

Are Teaching or Learning Quality?

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Abstract: We observe a great preoccupation with teaching quality in the engineering courses, as well with making partners that permit an exchange of experiences to increase this teaching more and more.

Now think, what are we doing to improve this quality? What kind of partners are we finding? What are we effectively transforming into collaborative actions? And which theory are we using to support our actions?

The works presented in engineering congress and conferences focus more the teaching than learning. Would «teaching and learning quality» be synonymous? Or are we starting with an equivocated hypothesis? How long do exist the nowadays problems discussed in the engineering congresses? Are these the same problems or are they new ones?

If we consider that the solutions for the problems are tightly dependent of the hypothesis that we use, what kind of the results would we obtain in changing the focus from engineering teaching quality to engineering learning quality?

And the partners, what can we say about that? We know that working individually we can only attack one part of the teaching problems. In front of these same problems, each kind of professional, face them from a different point of view. Normally the engineering teachers vision are focused on the contents transmission, the vision of a pedagogue is focused to the teaching and learning process and the vision of a psychology is focused on the subject and the relations with other ones. Meanwhile a psycho-pedagogic vision is focused on the articulation of all that three.

So what could happen if worked together one engineer-teacher and one engineer-psycho-pedagogue? What kind of hypothesis would they use in their research work? What kind of paradigm would be used for them?

In this work we will present what some engineering teachers of PUCRS are doing to improve the learning of their students, as well as show what theoretic support they are using in their research work with their students. The main results of this work are reflected on the students learning quality, the increase from 50% to 85% in the approval percentage and the transfer of their learning experiences to other disciplines. We are now opening a learning space laboratory founded in the Freud's psychoanalytical model as a psycho-pedagogic support to work the teaching and learning issues of engineering teachers and students.

Keywords: learning, teaching, psychopedagogy, psychology, psychoanalysis.

1. Introduction

In the last two years we have been doing a psychopedagogic experience in three classes of the Electrical Engineering course and another one of the Computer Science course. We are obtaining very exciting results, since we rose from about 50% at approval rating to more than 85% and some classes getting up to 100%.

We are also engaged in a group that is developing new curricula to the engineering courses. So we are able to know about the evolution of our engineering students since the initial classes.

With this, we realized that the approval rating in Calculus and Analytical Geometry classes were less than 30% and that these facts were causing a great worry to the administration and teachers.

We also realized that the evasion rate of the engineering courses were about 50% in the two first years.

2. Brainstorming

Based on these low ratings and comparing our actual number of students with that we had twenty years ago we started to ask ourselves: What could we do to improve these ratings and rise up the number of students in our engineering courses?

With this question in mind we kept with our work in these four classes, meanwhile we cursed the Psychopedagogic Laboratory for Engineering Teachers.

During one of these classes, we questioned our teacher, the mentor of this whole process, if it would be possible to apply our knowledge on the students in the Calculus classes of our engineering courses. It came up to us like this: when we applied our knowledge in our engineering classes we had a great improvement in the learning of our learners, what also improved significantly our approval ratings. What would happen if we used this knowledge in those students of Calculus?

At the same time we realized that if we had the opportunity of working with these students and making a significant improvement on their learning we would give them a great contribution. That is, they would graduate faster and at the same time the number of approvals in Calculus classes would rise up.

Then we dared to figure it out: "If there were more approvals in Calculus classes only a few people would evade from the Engineering Courses in the first two years and more students would reach the professional classes, increasing the number of students in them."

At this moment you must be thinking: "How dare they are willing such results!". With this in mind we decided to go on dreaming big, but determined to establish a way to make this process in course and do a practical research to verify its results.

So, we decided to create a Psychopedagogic Laboratory for Calculus Learning for the students of engineering courses of PUCRS to prove or not our basic hypothesis and evaluate the results that we intend to achieve.

3. Psychopedagogic Laboratory for Calculus Learning

We started our Psychopedagogic Laboratory for Calculus Learning from some hypothesis based on our previous work and researches, as follow:

If the approval rate is so low, this characterize more reactive problems than symptomatic problems as we can see in [9];

The students use to have more difficulties in "calculus problems" than in immediate applications of calculus concepts;

The students have much difficulties to "visualize" the manipulations that have to be done in the equations before apply the calculus concepts;

The teachers do not use to give opportunities to students to "think" in class, therefore they have difficulties to make that in the tests;

Based on those hypothesis we decided to achieve our work in two levels:

We are going to work the base learning of the learners, working the knowledge of basic relations of each issue like area, volume and trigonometric relations, utilizing concrete materials to develop those learning;

We are going to work the learning through problems, questions and exercises that they bring to us from their normal courses, doing an opportunity to them to develop "the think" in the problem before think in the solution;

We will work on their learning giving an opportunity to them to develop the "visualization" of what should be manipulated before applying the calculus concepts ;

And mainly, we will use the "psychopedagogic listen" to identify the students difficulties, so we would be able to develop tools and help them in their learning process.

After these hypothesis analysis, many tools were created to support the learning development of basic concepts often used in Calculus classes.

4. Laboratory Work

We decided to begin the laboratory work emphasizing that it is neither a recuperation course nor a reinforcement course, as well individual classes. Based on these directions we tried to contact some possible prospects inviting them for an interview and follow experimental class.

This procedure permitted us to achieve a "psychopedagogic listening" and verify whether the problems that students presented were "reactive problems" or "symptomatic problems" and verify too whether the difficulties that they appeared were about basic concepts or about calculus concepts.

Another important conclusion we obtained through these interviews were: We are not going to develop sequentially the normal contents of calculus, but work the basic concepts learning and the everyday problems that they have in class, once they would be attending the normal classes in PUCRS.

The functioning of the Psychopedagogic Laboratory of the Calculus Learning are being developed through three classes that have 4 hours a day each one, once a week. In that days we use one hour to exercise the “psychopedagogic listening” and the other ones to develop the basic contents or to solve some problems brought by the learners.

5. Some Results

Today we have some of our learners making the first tests in their normal classes. So we start to analyze about the results of them.

The first thing we realize was a change in their attitude in front of the tests, where they present themselves much more confident, much more self-esteem and with much more feeling of knowledge about what they are doing in the tests.

As we are just starting our experiment, it is to soon to publish our results about this scientific research, but we are very satisfied with the development of our learners and we have hope that we can confirm our initial hypothesis in a very soon time as our group increase and get better results.

It is convenient to say that the fact we have started our work with a few group of learners was an initial option, once the psychoanalysis is an individual process, where the proper individual find himself to fulfill his necessities. So we choose to make a little marketing about our work and we let the proper learners who work with us to make the marketing through the results of their learning.

We hope to publish in the next congress some of our results to contribute with the quality of teaching (or learning) that will be needed to face the challenges of this new century.

6. How to face our own learning

We consider very important to relate what happen with our own learning as a teacher in those spaces that we create to develop the learning.

As the hypothesis that we are working, firstly we are developing a base of knowledge in geometry and mathematics that are cornerstone to the learning of physics, calculus, geometry and algebra. At the same time we are working the problems or questions (exercises) that our learners have to learn how to solve on their day-by-day normal classes.

Following this strategy we often face up with questions that are not issues of our own specific area and which we have to develop our own learning. At the end what happen is that when developing this issues with our learners we ended up developing our own learning, as we are adding new knowledge or we are consolidating the old ones that were not been well developed.

With this we realize that, at the same time we are developing the learning of our learners, we are developing our own learning.

7. Conclusion

The most obvious conclusion that we get from our experiment is that: “to work the learning of our learners we need to be willing to work our own learning, that is, we as a teacher need to put ourselves as a learner to establish a vinculum with our learners so they can effectively develop their learning.

A second one that we observe is the fact of we are enthusiastic with our own progress of our learning give us some kind of internal stimulus that, of some manner (probably unconscious), transfer to our learners that appear to develop a kind of self-stimulus that make them enthusiastic to want to develop their own learning.

Another characteristic very curious that we observe is that some of learners can develop some kind of knowledge which we have not worked in our learning space and that they probably developed in some other place, like their own home or with colleagues or even in their normal classes.

As the proper Freud said in his work [6]: “The psychoanalysis could develop up in other fields beyond that ones it was firstly created with results much better than we could think”.

It was one of the most powerful affirmatives that oriented our work to utilize the didactic transposition in the manner which we based our initial hypothesis.

We hope to have contributed of some manner with the learning and teaching challenges of this new century and we would like to thanks all your attention to this work.

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