research which has found that students learn better when they construct knowledge instead of receiving it (Huba & Freed, 2000). It is crucial to work with tasks, practice what has been learned, and have models or examples which help them (Reigeluth, 2013). This is illustrated by a quote from Resnick (1981): "Teaching should not be designed to introduce knowledge in students' heads, but to put them in situations which allow them to obtain well-structured knowledge" (p. 660), or as Chickering and Gamson (1987, cited by Huba & Freed, 2000) affirm:

> Learning is not a game where the student is a spectator. He will not learn much if he is just sitting there, listening to the teacher, memorizing answers to write on tests and accumulating grades. Students should discuss what they are learning, write about it, relate it with their past experiences, apply it in their daily lives. They should make what they are learning their own (p. 45).

In sum, this approach places great importance on the active role of the student in learning and the need for her to appreciate that learning will require effort and dedication (Carlos, 2014b), because without that level of involvement learning cannot occur. Learner-centered teaching is being applied in different places around the world to innovate in teaching (Huba & Freed, 2000).

Description of didactic organization of courses
The experiment reported combined the three approaches described above, and what we present here are the son results obtained by applying it in three courses in an undergraduate program in psychology. The courses had the following characteristics:

•They clearly established the purposes and products of teaching. In this sense, at the begining of each course, the teaching goals were explained, as well as the different products, to verify command of course content.
•They identified prior knowledge, both to ascertain students' initial ideas and to assess their knowledge, so that they could be contrasted with those obtained after completing the course. To achieve this, we applied a pre-test and a post-test in each course.
•They clarified the style of work and evaluation. In the course outline we explained the style of work, the rationale, and the mechanisms to evaluate them, characterized by being continuous, with cumulative results, involving different kinds of tasks, and using scores differentiated based on the level of difficulty; everything the students did counted. There was no final exam and students were graded based on the assignments and tasks performed throughout the course. We encouraged them to try to learn, and not to obtain just a passing grade.
•They stimulated higher cognitive processes. The course activities, and above all the products requested, required students to be active participants in their learning, to develop complex cognitive processes, such as analyzing, interpreting, applying, creating, and organizing, and not just passively receiving the information provided by the teacher.
•They combined teaching strategies. We used different strategies, for example, expository teaching, cooperative learning, case studies, debates, and project work.

•They opportunely delivered the required course materials. The course materials were both printed and electronic. Printed materials were distributed beforehand and electronic materials were in a virtual folder, which also contained their grades, presentations, guidelines for assignments, and rubrics. Thus, they had everything needed for the course and could keep track of their performance.

•They worked basically on tasks or products. During the courses, different products suited to the nature of the course content were requested; examples include: designing instruments to evaluate learning; applying cooperative learning strategies; conducting an accreditation study; making a didactic sequence; formulate a teaching evaluation system; analyze teaching methods, etc. They also wrote essays and engaged in recreational activities like making a video, theatrical performances, didactic games, or poems and songs. We will explain the specific activities of each course in detail below.

•They took care to ensure that expositions were clear and well organized. They used PowerPoint presentations, which were sent to students in advance. In class, the presentations were explained, not read. At times, when the content presented was especially important, a dynamic was used in which, at the end of the class students were given time to summarize what they had seen, first individually and then in pairs. Later, at random, a student was asked to summarize the class presentation in the order it was given, repeating the process with several students until they had covered the full content of the class. If they did well, they were awarded an extra point and those who replied incorrectly were corrected; they were not punished. This dynamic was very important, because points were identified which students had not fully grasped in the lecture and which would have passed unnoticed by the teacher without this activity.

•They modeled and exemplified the tasks or products requested. For integrating products, examples were offered of finished works similar to those requested; rubrics were also used for this purpose.

•They gave students feedback and corrected their contributions. In all the activities, students, either in teams or individually, received advice and were shown areas that needed improvement.

•They created an atmosphere to stimulate learning. From the outset, the course sought to foster an environment of respect and confidence, and errors were seen as opportunities to continue learning. Students were treated with respect and were never punished for their mistakes.

•They used ongoing evaluation in such a way that students always knew what they had accomplished and what they needed to correct. All students who met the course requirements passed; only those who stopped attending failed.

•They promoted cooperative learning in the classroom. Many course activities were conducted in groups.

•Final course activities. At the end, students took post-test, which was the same test applied at the start of the course, and answered a questionnaire to evaluate the degree to which they thought they had achieved the course objectives and openly mentioned other accomplishments. They are all included in the results presented herein.

To evaluate the knowledge students acquired using this instructional strategy, we used the approach of the Organization for Economic Cooperation and Development (OECD, 2011) on *the value-added model,* which seeks to compare students' performance at two times: one on admission to the institution or at the start of a course, and the other on completing their studies or the course. We assumed that if there are positive differences between the two measurements, they are due to the effects of the school or the teacher.

To verify if there were positive differences in learning after taking the courses, we analyzed the data obtained from the pre-test and the post-test using Wilcoxon's non-parametric test.

Methodology

Design
We used a single-group pre-test-post-test design: O1--X--O2, in which we took a measurement before introducing the independent variable (pre-test) and another measurement after it was applied (post-test) (Campbell & Stanley, 1978).

Sample
Seventy-seven students participated, distributed across three courses (Sociocultural theory, Educational evaluation, and Paradigms in psychology of education) given in 2015 and 2016 in the undergraduate psychology program at the Mexican National University (UNAM). The duration of each course was sixteen weeks.

Below we present the characteristics of each course, the particular working style, and the instruments used to evaluate the effects of teaching:

a) Sociocultural theory
Forty-seven students participated in the course and its aim was to acquire the basic postulates of sociocultural theory and its educational applications. Various activities were conducted, one of which involved making a video in which students applied sociocultural theory to a topic of their interest. Likewise, in the course's last topic, students formed teams to apply a cooperative learning technique, with the respective evaluation to assess how well their classmates had acquired the information presented.

b) Educational evaluation
Twelve students participated, engaging in activities like creating different instruments for evaluation of learning and conducting a meta-evaluation and an accreditation study to offer solutions to a faculty problem chosen by them. Finally, they designed a teaching evaluation system with its questionnaire.

c) Paradigms in psychology of education
Eighteen students participated in the course, with the aim of applying instructional theories and principles to improve teaching. Students examined the postulates of cognitivism, constructivism, and humanism, in addition to the approach favored by learner-centered teaching and the principles of learning. They also wrote poems, songs, games, and essays. For their final project, we asked them to submit a proposal for innovative in-person or online teaching, for which we gave

them a rubric and samples of similar projects completed by students in previous semesters. The course's aim was not only that they acquire knowledge of the basic postulates of the relevant paradigms and principles, but that they use them to suggest innovations in teaching.

Instruments to evaluate acquired knowledge
We used two instruments:

•Pre-test-post-test. Answers were collected, using both quantitative (scores) and qualitative (differences in quality of answers) assessments. Tests were applied at the start and at the end of the course.
•A questionnaire for students to assess the extent to which they accomplish course goals and if they have also achieved other results not included in the stated goals.

Description of pre-test-post-test questionnaires
The instruments were: multiple-choice tests, questionnaires with open questions, and analysis of a case. In the course on Sociocultural theory, we applied a multiple-choice test with four possible answers for each question. The highest possible total score on the test was eleven points.

In the course on Educational evaluation, we applied a test with five open-answer questions graded on a scale of zero to five; the highest possible score was fifteen points. In the course Paradigms in psychology of education, we used two tests, a test with ten open questions and analysis of a case on poor teaching practices; in the latter, students were asked to explain, using psycho-pedagogical theory, the faults committed by the teacher and offer founded solutions to improve his/her teaching. This was accomplished by means of a questionnaire with three open questions. The tests were graded on a scale of zero to two; the highest possible score on the test was twenty points and the case analysis had a maximum total score of six points.

To grade the tests with open questions, we made a categorization with the types of answers expected; in Table 1, we show an example of the types of answers expected from students and the scores obtained. The more complete and developed the answer, the higher the score.

Table 1. Categorization to grade open answers between pre-test and post-test

Sample question	Score 3	Score 2	Score 1	Score 0
What is educational evaluation?	A systematic process the aim of which is to collect data on teaching, learning, or educational centers to judge them and increase their effectiveness or correct them.	An assessment of an educational process which involves collecting data.	Evaluating how much students have learned.	I don't know. An aid to education.

Evaluation of course objectives
In the last session, we applied a questionnaire to the three groups, which addressed the respective goals of each course; students were asked to assess the degree to which they thought they had accomplished those goals using the following scale: completely, fairly, or deficiently. The questionnaire included an open question asking students to state whether they had accomplished other goals or seen results different from those stated; their answers were categorized.

Wilcoxon's signed-rank test
To determine the significance of the results found, we used a measurement before the courses and one at the end, to assess the effects of teaching.

RESULTS
We present three types of results: a) differences in scores obtained between pre-test and post-test in each course; b) qualitative changes in students' answers; and c) students' opinions regarding the degree of success in accomplishing course goals and other achievements not specified beforehand.

Differences in scores obtained between pre-test and post-test in each course
In Table 2, we concentrate the results of the tests applied at the start and at the end of the three courses; in all, we can see an increase in averages. Applying Wilcoxon's test, the level of significance was 0.05, which means that the increase was not the result of chance, but was very likely due to the didactic method used.

It is important to recall that, for the course Paradigms in psychology of education, there were two types of instrument, an open test and analysis of a case.

Table 2. Comparison of results between pre-test and post-test for the three courses

Course		Pre-test	Post-test	Wilcoxon's test
Sociocultural theory		5.7	8.9	. 000
Educational evaluation		3.5	11	. 002
Paradigms in psychology of education	Test	6.05	11.4	. 000
	Case	1	4.3	. 001

Qualitative changes in students' answers
To exemplify the qualitative changes found, Table 3 compares the open answers given by the same student on the pre-test and the post-test for the courses Educational evaluation and Paradigms in psychology of education. The example of the course on Sociocultural theory is not presented because the test applied was objective.

Table 3. Comparison of students' open answers on pre-test and post-test

Course	Pre-test answers	Post-test answers
Educational evaluation Question: What is educational evaluation?	Participant 1: to evaluate education.	Participant 1: an organized, systematic, and continuous process which analyzes education, including the mode, and what is taught, to evaluate it and then see if the teacher's and students' goals were accomplished, [and] if anything should be modified to improve.
	Participant 2: use of tools focused on grading and knowledge of learning in an area or areas of knowledge.	Participant 2: a systematic process used to assess different aspects of education, like institutions, personnel, students, programs, curricula, etc. Its results are used to maintain, change, or remove components of the object evaluate.
Paradigms in psychology of education Question: What is the function of psycho-pedagogical theories or paradigms?	Participant 3: I think everything has a reason for being; I think paradigms acquire importance as the basis of ideas about what has been achieved in a discipline; in addition to not repeating mistakes, we can rely on their results.	Participant 3: their function is to give educational psychologists the foundations, or principles, they need to apply in practice.

Students' opinions regarding the degree of success in accomplishing course goals and other achievements not specified beforehand

Below, we examine students' opinions in a survey which asked them about the extent to which they felt they had accomplished course goals.

Tables 4, 5, and 6 show students' answers regarding the degree of accomplishment of course goals. On average, of the three groups, 65.74% stated that they had fully accomplished their course goals; 34.12 that they had accomplished them partially; and only one of all the students considered the level of accomplishment deficient. Below, we present the results in terms of stated opinions by number of students and total percentage for each course.

Table 4. Students' opinions on degree of success in accomplishing course goals in Sociocultural theory

Degree of success in accomplishing course goals in Sociocultural theory	Complete	Fair	Deficient
Command of basic principles and postulates of socio-cultural theory.	42	10	0
Contrast the principles of sociocultural theory with those psychogenetic perspective, cognitive processes, and other explanations of the role of social interaction in human life.	22	29	1
Apply sociocultural methodology in research and projects.	29	23	0
Use the principles and method of sociocultural theory to explain various educational processes and problems, both formal and informal.	45	7	0
Use the contributions of educational psychology and sociocultural theory in their formation.	43	9	0
Total	181	78	1
Total percentage	69.61	30	0.38

Table 5. Students' opinions on degree of success in accomplishing course goals in Educational evaluation

Degree of success in accomplishing course goals in Educational evaluation	Complete	Fair	Deficient
Acquire command of the basic concepts of educational evaluation.	12	6	0
Design different instruments to evaluate learning.	14	4	0
Develop proposals to assess different aspects of educational evaluation (for example, evaluation methodology, ac-creditation, and teaching evaluation).	9	9	0
Evaluate evaluations.	11	7	0
Total	46	26	0
Total percentage	63.88	36.11	0

Table 6. Students' opinions on degree of success in accomplishing course
goals in psychology of education

Degree of success in accomplishing course goals in Psychological paradigms of education	Complete	Fair	Deficient
Acquire command of the leading paradigms in educational psychology and the principles which analyze and explain academic performance.	10	10	0
Identify and compare the contributions of different theoretical approaches.	14	6	0
Use knowledge of paradigms to analyze, understand, prescribe, and suggest changes in teaching-learning processes.	15	5	0
Design didactic approaches based on the postulates of the theories and principles discussed.	12	8	0
Total	51	29	0
Total percentage	63.75	36.25	0

On the other hand, in Table 7 we show the types of answers students gave to the open question "What other unexpected goals and results do you think you accomplished in the course?" The answers were organized in categories deliberately constructed to classify the diversity of answers given by students. We also present examples of answers and the percentage obtained by each one. We can see that the number of answers given varies with the number of students per course; however, in all three courses students mentioned the purported benefits of the course activities, and the conceptual knowledge of the subjects which they felt they had acquired; similarly, they emphasized that they had learned to apply, both in and out of class, the lessons taught and acquired the means to formulate constructive criticism of their own ways of learning, of the course's object of study, and of education in Mexico in general. Finally, they affirmed that they now know how to apply what they saw in class and stressed the motivation they take from having taken the courses.

Table 7. Results by category for the question: What other unexpected goals and results do you think you accomplished in the course?

Categories	Sub-categories/ % of answers					
	Sociocultural theory		Educational evaluation		Paradigms in psychology of education	
Knowledge acquired Includes the type of knowledge students think they have acquired.	State of education in Mexico. Different learning strategies. Different areas of psychology, etc.	22.42	State of educational evaluation in Mexico, where it is applied, and psychologists' field of work.	60.86	Theories and strategies of teaching-learning, class design.	43.24
Classroom activities Activities students reported having engaged in in class, which they think were favorable for their learning.	Creativity [and] teaching were encouraged; it was unlike traditional classes and offered learning for today.	9.34	Teamwork, class discussion, and portfolio preparation.	13.04	Teamwork, participation, expression of ideas, meaningful and practical learning.	27.02
Being critical Refers to topics on which they thought they were critical after completing the course.	Toward oneself in one's ways of learning and working with others.	4.67	With educational evaluation, in Mexico and in general.	13.04	With educational programs and the Mexican education system.	13.51
Application of knowledge and motivation	Skills and attitudes acquired; application of knowledge; motivation.	63.54	Motivation.	13.04	Application of knowledge.	16.21
Total answers	107	100	23	100	37	100

Below, we discuss the results found in each course. In the course on Sociocultural theory, we observed that in 49 answers (45.79%), students reported having acquired skills like use of technologies and teamwork, and emphasized that they are now able to communicate better and work under pressure. They also learned different learning strategies. Nine more answers (8.41%) referenced the accomplishment of applying the lessons learned in real-life situations, in professional practice, and in daily life, while another nine (8.41%) expressed motivation to help others learn and improve their own academic performance. On the other hand, five answers (4.67%) emphasized greater motivation to learn on their own and continue working in teams.

In Educational evaluation, beyond the acquisition of knowledge to pass the course, it is important to mention that three students (13.04%) said they felt more motivated to continue learning about the course topics on their own account and improve not only in academic, but in personal areas.

Finally, for the course Paradigms in psychology of education there were six answers (16.21%) and students mentioned having incorporated different learning strategies in their academic routines, and reflected on those they had used to date and their effectiveness.

CONCLUSIONS

Our purpose is to share our experience using an innovative approach to teaching psychological content, to show how it can achieve better results than traditional teaching, and based on the different types of data offered, we can confirm that it did exactly that. To support our claims, we emphasize, first, that we found significant differences in scores obtained between pre-test and post-test; in other words, depending on the statistical test applied, there was a rate of gain in students' learning imputable to their having taken the courses.

In second place, we detected qualitative changes between students' answers before and after the instructional experiment. It was clear that at the outset they were incomplete or limited or students did not answer. In contrast, at the end, the same students offered more complete, profound, and accurate answers, revealing conceptual changes, which are, precisely, one of the indicators of learning (Bain, 2004).

In third place, based on students' own opinions, almost 66% of them thought they had accomplished their course goals. Another 34% thought they had accomplished them partially; only one student stated that she/he had not accomplished one of the goals. In this regard, we can affirm that there were reasons to share opinions, in some cases, partial command of goals, given that, for varied reasons, students lacked time to cover some topics thoroughly, but there also were discrepancies between the professor's perception and how students assessed their performance; in general, students were less certain or expressed insecurity about the knowledge acquired, when in the teacher's opinion they had accomplished the stated goals completely. This may be a subject for another investigation on subjective differences between teachers and students on the degree of command of subject matter. Notwithstanding, a clear majority shared the perception of having fully attained the objectives established in their academic programs.

In fourth place, students openly and spontaneously reported having acquired other kinds of knowledge, skills and attitudes, for example developing critical thought, applying lessons learned, and improving their learning strategies. These results, as mentioned before, are valued aims in higher education. Although our interest was to ascertain students' perceptions regarding their degree of success in accomplishing concrete course goals, it shows us that the fact of acquiring an adequate command of course content has repercussions for achieving other goals of greater cognitive and attitudinal complexity (Weimer, 2002).

In our view, these are examples of the benefits of teaching which strives for relevance and pertinence of content and does not merely seek to transmit knowledge to achieve accreditation or theoretical command, to then be forgotten, but rather to be used; such use extends outside the classroom and becomes part of the student's personal store of knowledge. This shows that in this kind of teaching, there are other accomplishments different from those stipulated in syllabi which, in some cases, it would be advisable to include in official curriculi.

As regards students' motivation to continue studying the topics seen in courses on their own account, especially in Educational evaluation, our findings positively

support Bain (2004), who explains that, to evaluate the effectiveness of teaching, academic achievement is not enough, and rather, teaching must not cause harm; in other words, there is no point in students' learning the content taught if the experience is so bad that they are left with no desire to know more about the course content or the teacher.

How can we explain these results? They show that combining the three didactic approaches was effective; in particular, based on our experience, we think that they were primarily due to clear and concrete establishment of instructional aims; the atmosphere created to foster learning; following one of the principles of learning which affirms that learning requires the active involvement of the student in the process (Carlos, 2014b), teaching students to do more than just "take notes" and moving beyond receptive teaching styles (Hativa & Birenbaum, 2000). We clarify that we need to do more than keep students active; instead, we should seek to engage them in instructional activities and tasks which are meaningful, situated (Woolfolk, 2014), and culturally relevant (Na`ilah, 2016) and useful in professional practice.

Other factors which affected the results were modeling of the tasks and products requested, as well as the examples and rubrics offered to make clear to students what was expected of them. Other useful components included feedback, consulting, and formative evaluation, in which it was more important that students knew what they needed to correct than their scores. It was also helpful to use different teaching strategies, including expository teaching, to prove that it is necessary. Some propose to eliminate it; we, in contrast, maintain that it should be complemented by strategies, but not be the only one.

These results are consistent with the findings reported by Hattie (2009), who mentions the influence on learning of what he calls *mastery learning*; he claims that all students can successfully meet the criteria if they have suitable conditions to do so, and benefit from feedback, both that which teachers give students and that which teachers receive from students, thereby maximizing the positive impact on learning and better developing the qualities of self-analysis, self-evaluation, self-assessment, and self-teaching, results which some students reported having achieved.

Limitations

The primary limitation is methodological, because we do not use an experimental method in which students were randomized, forming an experimental group, which would receive treatment, and a control group, which would not (Campbell & Stanley, 1978). Such conditions are difficult to create in real classrooms, like those in which this experiment was conducted, because it is unethical for a psychologist who practices teaching to deprive students of the opportunity to acquire knowledge, skills, attitudes, and aptitudes which ensure their successful future professional performance (Ethical Code of the Psychologist, 2009, art. 40).

However, given that the students were not exposed to this kind of content in other courses, we thought that the advances observed could be imputed to specific course activities and not the influence of other variables. Consequently, we agree with Bolívar and Caballero (2008) that, despite the difficulties of investigating teaching in the settings where it takes place, there should be no excuse not to do so in a systematic, verifiable manner, using appropriate methods to prove its effects on students' learning.

Suggestions

Our main suggestion is to work with other colleagues who teach the same sub-jects, in which the same pre-test-post-test instruments are applied and course content is shared, but where each teacher maintains their personal style, keeps a journal, and shares results at the end. Then, analyzing the results obtained and repeating teaching practices which have shown the best results.

In the first place, the experiment reported may help teachers confront the cha-llenge of teaching in non-traditional ways, because it offers a concrete and specific example of innovation in teaching. In second place, although using the procedure described herein requires changing our vision of teaching, using it does not de-mand major changes in how teachers customarily function; all teachers have a program with their respective goals, planning of activities, and evaluation instru-ments. They need only add the pre-test and post-test, as well as the questionnaire on accomplishment of course goals.

These are examples of possible actions; there would be others, but it would be essential to use them to corroborate the effects of teaching on students' learning, because showing how they undergo positive change and acquire knowledge use-ful for their development, both academic and personal, are the ends which give meaning to our endeavors as teachers.

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