Pedagogical Practices of the Teachers

in the Presential and Distance Programs

of Systems Engineering

Diofanor Acevedo Correa¹, Raúl J. Martelo² and Lorenzo Fuentes Berrio¹

¹Research Group Innovación y Desarrollo Agropecuario y Agroindustrial
Universidad de Cartagena, Av. Consulado, Street 30 No. 48-152, 130015
Cartagena de Indias, Colombia

²Faculty of Engineering, Research Group in Communications and Informatics
Technologies GIMATICA, University of Cartagena, Colombia

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Abstract

The main objective of the present investigation was to identify and evaluate the methods and techniques currently used by teachers in the teaching of basic sciences in the systems of presencial and distance systems. The study took place in the first semester of the year 2016-2, the population under study was made up of 20 professors, 10 for the presential study program and 10 for distance study. These were subjected to direct observations and surveys were applied to both students and teachers and administrative staff. The results show that pedagogical characteristics are addressed by teachers, where a traditional behavioral model is based on knowledge fixation and learning accumulation, in which the teacher is dedicated to transmitting information. It was concluded that it is evident, the need for training and education in pedagogy of the university professor to improve their teaching skills, generate principles and practices that allow to adapt the different fields of knowledge to the training process.

Keywords: pedagogical practices, teachers, study methods, distance education
1. Introduction

The pedagogical practice is the place where the teacher interacts, the students and the didactic resources, where he confronts the theory with the practice, that sometimes is disarticulated the pedagogical making, that allows the meaning in the learning [1]. According to Duque et al., [2], the pedagogical practices are the diverse actions that the teacher executes to allow the process of integral formation in the student, the teacher must do things like: to teach, to communicate, to socialize experiences, to reflect from the everyday, to evaluate the cognitive processes and even, to relate with the educational community.

The teaching and motivation developed by the university professor is the activity that drives learning in the student, for this the teachers need to be clear about what it is to teach and learn, and that clarity means following a method, which is the best way to arrive at a work well done. The current pedagogical concept gives rise to a practice that innovates, changing traditional paradigms through critical and mediational pedagogies; however, such appreciations denote an apparent repositioning of knowledge in the distorted appropriation of the same in terms of doing or, the same experience that is apparent, instrumentalized and inconsistent with the revitalizing option of the unpublished [3].

Distance education has become a fast-growing teaching modality in recent years to democratize university education [4]. Pedagogical practices in distance education need to mediate processes, with teacher support, under a closer relationship in which the student performs collaborative work and online learning [5]. Distance education is a type of modality that represents an ideal alternative for an important group of students, because it allows them to reconcile their work and family activity with their training, by developing it in their own home. This type of education has characteristics that greatly differentiate it from presential education, such as greater student autonomy and independence for the development of their learning process, as the student sets the pace of their work [6].

De Medeiros and Borges [4] conducted a comparative study between two different modules of the same undergraduate technology in the modality of distance education, they concluded that a process of teaching and learning in distance education should not be based only on the structure of content available to students in learning management systems and on the premise of their autonomy, but should be extended to pedagogical practice at a higher level of interactivity.

On the other hand, the selection of a suitable technique will depend among other things on the number and grouping of the students and the organization of school activities. Bejarano [7] in this sense, proposed some techniques: teamwork, the didactic exhibition, the interrogation, the colloquium, the round table, the panel,
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the directed discussion, the whirlwind of ideas, the Role-Playing, among others. In terms of distance education, the appropriate use of technology is an essential condition for the success of the modality. Institutions that work with distance education implement learning management systems. An LMS (Learning Management System) is a web platform that allows managing learning processes in different perspectives: technical, administrative and pedagogical, presenting some basic mechanisms of interaction such as email, discussion forums or chats (real-time discussion) [8]. The purpose of these techniques and methods is to equip students with the knowledge, skills and values that can become competition for students [9]. The objective of this study was to explore aspects of the pedagogical practices of teachers in the presental and distance systems engineering programs. In order to identify and evaluate the methods and techniques currently used by teachers and how they influence the fundamental purpose of education; which is nothing more than developing skills in the students.

2. Methodology

For the development of this research, the quantitative paradigm was used, it was descriptive typology, not experimental and transversal cohort. The study took place in the first semester of the year 2016-2 until the culmination of it. The study population consisted of 20 teachers, ten for each of the systems of presental and distance systems.

2.1 Research instruments

For the development of this research, direct observations were made, which were executed through the implementation of instruments designed by the members of the research group; surveys were also applied to students as well as to professors and administrative personnel, in such a way that they could confront the data to give a higher level of truthfulness to the information that would be collected. Likewise, interviews were conducted with different actors of the educational process.

The descriptive investigation allows to obtain an exact description of what is happening around the didactic strategies used by the teachers and their relationship with the development of skills in the students. For this it was necessary to establish a representative sample of the universe of study; to finally, draw conclusions about the analysis of results. To corroborate the existing relationships between the study variables in a quantitative and qualitative way, the empirical methods of observation, measurement, survey and interview were used.

To answer and analyze the research questions: No1 What are the methods and techniques currently used by teachers in the teaching of basic sciences in presental and distance system engineering?, No. 2, have you How much does the
same method of teaching use?, No. 3, What strategies do students use in the teaching-learning process?, No. 4, What are the types of evaluation applied by teachers? Observation techniques and surveys were used, the results of the observations were recorded in instruments called field cards; while, for the application of the survey, a questionnaire was used with questions between closed, open and directed to the teachers.

3. Results

In order to identify and evaluate the methods and techniques currently used by teachers in the teaching of presential and distance systems, it was necessary to establish analyzes on general aspects of didactics and didactic strategies.

3.1 Methods and techniques used by teachers

Regarding teaching strategies (methods and techniques), 75% of teachers say they know the conceptual aspects of teaching methods. While the remaining 25% do not know it. The methods most frequently used by teachers are presented in Table 1.

<table>
<thead>
<tr>
<th>Method</th>
<th>Modeality</th>
<th>Presential (%)</th>
<th>Distance (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deductive</td>
<td></td>
<td>5.0±1.43</td>
<td>10.0±2.30</td>
<td>0.0456</td>
</tr>
<tr>
<td>Inductive</td>
<td></td>
<td>6.7±2.68</td>
<td>8.0±3.58</td>
<td>0.6782</td>
</tr>
<tr>
<td>Analogous</td>
<td></td>
<td>10.0±2.59</td>
<td>5.0±1.79</td>
<td>0.0382</td>
</tr>
<tr>
<td>Logical</td>
<td></td>
<td>5.0±0.68</td>
<td>5.0±1.98</td>
<td>0.0642</td>
</tr>
<tr>
<td>passive</td>
<td></td>
<td>12.0±3.74</td>
<td>2.0±0.65</td>
<td>0.0284</td>
</tr>
<tr>
<td>Active</td>
<td></td>
<td>11.3±4.83</td>
<td>30.0±6.63</td>
<td>0.0374</td>
</tr>
<tr>
<td>Verbalistic</td>
<td></td>
<td>20.0±4.07</td>
<td>10.0±1.89</td>
<td>0.0278</td>
</tr>
<tr>
<td>Heuristic</td>
<td></td>
<td>10.0±2.79</td>
<td>15.0±4.18</td>
<td>0.0456</td>
</tr>
<tr>
<td>Experimental</td>
<td></td>
<td>5.0±0.04</td>
<td>5.0±1.93</td>
<td>0.5791</td>
</tr>
<tr>
<td>Problem</td>
<td></td>
<td>15.0±3.59</td>
<td>10.0±2.56</td>
<td>0.0486</td>
</tr>
</tbody>
</table>

The preference of the learning style affects the way in which groups of students respond to their curriculum. Teachers have many options in methods to deliver content and communicate knowledge, as well as to evaluate students [10]. According to the table 1 the most used methods in the teaching in presential Systems Engineering are the verbal and problematic, it is evident how the traditional instruction appears, in which the teacher after presenting the explanation of the subject by means of an example, Students must memorize the rules and practice them in problem solving exercises proposed for this purpose. It is shown that the theoretical reflection giving participation to the students is scarce, emphasizing consequently in the application of the explained concepts more...
than in the domain of the specific concepts. The learning is vertical, where the teacher is the transmitter of knowledge and the student is a passive learner.

While in the distance modality the most used are the asset and the heuristic, which is consistent with the modality where the student is responsible for their training. These differences translate into improvements in educational processes that are developed through virtual environments where education is not restricted in time or space, thanks to the rational and strategic application of electronic technology. The teacher has skills to manage time, develops strategies to find information, is autonomous, self-regulated, self-motivated, problematizing and creative, with more flexibility, more interested in how you learn [11]. Another of the aspects considered within the didactic strategies are the teaching techniques used by the teachers. The most frequently used and their percentage ratio are presented in Figure 1.

![Figure 1. Teaching techniques used by teachers](image)

The master class is the technique most used in teaching by teachers, it has a level of employment of 54%; then, and in a descending manner, they use group work, theme presentations, workshops and seminars. In general terms the students affirm that the teacher is very well prepared academically, is clear in their concepts, it shows a preparation of their materials for the class and does not improvise, but in most cases they get tired of listening to him speak for so long in classes so long and fail to maintain attention, so they say that may be one of the reasons why they do poorly in exams. Regarding the didactics of pedagogical practices used by teachers, the strategies that prevail are focused on the teacher, according to their own opinion, independent of the subject, the interaction is unidirectional, teacher-student where the person responsible for learning has been limited exclusively to the training of techniques or their evaluation [12].
According to Paulo Freire "Teaching should not be limited to the transmission of knowledge, but create the possibilities for its production or construction" [13].

On the other hand Güneş et al., [14] stated that the majority of teachers in science and technology classes use within their teaching techniques the constructivist approach, problem-based learning, cooperative learning and computer-based learning.

3.3 *Time of use of teaching methods*

In Table 2 we can see that 60% of the professors of presential Systems Engineering use the same methods described for more than 10 years, on the contrary the professors of the distance Systems Engineering program 50% of teachers use the same methods for six years, which means that they are being updated in teaching methods. It is to consider the time factor as an indicator of expiration and not update, which determines a negative effect on the relationship between the teaching process and the process; because, during a class, the methodology used acts as a guiding reference, but in the end it does not determine the action; nevertheless, the need is felt towards this holistic methodological change where processes that allow construction and research are promoted and, substitute the verbal and expository forms for participatory, experiential and experimental ways of group learning.

<table>
<thead>
<tr>
<th>Time using the same method</th>
<th>Modality</th>
<th>ANOVA</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Presential (%)</td>
<td>Distance</td>
<td></td>
</tr>
<tr>
<td>3 years ago</td>
<td>5±1.73</td>
<td>5± 1,01</td>
<td>0.7641</td>
</tr>
<tr>
<td>6 years ago</td>
<td>30±6.59</td>
<td>50± 4.70</td>
<td>0.0348</td>
</tr>
<tr>
<td>10 years ago</td>
<td>60±8.41</td>
<td>35 ± 6.33</td>
<td>0.0426</td>
</tr>
<tr>
<td>20 years ago</td>
<td>5± 1,96</td>
<td>10±1,45</td>
<td>0.0471</td>
</tr>
</tbody>
</table>

On the other hand, 100% of the program coordinators, program directors, department heads and departments surveyed maintain that teachers of presential and distance systems engineering should use more appropriate methods for teaching-learning. This perspective corroborates a behavior and use of paradigm concepts typical of traditional education that have contributed to an ineffective and effective educational process, based mainly on a transmission model, which conceives teaching as a craft activity, to the teacher as a artisan and the student is seen as a blank page.

3.4 *Strategies used by students in the teaching-learning process*

As a result of the analysis of the objectives, the content and the methods applied in the teaching activity, it is necessary to consider the teaching methods that will
be used. These facilitate the process of abstraction and direct students’ attention to the common essential characteristics of what they must assimilate, from the abstract to the concrete. Special attention must be paid to the use of the blackboard, textbooks and information and communication technologies, which are effective tools when used properly [15]. Considering the methods and techniques used by teachers for teaching in Systems Engineering programs, and from the perspective of students, Figure 2 shows the main ways for student learning.

![Figure 2. Strategies used by students in the teaching-learning process](image)

Figure 2 shows a majority tendency to depend on class attendance, that is, to learn according to how they are taught (50% and 59% of students for distance and presential classes, respectively); that is, it depends directly on the way the teacher teaches and is related to the didactic strategies he uses. Bernard [16] calls strategies as supports that include key aspects that condition learning such as time control, organization of the study environment, management and control of effort. On the other hand, Gonzales et al., [17] in their research on the learning styles of nursing students described the students as concrete thinkers oriented towards facts (detection); preferring images, diagrams, flow charts, demonstrations (visual) and enjoy working in groups and trying things out. They concluded that predominant learning styles suggest that educators teach concepts through simulation, discussion and application of knowledge.

### 3.5 Types of evaluation applied by teachers

In Table 3 it can be seen that the written exam is the type of evaluation most used by the professors of the two engineering programs with 50%, with which its purpose is to measure and verify the degree of performance or learning achieved by the students. The flexibility of distance education with the support of the virtual platform allows planning and organizing the educational process and act of evaluation that favors teachers and students, implying the change of perspectives.
focused on the construction of knowledge in each of the Basic subjects of the Systems Engineering program. The evaluation in the distance modality has some characteristics that are inherent to its essence, according to Corrales, it is based on previously defined objectives, it follows a continuous process, so it allows the student a permanent control of the development of their learning, has an educational character, uses technology, both in the development of tests and in the analysis of results and is individualized, respecting the needs and pace of learning of each student [18].

<table>
<thead>
<tr>
<th>Type of evaluation</th>
<th>Presental (%)</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Exam</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Workshops</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Exhibitions</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Quiz</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Written exams in pairs</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Jobs</td>
<td>5</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 3: Types of evaluation applied by teachers

4. Conclusion

The teachers intend to provide pedagogical practices based on the difference, understanding the cognitive processes from the other, but in the real field a traditional behavioral model prevails, based on knowledge fixation and accumulation of learning, in which the teacher devotes to transmit information. It was concluded that it is evident, the need for training and education in pedagogy of the university professor to improve their teaching skills, generate principles and practices that allow to adapt the different fields of knowledge to the training process.

References


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