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Distance Learning vs on Site Learning "A Comparative Study in a Public University in Mexico"

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Abstract The demands of highly trained staff are becoming more challenging in the actual work field, which is why today's Information and Communications Technology (ICT) contribute to transmit knowledge to students, which must be innovative using tools that generate interest in receiving the information to successfully achieve the appropriate learning. At the present research, we analyzed the use of Moodle platform for piloting the subject of Electricity and magnetism from the area of physics and mathematical department, where data was collected specifically about learners interacting virtually with each technological resource inherent to each unit of the second semester of the career corresponding to automotive systems engineering taught at the Interdisciplinary Professional Unit of Engineering Campus Guanajuato (UPIIG) of the National Polytechnic Institute (IPN). The results of the group being piloted were compared with the results obtained by 5 groups that attended the learning subject on site. The results showed that 77% of the overall group expressed resistance to change by using the methodology of learning during the opening of this style of ICT teaching. At the end of the course, 35% of students were adapted in full to this methodology of virtual study. Finally it was concluded that the use of technological tools in remote mode, offer professional development opportunities to people with mobility problems, so a simple route in the evaluation of research and ongoing assessments for teachers and transmitters of knowledge.

Keywords Virtual mode, Technological tools, Significant learning, On site learning

1. Introduction

Data mining in undergrad education is an emerging discipline in the educational context. It has to do with the development of methods for the exploration of particular types of data coming from educational settings. Its aim to have a better understanding on how students learn and identify areas where there is a way to improve educational outcomes and on educational information phenomena [1, 2]. These methods allow to discover new insights into the database of student use [3].

Moodle is a system of management courses designed with pedagogical principles, to help educators create learning communities that are effective online, some of the advantages of this platform are: the community of users and developers that has been created around it, contributing both to constant improvements and innovations as a process of collaborative construction, being an open source platform, with educational possibilities and principles of design and continuous development [4]. This platform is a learning tool based on an open source system that has kept the interest in recent years of the student community. It allows learning scenarios to be constructed as sequences of learning activities rather than limiting to the sequences of the contents or objects. Although Moodle can be used for many types of educational applications, it is based on socio-constructivist principles, allowing an appropriate educational approach that involves interaction between people rather than the transmission of content. On the other hand, enables teachers to supervise the creation of activities through participation forums, quizzes and interactive chat with every student [5, 6]. It is important to note that teachers may have more information on the activities and tasks that students do, as well as to appropriate measures to develop their teaching tools [7].

Online teaching has been in transition throughout its entire existence. The number of distance learning courses has grown rapidly, an excellent online course is that the student is able to focus on the course itself, and the technological environment becomes transparent in this process [8]. Teachers from different universities use Moodle to place notes, videos, pictures and try to inform their students the purpose, content and tasks of different learning subjects [9-11]. This system can be considered as an optimal solution to meet the educational needs of teachers and students, supported by the rapid response of the tutor to emails and activities [12]; committed, frequent contact and individual feedback [13]; clearly to specify the aims and the objectives [14-17] and detailed enough to clarify "what the student is

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able to perform, the conditions under which students are expected to produce the expected behavior, and how well the student must be able to do it "[18]; important communication skills [19]; frequent use of the names of the students [20] and the ability to be authentic and genuine [20-21].

Distance education studies make a comparison between Moodle and Blackboard platforms, however both systems have the key tools to generate friendly learning scenarios [22-24].

At the present paper we analyzed the behavior of learning between distance learning versus traditional modality in groups of second semester of the career in automotive engineering pursuing a learning subject in the field of physics.

2. Materials, Methods and Procedure

A pilot group of 26 students from the second semester of engineering in automotive systems at UPIIG, during the period of August-December 2015, was monitored as a control group through the virtual platform Moodle in the learning subject of electricity and magnetism as a main tool in the process of Teaching-Learning. The aspects that were evaluated are a) the average grade and b) the standard deviation.

The organization of the virtual course was conducted in 3 stages, the first stage was the organization and development of the contents of the subject being taught. The stage 2 was the introduction of a virtual advisor which served as a guide during the semester and the stage 3 the scheduled was presented which contained a schematic and clear process to deliver the activities, where each virtual student had a transparent and easy concept to understand the structure of the course. (See. Fig. 1)

As shown in FIG. 1, the learning subject was divided into five thematic units according to the curriculum that applies to this subject at the National Polytechnic Institute, which were 6 hours / week with 4.5 hours of theory, the contents were taught trough the Moodle platform that corresponds to 81hrs and 1.5hrs of laboratory, which were 27 hours on site mode, covering the course in a total of 108 hours / semester. The stage 4 a survey was applied to the students to determine the level of resistance to change from the previous way of teaching, this same survey was applied in week 18. The Stage 5, a concentrate of grades of each evaluation period from the 5 on site groups and the virtual group was analyzed to determine the average and the standard deviation.

Each unit was organized (Fig.2) taking into account 5 essential points: The purpose of thematic unit, subtopics, instructions for virtual receivers, portfolio of evidence and evaluation criteria by rubrics. These essential points were developing by a) participation in 3 discussion forums, b) 20 specific homework, c) the application of 3 test that belonged to 3 periods, each one of six weeks.

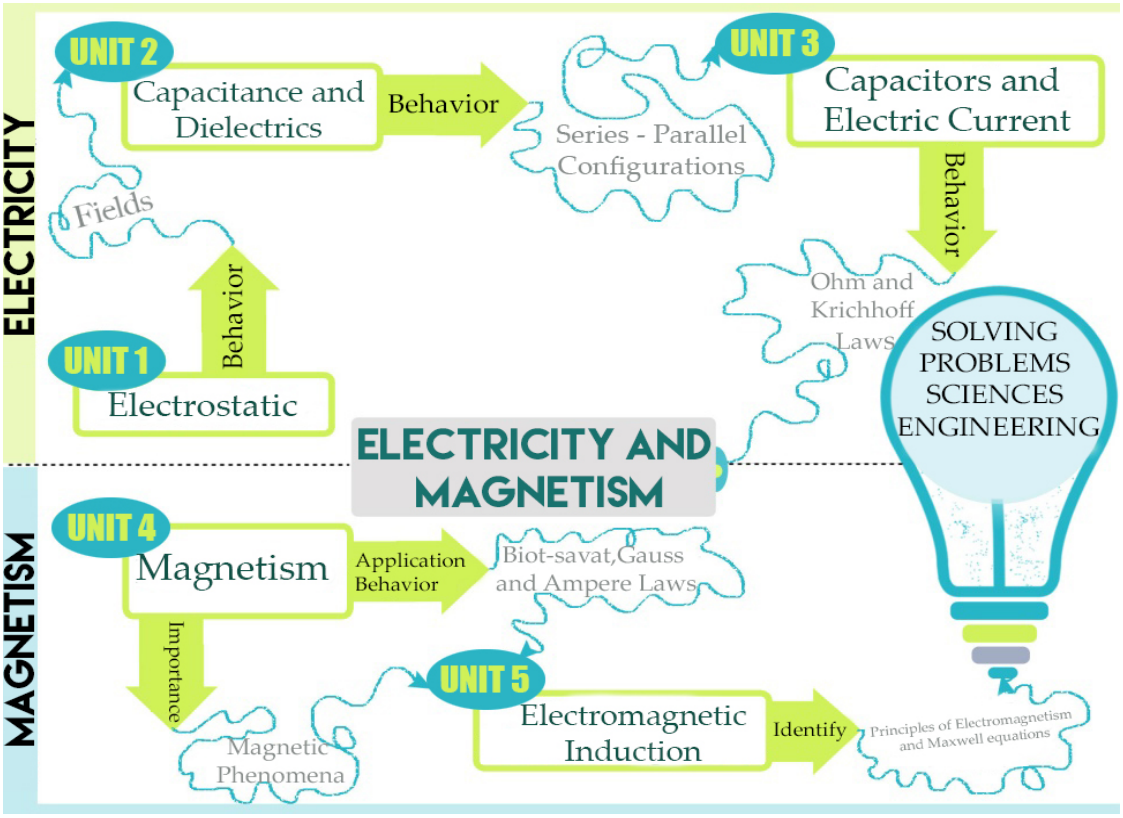

Figure 1. Contents of the academic subject

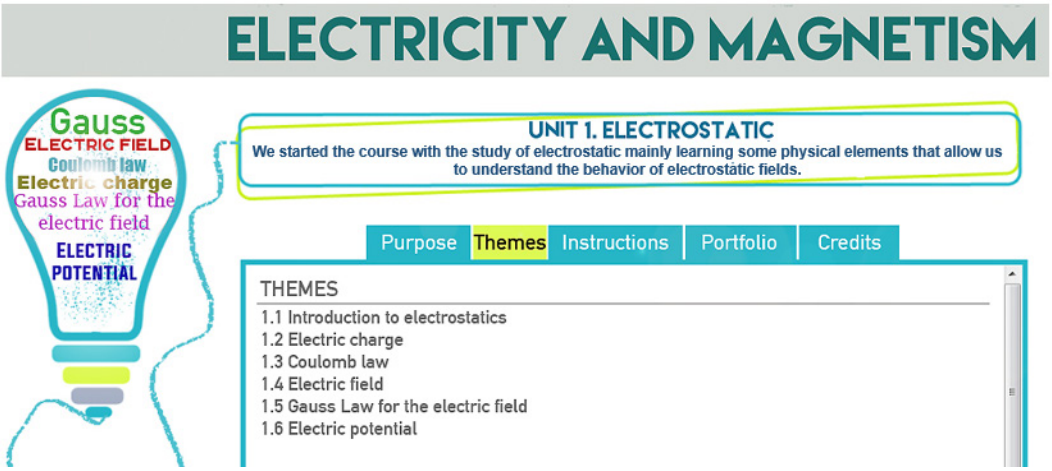

Figure 2. Contents from the Academic Subject

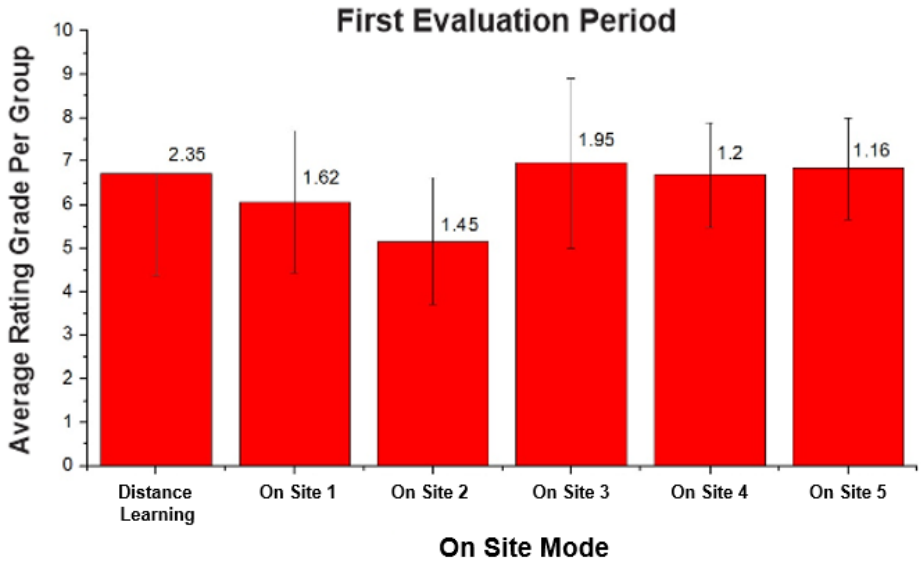

Figure 3. Comparison between the 5 on site groups and the virtual group during the first evaluation

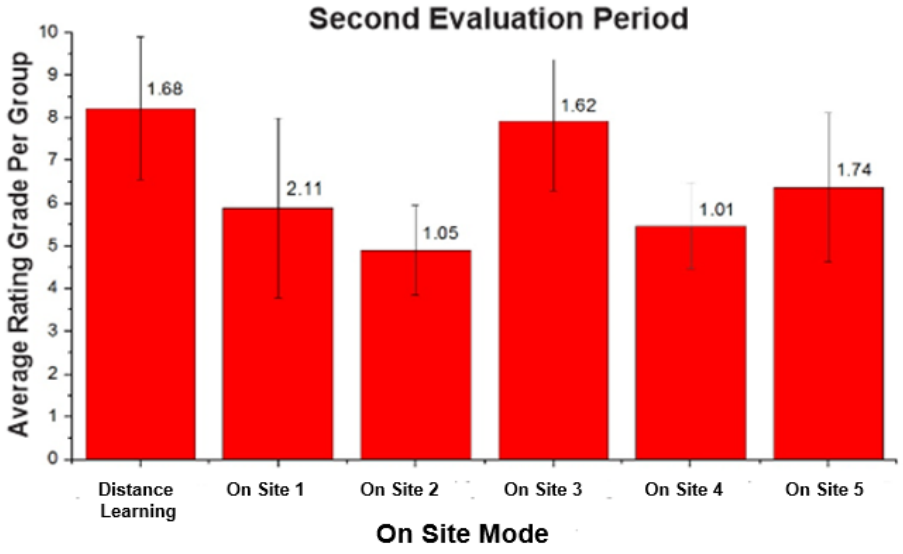

Figure 4. Comparison between the 5 on site groups and the virtual group during the second evaluation

3. Results

The comparative study between 5 on site groups of the second semester of engineering in automotive systems career that were taking the subject of electricity and magnetism and a virtual group were evaluated. The average rating grade per group and a standard deviation were calculated in each of the evaluation periods. In (Fig 3), we can see how the on-site group number 3 slightly got the best grade average (6.96) with a standard deviation of 1.95, compared to other groups evaluated, followed by on site group number 5 with an average of 6.83 (deviation of 1.16) and the group in virtual mode (Moodle) resulted in an average of 6.71 and a standard deviation of 2.35.

The same procedure was developed for the second evaluation period, where we verify that the virtual group achieved an average score of 8.22, and a standard deviation of 1.68, followed by the on-site group number 3 with a grade average of 7.92 standard deviation of 1.62 and the on-site group number 5 recorded an average grade of 6.38 with a standard deviation of 1.74. Such behavior can be seen in (Fig 4).

In the third block of evaluation the virtual group marked a pronounced difference from the on-site groups, reaching an average grade rating of 8.73, but with a standard deviation of 2.46. The trends were preserved as the evaluation results that happened in the second block, followed by on site group 3 and 5 with an average on assessments of 6.75 and 5.93 respectively with deviations of 1.57 and 1.07. See Fig. 5.

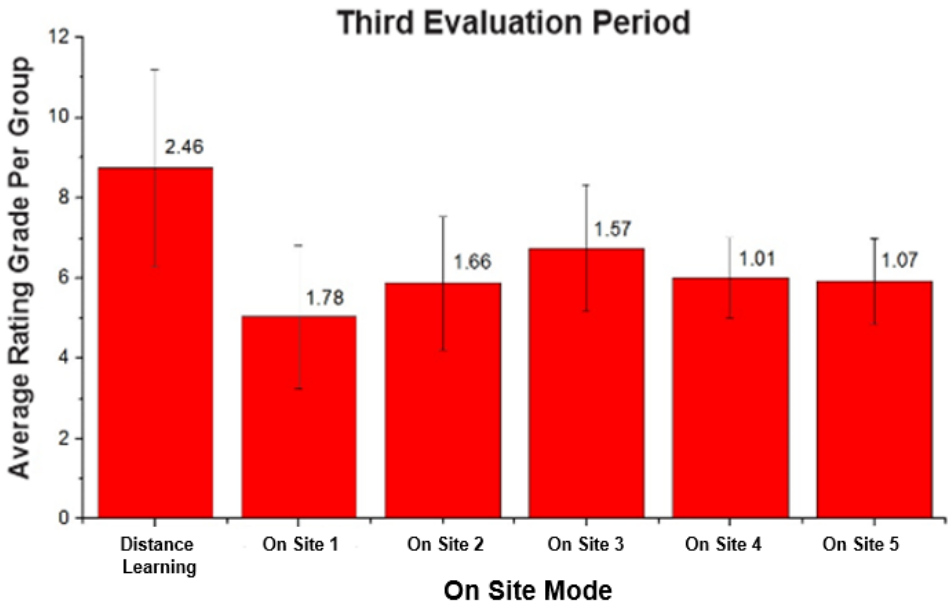

Figure 5. Comparison between the 5 on site groups and the virtual group during the third evaluation

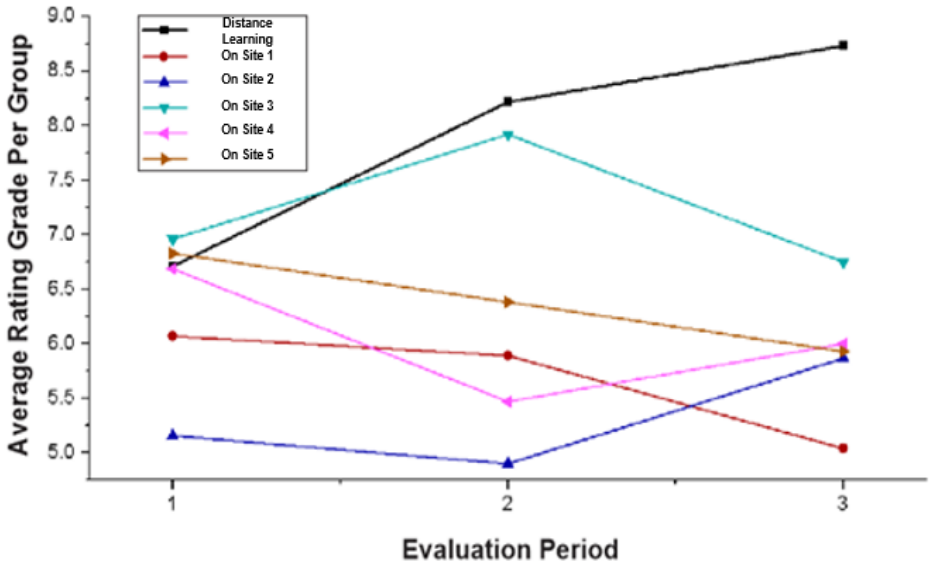

Figure 6. Trends of the groups that were evaluated during the three periods of assessment

Finally, in Figure 6, we can see the upward trend of the virtual group compare with the on-site groups during the three periods of evaluation. This graph shows how the pilot group was improving for the time spent in Moodle platform in addition to acquiring the knowledge in correlating the theoretical part of the contents and the virtual laboratory.

The results of the survey from the pilot group sought to determine the level of resistance to change the mode of study, the results of the first survey are that 77% of students in the pilot group exhibited a resistance, the causes found were: a) the first contact with the Moodle platform, b) the first approach to mathematical content in virtual mode physical area and assumed that the contents would not be clear to be understood without the presence of a facilitator. With the final application of the same survey at the end of the semester was found that this result decreased to 35%. The factors that affected positively were the number of hours used by students in the virtual platform, clarity of content, rapid response form the virtual advisor within the first 24 hours after making the questions or needed technical support.

4. Discussion and Conclusions

The use of the Moodle platform can cause confusion on students who are not used to take distance learning courses. However, when accessing information and having a good management of each of the tools available in the platform, the results can be encouraging for future online courses. The results indicate that the use of the Moodle platform can support largely self-educated students with the skills required, and it is a technological tool that makes it easier the evaluation in large groups, allowing us to obtain real-time scoring.

We can conclude that starting from the results of this investigation it was found that the use of Moodle tools is part of the everyday work of teachers in (UPIIG) within those, it is notice that there is a higher application rate in the discussion forums, internal messaging, document repository, assignments, quizzes, tracking the trajectory of each student evaluations, co-evaluations and self-assessments as well as the grading of midterms and final exams.

The results of this study generated expectations of the constraints on space and time to extend the versatility of the teaching-learning scenarios –in a complementary way in which students interact with teachers, establish a particular style that allows them cognitive learning strategies that generate new spaces: "virtual classrooms".

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