Social-Economic Factor as a Determining Factor of Parameters of Use and Performance in A TLVE Applied to Anatomy Teaching

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SOCIAL-ECONOMICFACTORASADETERMININGFACTOROFPARAMETERSOFUSEANDPERFORMANCEINATLVEAPPLIEDTOANATOMYTEACHING

Strictly as per the compliance and regulations of:

Social-Economic Factor as a Determining Factor of Parameters of use and Performance in a TLVE Applied to Anatomy Teaching

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Summary- Introduction: In preliminary studies, we have determined that there is a high adhesion and usefulness with the use of virtual spaces (TLVE) in Anatomy students as a teaching resource which is supplemental to practical assignments (PA) of the subject. The population on which studies have been conducted showed an important heterogeneity regarding the social-economic characteristics of participants.

Purpose: To assess the impact of the social-economic factor of students in the parameters of use, adhesion and performance in the virtual space, with specification of the teaching techniques used.

Materials and Methods: Observational, retrospective and transversal study on parameters of use and performance with a TLVE in a cohort of 309 students. Results have been divided by areas of the subject, statistical parameters have been applied (descriptive and inferential) and they were correlated with the above-referenced data of social-economic characteristics. The work complies with applicable ethical-legal regulations.

Results: The working hours of students were correlated with the use of the TLVE (number of inclusions/day $r^2=0.75$ and week $r^2=0.78$) and performance in clinical-surgical cases was proportional to the logging time ($r^2=0.75$).

Conclusions: Working activity together with university studies and, specially, the time of weekly working activity, were determining factors in the performance obtained in the virtual space and in the parameters of use of the technological resource.

Keyterms: anatomy, teaching, social-economic factor, teaching and learning virtual space.

I. Introduction

The social-economic heterogeneity of our university population causes the contents taught by teachers not to be homogeneously received and internalized by students, beyond the subjectivity of each student and his cognitive structure. Such heterogeneity is shown in several aspects that have an impact on students´ quality of learning, such as whether they are near the university, the time of transport to such university, possibility of full access to bibliography for study, time, quality of hours and space for study and understanding of the topics, among many other factors of the same importance.

Our Medicine School is located in the downtown of the capital city, with multiple means of transport for access (subway, buses) and it is free of charge. In order to pay for their studies, many students need to perform working activities, some of them for a few hours and days, but others have an important number of daily working hours, and this continuous solution to develop their university course of studies has an impact on the solidity of the significant learning that such students are able to develop.

Working activities which are simultaneous to the days students attend school cause attendance to academic classes to be reduced to another space in the student´s timetable, with similarities to the experience of their working structures.

The physical space for attendance, learning, discussion on the topics learned and opening of new scenarios for search of other information or reflection in an environment of social exchange among peers or with tutors in person is diluted.

In addition to this social and economic context that characterizes most of our students, the social impact of the Web in the late 90´s has transformed the connection means and the way of access to information by students[6,10,12]. In addition to accessibility to the information, information and communication technologies (ICT) provide multiple tools and possibilities to manipulate and produce information that have had an impact on education and teaching strategies, and teaching and learning environments (TLVE) have been generated[8,9,13]. In preliminary studies conducted by our research group of the Teaching and Educational Sciences Laboratory, we have found that there is a high adhesion and usefulness with the use of TLVEs in Anatomy students was a teaching resource which is supplemental to practical assignments (PA) of the subject and with special characteristics regarding the different rotations of such subject. However, we have found some indicators that the use, usefulness and performance in the TLVE might be related to social-economic characteristics of receptors.

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II. Purpose

The purpose of this research work has been to evaluate the impact of the social-economic factor of undergraduate university students on the parameters of use, subjective adhesion, management of contents and performance in the virtual space, with specification of the teaching strategies implemented in the activities used.

III. Materials and Methods

An observational, retrospective and transversal study was performed on the implementation of a TLVE designed with the platform Moodle® that was implemented as an instructional resource which is supplemental to practical assignments with cadaveric materials and to theoretical classes taught by teachers of the Chair.

The impact of the working factor has been studied, as the most important social-economic factor in this group, which, due to its intrinsic characteristics, might have an influence on the use, subjective adherence, management of contents of the virtual space, and also directly on the performance obtained in the activities of the virtual space as well as the results of the programmatic test of the subject.

The parameters of use analyzed were related to characteristics of quantity, time and moment of inclusion or logging, as well as technological means and way of access to the TLVE. In the case of management of contents, both administrative and academic, the focus was placed on characteristics of the teaching-learning process, and the average of times that activities were performed, the necessary times to pass them, the percentage of times (attempts) passed and failed and the percentage of students that repeatedly failed 2 or more times the same activity was analyzed.

Subjective adherence has been assessed according to the satisfaction of users with inter-space communication and qualitative analysis of materials and their teaching strategies. Finally, the performance obtained in the TLVE has been analyzed according to the number and type of passed activities (specifying the number that have been passed with the optimum score or 100%) and failed.

The population of users was formed by 309 students from 3 divisions of year 2012 pertaining to the study of Anatomy of the 3rd Anatomy Chair of the Medicine School of the University of Buenos Aires who fully performed all the above-mentioned activities in their different formats. Those students who had not performed all the activities (due to the fact that they had lost their condition of attending students or to failure to adhere to this teaching resource) were excluded from this research. Population characteristics of the sample are shown in Table I.

The results have been submitted to tests of descriptive statistic (average, minimum, maximum) and inferential (correlation r and r^2) and figures were performed by means of the use of Microsoft Excel® 2007 for Windows. This research work has been performed in accordance with applicable ethical guidelines and norms (requirements of Good Clinical Practices -GCP-, regulatory provisions and adherence to ethical principles arising from the Declaration of Helsinski).

IV. Results

In the assessed parameters of use, 48.77% of students who performed working activities had 4-5 times a week loggings in the virtual space, average of weekly loggings higher than the one recorded for students without working activities (3 times/week). When the number of loggings per day was assessed, in the group with working activities it was recorded that 48.77% did so 2-3 times a day on average; in the other group, prevalence was lower (1 time/day or less). The time of logging in the virtual space, in such students with working activities, it was found that it was done between 24 and 72 hours after the pertinent PA; the group without working activities recorded nearer loggings (the same day of the PA and up to 24 hours later). [Figure1]. The average time of stay logged was significantly shorter in students with working activities (20-40 minutes); the time of higher frequency of loggings in those students with working activities was at night and early morning (33.99%; 28.08%) with prevalence of loggings during weekdays followed by weekends (38.42%; 36.45%); in the group without working activities it was unspecific, and the time of logging was very heterogeneous [Fig. 2]. The type of connectivity prevailing in the virtual space in the group of students with working activities was both mobile as non-mobile (55.67%) in contrast with most of the students in the other group that referred non-mobile connection (41.51%) and associated with the place and instrument for logging. Connection from public access and working space from desktop computers was highlighted in the group with working activities [Fig. 3].

All the parameters of subjective adherence to the virtual space had a positive response of satisfaction higher than 70%. Some parameters were recorded with significant differences among groups: the usefulness of the teacher-student exchange by virtual means was 20.95% lower in students with working activities, as well as correlations and images cases for a better management of the cadaveric preparation was 24.67% and 16.36% lower in this group with working activities [Fig. 4]. This group showed 15.11% more acceptance than exercises and attached materials were useful to complete rotation PA [Fig. 5].

Regarding management of the contents, we have determined that the group with working activities had a higher number of performances of activities and a higher number of times used for passing activities, this difference was higher in the case of clinical-surgical activities [Fig. 6]. This group with working activities had, on average, a lower number of attempts passed, but a higher percentage of students who repeatedly failed 2 or more times the same activity [Fig. 7]. In both groups, it was found that clinical-surgical cases had higher percentages of failed attempts with a higher number of students who failed 2 or more times the same activities.

When performance in activities of the virtual space was assessed, we found that the group with working activities had a lower percentage of passed PA and PA passed with 100% correct answers compared to the group without working activities. We highlight that clinical-surgical cases had a higher percentage of fails in the group with working activities, whereas in the group without working activities, clinical-image cases did so [Fig. 8]. The group of students with working activities recorded a higher percentage of failed PA, but it was highlighted that the percentage of approved assignments with 100% of correct answers was equivalent in both groups [Fig. 9].

By correlation figure, we have found that working hours were proportional to the use of TLVE with respect to the number per week (r2=0.78) and per day (r2=0.75) of loggings [Fig. 10]; the average time of stay logged in was directly proportional to the result obtained in the activities of clinical-surgical cases in the group with working activities (r2=0.75) [Fig. 11]. The number of working hours per week of students was inversely proportional to the number of students with 2 or more fails in the same activity [Fig. 12].

V. Discussion

Currently, medical sciences schools are facing a changing social context where the scientific and technological development, the speed at which new knowledge is generated, globalization of such knowledge, as well as the fast caducity and replacement by new knowledge have characterized the latest 20 years. Information and communication technologies have been included and positioned as a teaching resource at all levels of the teaching of medicine, becoming adapted to curricular requirements and objectives of teachers due to the multiple (maybe infinite) tools they provide[6,8,9,10]. Furthermore, the profile and the characteristics of students have also changed, demanding teachers to be dynamic in their teaching strategies with the focus on achieving their goals as efficiently as possible[7,13,15,19].

In previous researches, we have determined the high adhesion of students to the use of TLVE as an instructional resource supplemental to the teaching and learning process of the Human Anatomy subject at the university level for the Medicine course of studies. This high adhesion was kept in the 3 areas forming the subject (motor, splanchnology and neuro-anatomy)[1,3,17] and it had an impact on subjective adhesion by students to the subject by means of the sustained use of the technological resource. We have found benefits related with the time of study of the subject[11], as well as different performances related with teaching strategies of activities[4,16] and of the topographic area to which they belonged[2,5,17]. Such specificities that associated performance with teaching strategies and topographic areas have been interpreted with an origin in the intrinsic factor of the study purpose (approaching the study of the relationships of the kidney is different from the study of brain association fibers, as well as studying the biomechanics of a joint is very different from studying the anatomic relationships of the trachea by means of magnetic resonance images). These differences are investigated by our work team for the purpose of developing activities based on efficient teaching strategies in accordance with the study topic, evaluating the impact on the cognitive structure of receptors and its impact on learning and performance. As at this date, the advantages obtained by means of the use of virtual spaces as a teaching resource or the abilities that they generate in university students have not been consistently assessed, despite the fact that there are theories based on hypotheses of cognitive neuroscience applied to learning.

Students with working activities have had particular characteristics regarding study styles. In 2011, we found a higher consumption of psychoactive substances in this group (also in students who were re-taking the subject) for the purpose of increasing studying hours, a conduct aimed at compensating the demands for time that are reduced in this group, but which leads to important consequences for the health and type of learning[14]. In a study published in 2012, we described how working students used mobile TLVE (mTLVE) with more prevalence and recorded more loggings and logging time in the system[18], facts that we ratify in this research and which might also be related to the demand of time of study, which is not generated in an enriched environment for it. The prevalence of students with working activities has a sustained increase at our School and, although the special characteristics of this group are various, the current social reality obliges us teachers to design ways of access and communication of the information which generate factors for learning and the generation of abilities in students, whether by a direct means or by an alternative means, without wasting these spaces, which are also exchange and learning places.

VI. Conclusions

In the analyzed cohort of university students, those with working activities shown specificities in the parameters of use, adherence and performance that were associated with the teaching strategy of the activities and the number of working hours. It is necessary to increase the size of the sample and it is also necessary for teachers to design activities focused on this group, in accordance with the social-economic reality and the dynamical characteristics of the undergraduate university population.

References Références Referencias

1. Algieri RD, Mazzoglio y Nabar MJ, Castro Barros FA. Espacios virtuales de enseñanza y aprendizaje (EVEA) en Esplacnología: especificidades pedagógicas en su enseñanza topográfica. Int. J Morphol 30(3):908-915, 2012.
2. Algieri RD, Mazzoglio y Nabar MJ, Dogliotti CG & Gazzotti A. TICs aplicadas a la enseñanza del aparato digestivo (TICs applied to teaching the digestive apparatus). Int. J. Morphol., 27(4):1261-1268, 2009.
3. Algieri RD, Mazzoglio y Nabar MJ, Dogliotti CG, Gazzotti A, Jiménez Villarruel HN, Rey L, Gómez A. Especificidades pedagógicas en la utilización de un EVEA para la enseñanza del aparato locomotor. Rev Arg Anat Online 2012; 3 (4):109-115.
4. Algieri RD, Mazzoglio y Nabar MJ, Dogliotti CG, Gazzotti A, Rey L, Gómez A. Rendimiento en casos clínico-imagenológicos a través del espacio virtual. Revista del Hospital Aeronáutico Central 2012; 7 (2):111-117.
5. Algieri RD, Mazzoglio y Nabar MJ, Dogliotti CG, Rey L, Gómez A, Tornese EB. Espacio virtual de enseñanza y aprendizaje aplicado en la enseñanza del tórax: adherencia y utilidad didáctica. Revista del Hospital Aeronáutico Central 7 (2):37-39, 2011.
6. Avila RE, Samar ME, Peñaloza Segura F. Descripción y Evaluación de una página Web como Apoyo Virtual del Curso Presencial 2003 de Biología, Histología y Embriología en la carrera de Medicina. Primer Congreso Virtual Lationamericano de Educación a Distancia. LatinEduca2004, 2004.
7. Buelta Carrillo L, Fernández Fernández F, Garijo Ayensa F, Val Bernal F. Docencia virtual de anatomía patológica. Rev Esp Patol 36(2):139-148, 2003.
8. Burgos, D. & Koper, R. Comunidades virtuales, grupos y proyectos de investigación sobre IMS Learning Design. Status quo, factores clave y retos inmediatos. RELIEVE 2005; 11(2):189-200. Disponible en: http://www.uv.es/RELIEVE/v11n2/RELIEVEv11n2_6.htm
9. Correa Gorospe, J. M. La integración de plataformas de e-learning en la docencia universitaria: Enseñanza, aprendizaje e investigación con Moodle en la formación inicial del profesorado. RELATEC, 4(1):37-48, 2005.
10. Duart, J. M. & Sangrá, A. Aprender en la virtualidad. Barcelona, Gedisa, 2000.
11. Gazzotti A, Algieri RD, Dogliotti CG, Mazzoglio y Nabar MJ, Rey L, Jimenez Villarruel HN, Gómez A, Pró E. Adhesión al Espacio Virtual de Enseñanza y Aprendizaje (Moodle) en alumnos de Anatomía (Joining the virtual teaching and learning (Moodle) space for students of Anatomy). Revista Argentina de Anatomía Online, 2(2):60-63, 2011.
12. Lara P, Duart JM. Gestión de contenidos en el e-learning: acceso y uso de objetos de información como recurso estratégico. Revista de Universidad y Sociedad del Conocimiento 2005; 2(2):6-14. Disponible en: http://www.uoc.edu/rusc/2/2/dt/esp/lara.pdf
13. Litwin, E. Tecnologías educativas en tiempos de internet. 1ª ed. Buenos Aires, Ed. Amorrortu, 2005
14. Mazzoglio y Nabar MJ, Algieri RD, Dogliotti CG, Gazzotti AM, Jiménez-Villarruel HN, Rey LM. Utilización de sustancias psicoactivas en alumnos de Anatomía y su implicación en el aprendizaje. Educ Med 2011; 14 (2): 129-132
15. Montero O'farrill, J.L. Estrategia para la introducción de las Tecnologías de la Información y las Comunicaciones. Revista Latinoamericana de Tecnología Educativa – RELATEC 2010, 9(1), 75-87. Disponible en: http://campusvirtual.unex.es/cala/editio/.
16. Popescu B. M.; Navarro V. Comparación del aprendizaje en internet con la clase convencional en estudiantes de medicina en Argentina. Educación Médica 2005; 8(4):204-207.
17. Tornese EB, Dogliotti CG, Mazzoglio y Nabar MJ, Algieri RD, Gazzotti A, Jiménez Villarruel HN, Rey L, Gómez A. Entorno virtual de enseñanza y aprendizaje aplicado como recurso instruccional complementario en la enseñanza de Neuroanatomía: aspectos poblacionales, didácticos y psicopedagógicos. Int. J Morphol 29(4):1130-1135, 2011.
18. Tornese EB, Mazzoglio y Nabar MJ, Algieri RD, Dogliotti CG, Gazzotti A. mEVEA: Espacios de enseñanza sin límites?. Rev Docencia Universitaria 13:57-67, 2012.
19. Wiecha J, Barrie N. Collaborative online learning: a new approach to distance. 2005. [Disponible en: http://www.jmir.org/2003/2/e13/].

TABLES AND FIGURES

Table 1 : Population characteristics of the sample.

Sex	Male	31.07%
	Female	**68.93%**
Age	**18-24**	**85.44%**
	25-30	12.62%
	> 30	1.94%
Timetables in which he/she attends school	Morning Shift	36.25%
	Afternoon Shift	33.33%
	Evening Shift	30.42%
Working	**Yes**	**65.70%**
	No	34.30%
Number of weekly working days	1 day/week	22.17%
	2 and 3 days/week	34.97%
	4 or more days/week	**42.86%**
Weekly working hours	**between 12 and 24 hs/week**	**44.98%**
	between 25 and 30 hs/week	35.60%
	between 30 and 40 hs/week	13.59%
	> 40 hs/week	5.83%
As a student, does he/she have any previous experience in the use of e-learning?	Yes	7.44%
	No	**93.85%**
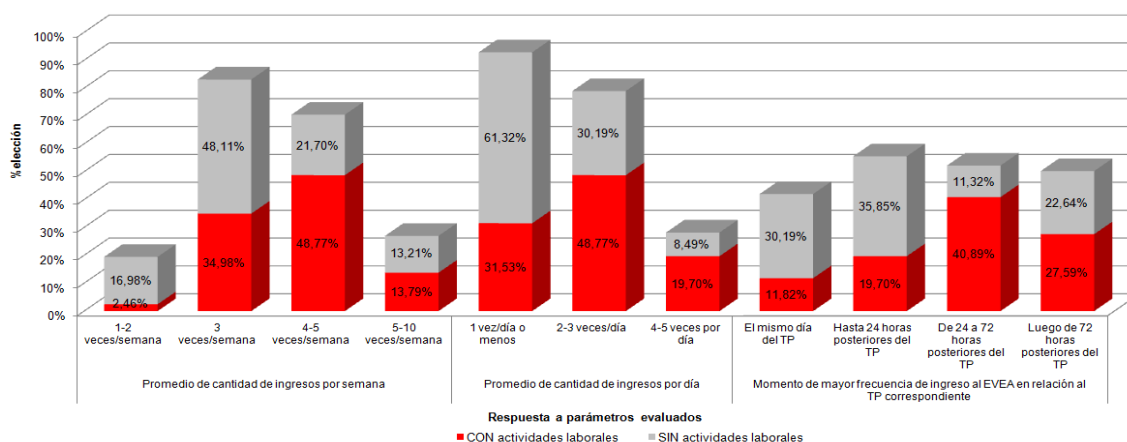
Figure 2 : Percentage of responses to 3 parameters assessed on data of use of the TLVE in accordance with the area of the subject.
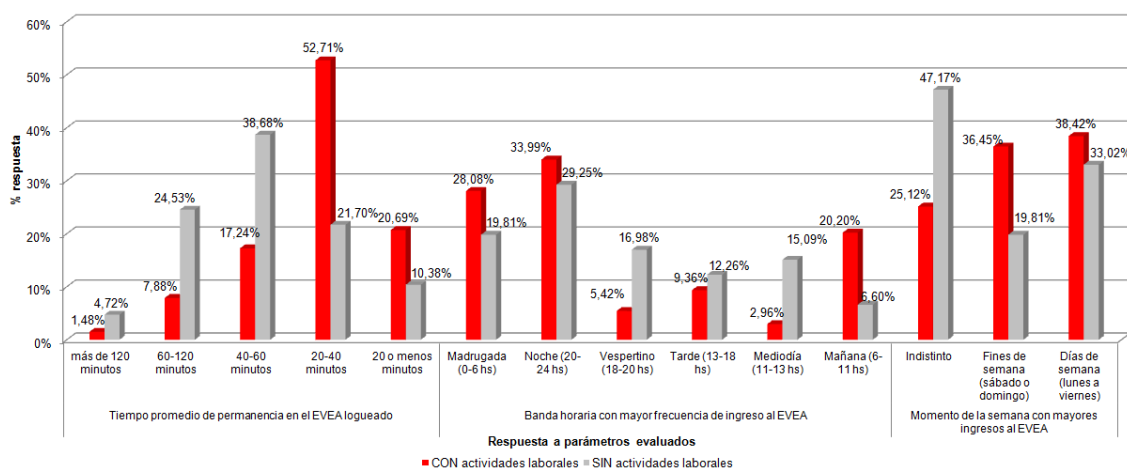
Figure 3 : Percentage of responses to 3 parameters assessed on temporary data of use of the TLVE according to the area of the subject.
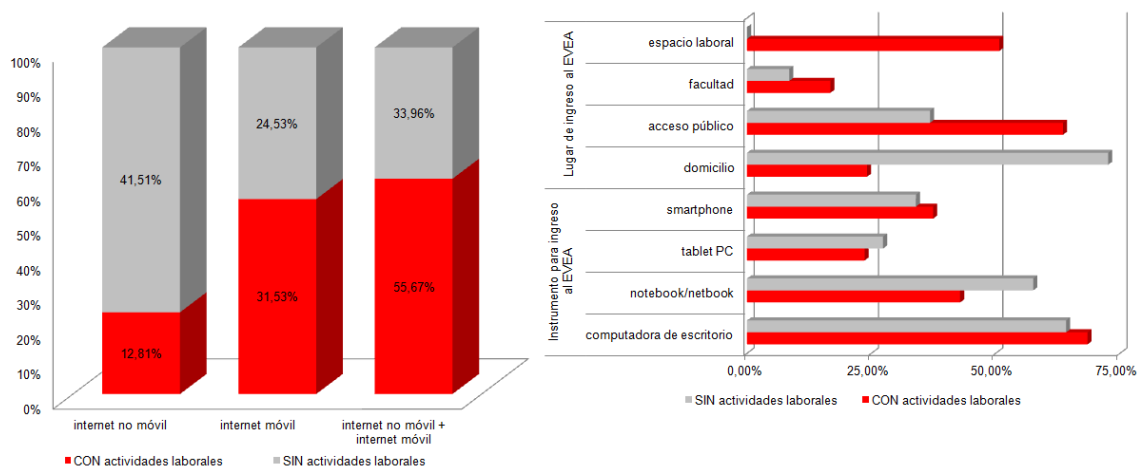
Figure 3 : Media for connection with specification of the instrument used and physical place of logging.
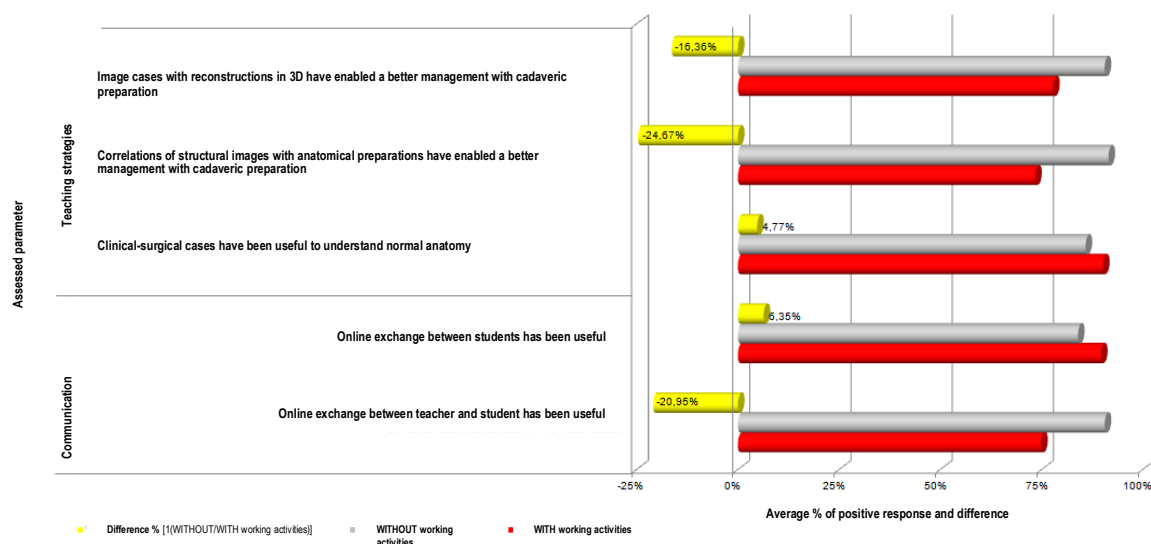
Figure 4 : Percentage of responses on subjective adherence of students with 2 communication parameters and 3 related with teaching strategies and their percentage deference.
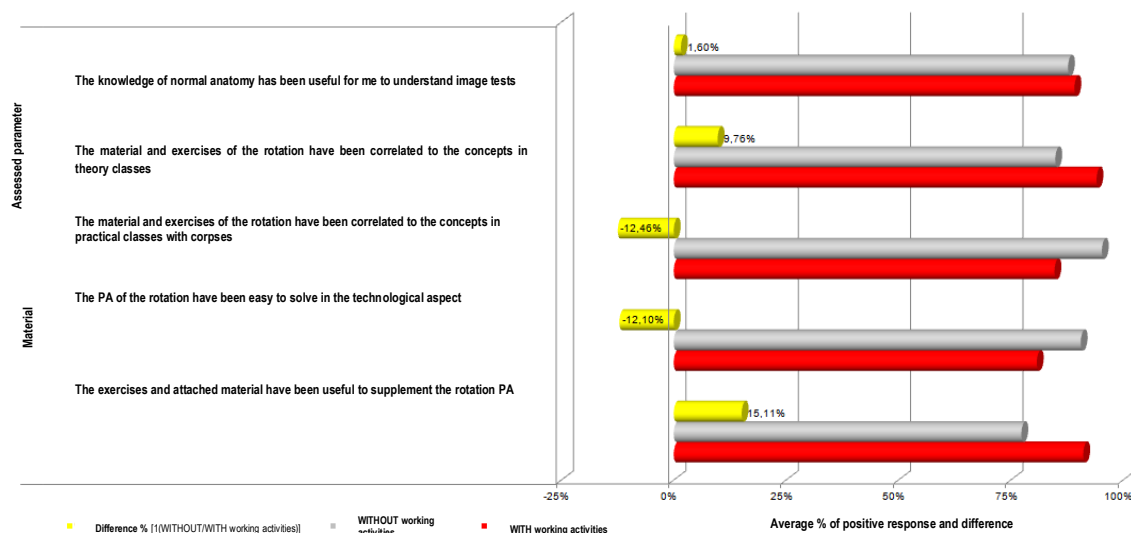

Figure 5 : Percentage of responses on subjective adherence of students with 5 parameters on materials and their percentage deference.
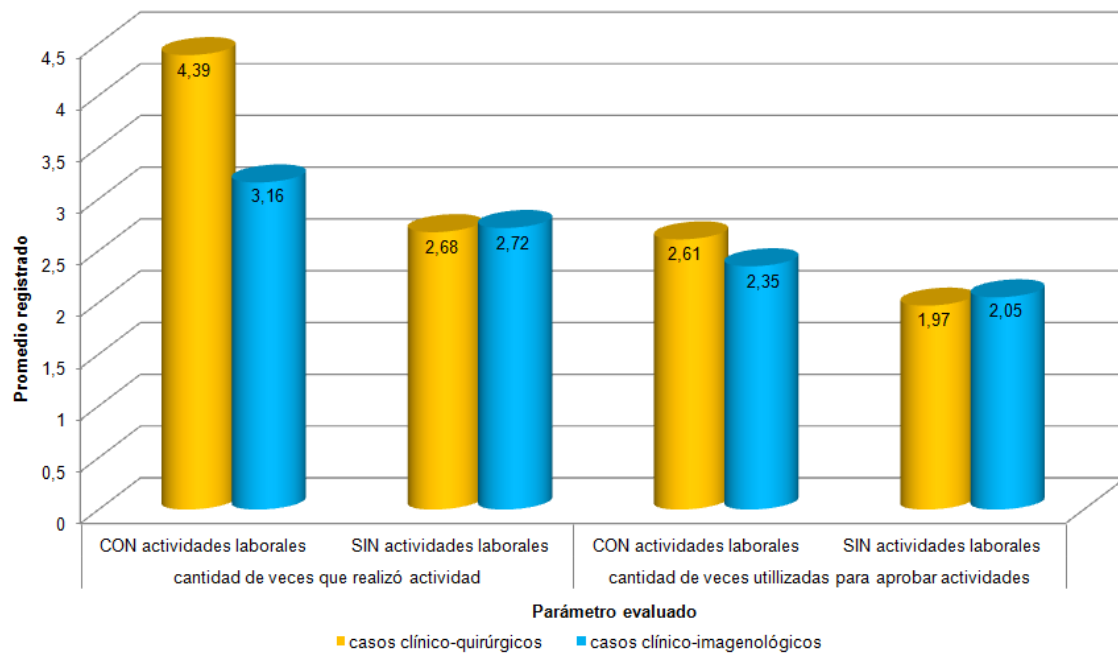
Figure 6 : Average of times used for performance of activities in the TLVE according to their teaching strategy.
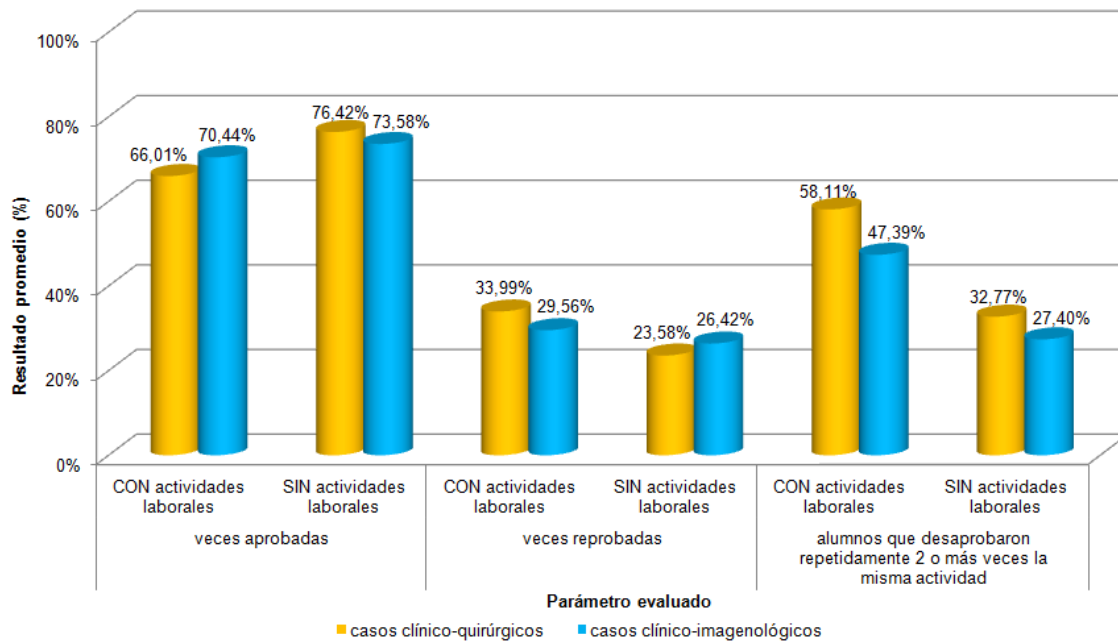
Figure 7 : Average of attempts used and their results in TLVE activities according to their teaching strategies.
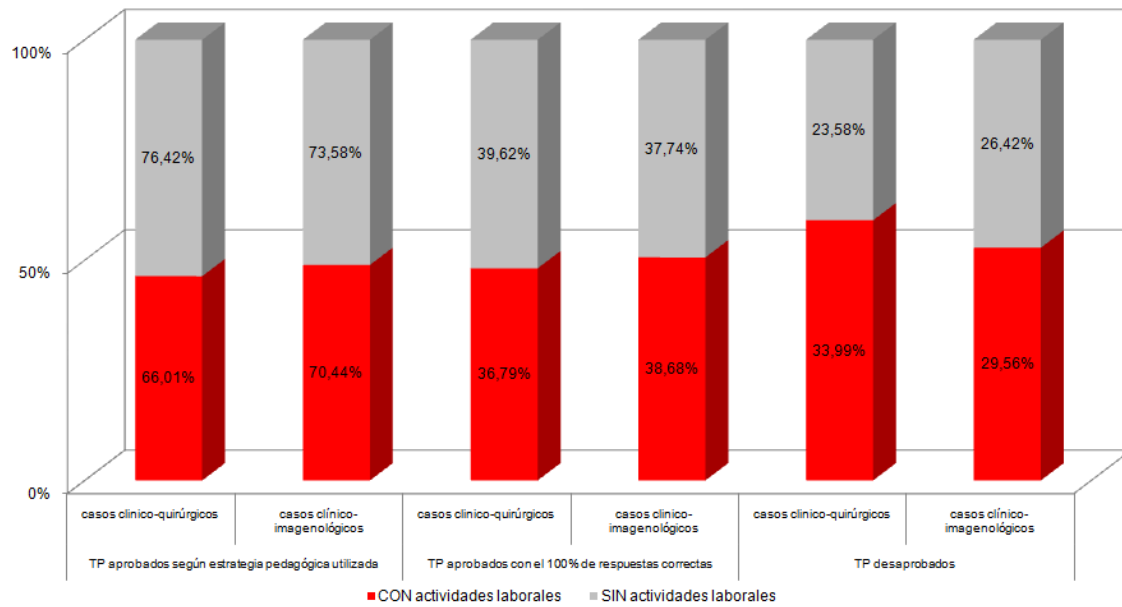
Figure 8 : Performance in Clinical anatomy activities according to the teaching strategy and students´working activity.
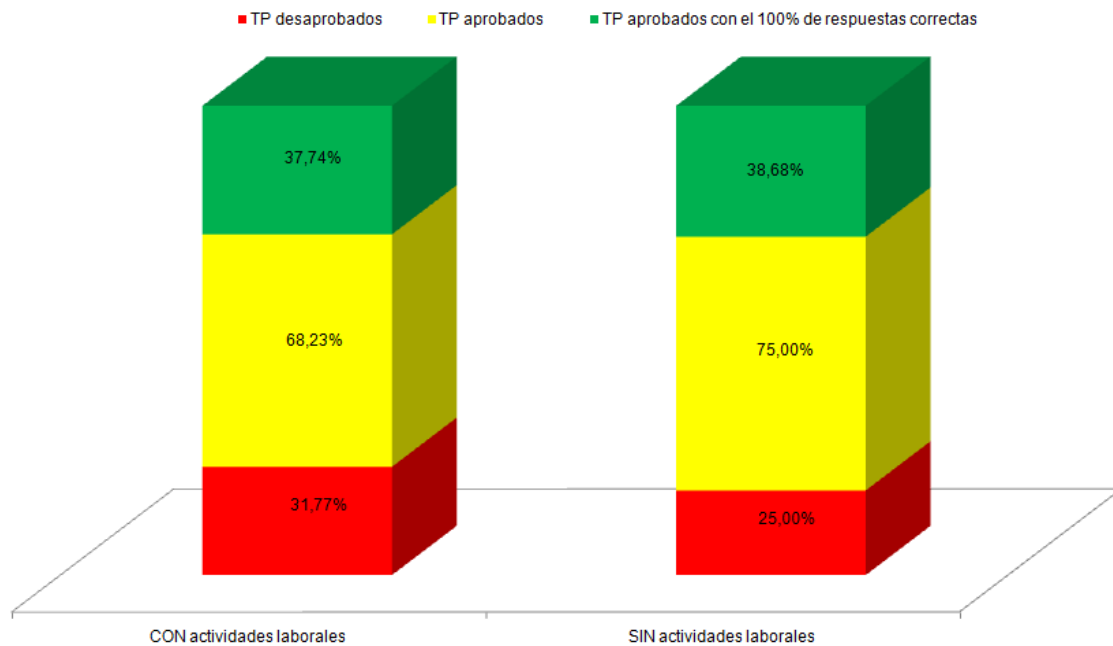

Figure 9 : Students`performance in clinical anatomy exercises according to their working situation.
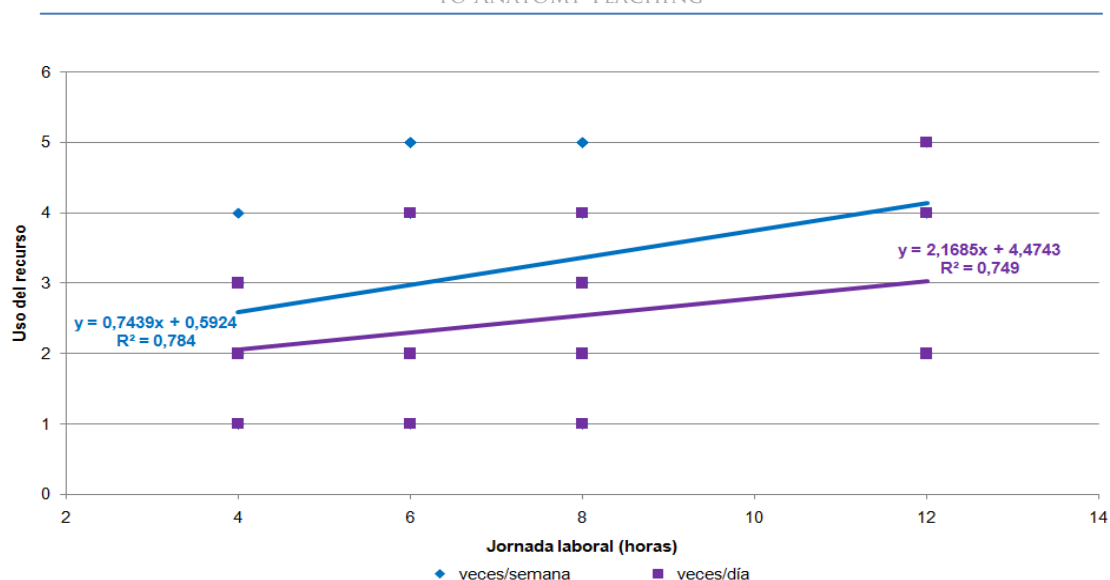
Figure 10 : Correlation between working hours and parameters of use of the teaching resource.
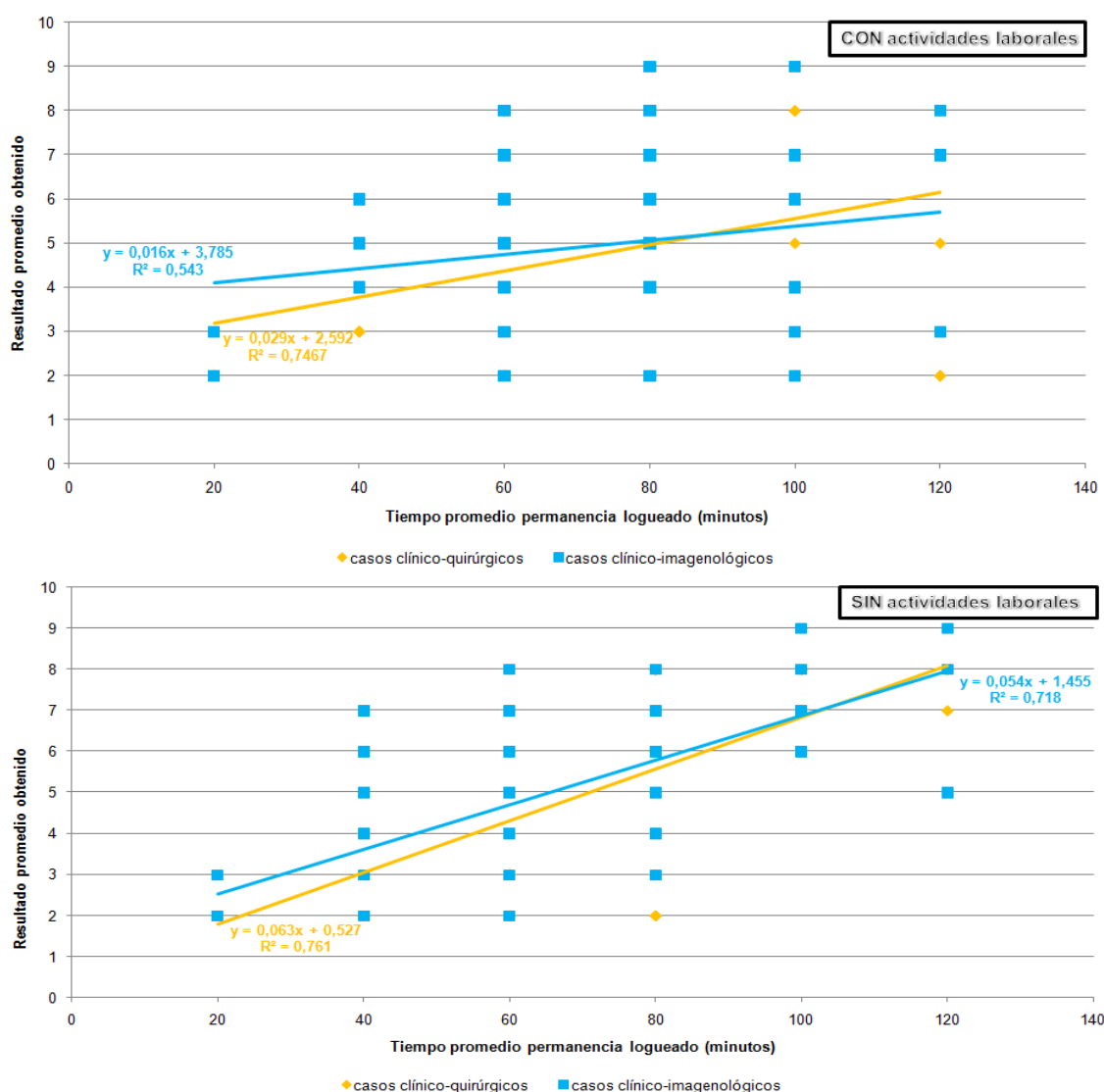

Figure 11 : Correlation between the average time of stay logged and the average result obtained in activities
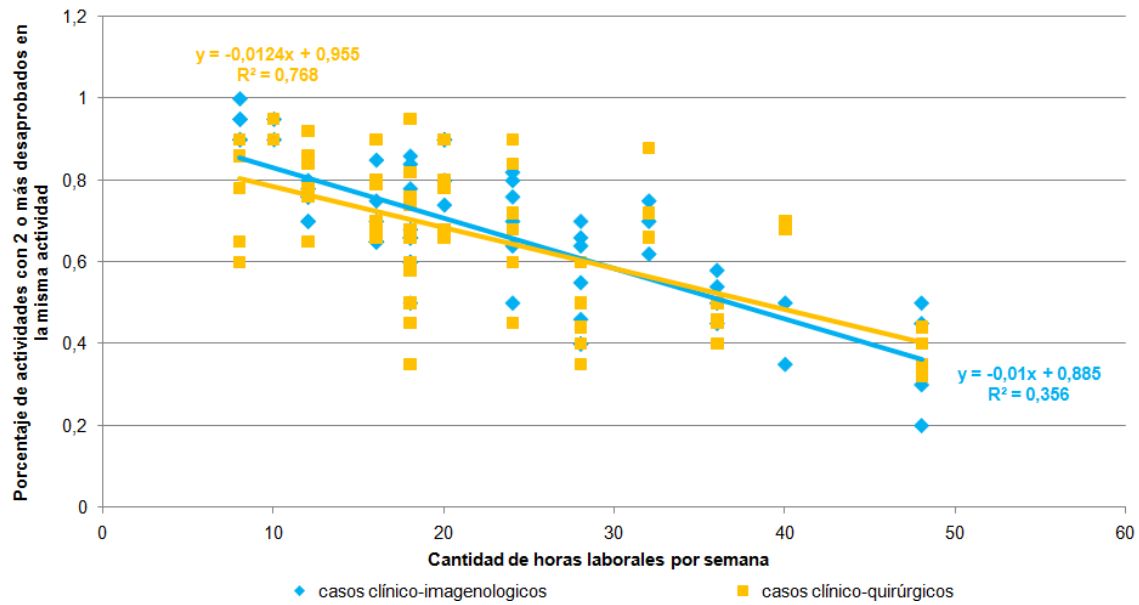according to their teaching strategy in both groups

Figure 12 : Correlation between the number of weekly working hours and the number of record of 2 or more fails in the same activity according to their teaching strategy.