* Original article

A Distance Education Experience with a Semipresential Model at UNIRIO_s Medicine and Surgery School

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Abstract
This study investigates the feasibility of implementing a distance learning methodology based
on a hybrid model in a discipline of a Medicine School. Sixty-four students divided themselves
into six groups with a leader for each one. In Stage 1, educational material in digital format
was sent to the leaders. Groups engaged in a friendly discussion to answer the questions.
Afterwards, the leaders sent their response off to the Department of Neurology. In the second
stage, six master's degree students of neurology tutored two onlineactivities using an instant
messaging software. The "Epilepsy" segment was chosen to be taught at a distance using
programmed instructions, texts and case histories. Somative evaluation consisted of nine
multiple items questions graded by absolute criteria. Question No. 7 was entirely dedicated to
the distance learning segment. Of all students, 81.2% were active participants. Exploratory
data analysis ranked question No. 7 in fourth position. Statistical analysis revealed that
performance of groups in question No. 7 was similar to the other questions. Students
experienced no difficulties in using technology. Overall performance in "Epilepsy" segment was
similar to other face-to-face segments. This distance learning activity seemed feasible and
fostered active learning by opening up new avenues for discussion.

Distance learning occurs when the teacher/professor and the student are logistically separated
(BAKER, 2003). The simple fact of the temporal and/or geographical separation already
indicates the need to establish an effective method of communication. The development and

the fast penetration of new information and communication technologies (TIC), such as, for instance, personal computers and the Internet, have contributed positively for said goal to be fully reached.

TICs are the array of material resources employed in the collection, storage, processing and distribution of information. Besides computer equipment and software, tools, techniques and methods for planning, developing and supporting the usage of information are included. One of these technologies, the Internet, is a conglomerate of computers linked in a worldwide network.

History shows us examples of DL since the first half of the 18th Century (SNELL, 2003). In the 20th Century in Japan, television and the Internet deeply changed the ways to transmit content. The second half of this century saw the appearance of concepts in which superior education could be more complacent with individual learning variations. Thus open universities came and spread around the world (OPEN ..., 2007). Internet use statistics in Brazil show the country in sixth in number of Internet users in the world and with a growth of more than 680% in the 2000/2007 period (INTERNET ..., 2007).

In the revision of national literature, four DL works were found in the medical field, including Medicine and Nursing. None of the experiments dealt with neuroscience themes, but all pointed out their results as effective (LEE, 2001; MAIO *et al.*, 2001; RIBEIRO *et al.,* 2006). International literature was more prolific, but only two studies were related to neurosciences. Davies *et al.*, (2005) describe the experience of a course on neurological diseases aimed at Pediatricians, and Candler & Blair (1998) a neuroanatomy course converted to the semipresential model.

The Brazilian federal government cares about regulating the use of methods for distance learning since 1996. Law 9394 (BRASIL, 1996), Ordinance 4059 (BRASIL, 2004), Decree 5622 (BRASIL, 2005) and Ordinance 873 (BRASIL, 2006) regulate the offer of courses with distance methodology and its tutorships.

Attentive to the developments in the use of new education technologies, the Federal University of the State of Rio de Janeiro (UNIRIO) created the Distance Learning Coordination (CEAD). Linked directly to the Rectory, CEAD takes care of all technical details regarding the implementation of distance courses with the permission of the university. Regarding the UNIRIO Medicine Faculty, no projects or works were found involving DL.

The discipline of neurology in the graduation course of the UNIRIO Medicine and Surgery School (EMC) uses an integrated teaching method based on the proposition of J. J. Guilbert, supported by the World Health Organization (ALVARENGA, 1990; GUILBERT, 1981). The author – a neurologist and systems analyst - decided to study the intricacies of the education/technology interface through a DL experience within the medical field.

When dealing with the theme Distance Learning (DL), it is necessary to point out that there are several definitions available, but all of them converge to a common point: the distance between interested parties. Thus, they highlight the use of some technology as a solution to shorten this distance.

In the first semester of 2006 the coordination of the UNIRIO EMC Neurology discipline had its first experience with DL in the semipresential model. The graduation class of the eighth period and the "Epilepsies" module were chosen for the project. In accordance to the legislation in force, 20% of the 90-hour-total hour load were made available for distance activities. The general schedule for the discipline applied to 64 students, on Wednesdays and Fridays between 12 and 4 PM is made up by: UNIT I – NEUROANATOMY AND COMPLEMENTARY

EXAMS (27H), UNIT II – CLINICAL NEUROLOGY (PART 1 – 36H) and UNIT III – CLINICAL NEUROLOGY (PART II – 27 H).

Traditionally, the educational program is divided into three units, with definite educational goals. The first unit encompasses themes of neuroanatomy and complementary examinations, whereas Units II and III refer to prevalent neurological themes, and the program is turned towards the development of competencies in diagnosis and initial conduct. Different types of resources (multimedia) are used, as well as the following teaching techniques: expositive lesson (for the whole class), directed study with a written simulation of clinical cases (the class divided into two groups of 30 students) and techniques in small groups (with 10 students each) for practical lessons. The discipline makes available for individual study a book for each unit with the following teaching material: 50 descriptions of clinical cases, 25 programmed instructions and 100 anatomic figures with complementary exams and exercises. The evaluation has a pre-test, formative evaluations and tests written with correction by absolute criteria at the end of each of the units.

Unit I was taught conventionally. The DL experience was proposed for Units II and III. Six groups were formed by affinity, with 10-11 students, and, within each, a student was chosen as leader. E-mail addresses were created for the class, for each of the groups and for each student. The definition of names was made by the participants, and followed the criteria described in Table 1.

Names for e-mail addresses	
Student address	neuroYEAR.SEMESTER.STUDENT_NAME@hotmail.com
Group address	neuroYEAR.SEMESTER.GROUP_LEADER_NAME@hotmail.com
Class address	medYEAR.SEMESTER@gmail.com

Table 1: Criteria for e-mail address names

The invitation to students for joining the distance activity, along with the rules, was sent to the e-mail of the class at May 3rd by the professor responsible for the discipline. The first stage was the weekly sending of digital teaching material to the leader of each group. The material was made up of texts and exercises traditionally used in the discipline for individual study.

The leader was charged with distributing the material and schedule a presential meeting with the group for reading, discussion and response to the exercises. The distance activity ended when the leader sent the answers, through e-mail, to the coordination. These activities complemented exposition classes and replaced, for five weeks (May 10th to June 21st, 2006) presential directed study classes with a written simulation of clinical cases. The reader was asked to organize the e-mails of students in the group and send them to the neurology secretary until July 30th. The definition of names would be defined by the participants, as per the criteria described in Table 1.

The evaluation of the author about this first stage of distance activity was an analysis of the teaching material used, its language, images, adaptation to the goals proposed, revision of the answers of the exercises sent by the leaders, as well as the delivery of e-mails within deadline.

The second stage was the replacement of all presential activities on the theme "Epilepsies" of Unit III with distance activities. The Coordinator of the discipline sent in July 3rd, 2006 an e-mail for students and tutors establishing the schedule of the activity and the teaching material (Table 3). For all students, two programmed instructions about epilepsy and coma were sent,

as well as three clinic cases referring to different types of epilepsy, for individualized study. Specific material for chats was also distributed. Each student received an English text selected from book chapters.

Six master's degree neurology students were designated to act as tutors of the groups. This activity was integrated to the pedagogy subject in the Master's degree. The goals of the theme epilepsy were previously defined (Table 2) and were distributed to tutors and students. The evaluation system was made up by a formative part, during the DL activity, and another summing part at the end of the school period. Distance activities organized in two chats mediated by tutors were prepared. At the end of the school period, there was the implementation of the summing evaluation.

In tutorial activities, software that creates and manages chat rooms was used. The choice fell on software *Microsoft Messenger*® of *Microsoft Corporation* as a chat manager, as this synced communication program was pointed out as being of frequent use by the students. The encounters were conducted at times previously destined to presential classes of the Neurology discipline itself, so that graduating students would not feel any loss in relation to the activities of other disciplines.

The author, with his computer formation and solid knowledge of the technology chosen, sponsored a training activity for the tutoring master's degree students. Training in the use of synced communication tools was provided, as well as an explanatory lecture about the tasks and abilities of the DL tutor. A period of 4 hours was dedicated to a chat between the 6 master's degree student tutors so as to simulate the monitoring of an online environment, possible technical failings, its solutions and dismiss doubts. The lecture about the tasks of the tutor happened in an informal environment with exchanged ideas.

During the first chat each student would have to answer a series of questions about the text previously provided (Table 2) that were discussed in real time with their companions and tutors. Besides, one hour before the beginning of the chat every group received a clinical case to be responded, without help from the tutors, as per the express orientation of the pedagogic coordination of the discipline. During the session, specific questions were sent to each student, and free discussions about the texts were stimulated, in which the role of the tutors should be mediation. The second chat took place few days after the first one and was destined exclusively to solve doubts about the theme and debate the responses of the students.

At the end of the school period (July, 2006), a theoretical test made up by nine objective questions was applied, including a specific question about the theme epilepsy (Question 7) as a sum evaluation of Units II and III.

Question 1 – Meningeal Syndrome
Question 2 - Medullary Syndrome
Question 3 – Peripheral Nerve Syndrome
Question 4 – Peripheral Nerve Syndrome
Question 5 – Peripheral Nerve Syndrome
Question 6 – Peripheral Nerve Syndrome
Question 7 – Peripheral Nerve Syndrome
Question 8 – Peripheral Nerve Syndrome
Question 9 – Peripheral Nerve Syndrome

Table 2: Organization of the sum evaluation of Units II and III

Each of the questions was made up by 4 to 6 sub-items for direct, short answers. The correction was made by the tutors according to absolute criteria sent by the Professor in

charge. Each of the questions was made up by 4 to 6 sub-items and each of them received a concept of 0, 7 or 10 as per the classification "wrong", "partially right" and "completely right".

The statistical analysis followed this methodology: for each question, a performance indicator was calculated from the success percentile in each of the nine questions of the test, and, for the distance module, the students were divided in three groups according to their performance: weak (1) with a performance between 0 and 49, regular (2) between 50 and 69 and good (3), 70 or higher.

The analysis of data was made in two steps. In the first, the distribution of percentages was investigated as per all questions. In the second step, the students were analyzed as per the performance in the nine questions of the summing evaluation, comparing question 7 (epilepsy) with the others. The statistical analysis of the results was made with the help of the software *Statistical Package for the Social Sciences (SPSS®) for Windows®* version 14 of *SPSS* Inc..

The analysis of the teaching material made available to the neurology students showed that the following were clearly defined: the unit, the module in course, topics to be discussed, educational goals of that unit, techniques and resources for teaching and the description of the type of material destined to professors and students. The description of clinical cases followed the classical framework of anamnesis, physical and neurological examinations. Photographs of the physical of the patients were available for analysis. The language remained clear during the entire text, except for the description of patients where the use of their own speech was allowed.
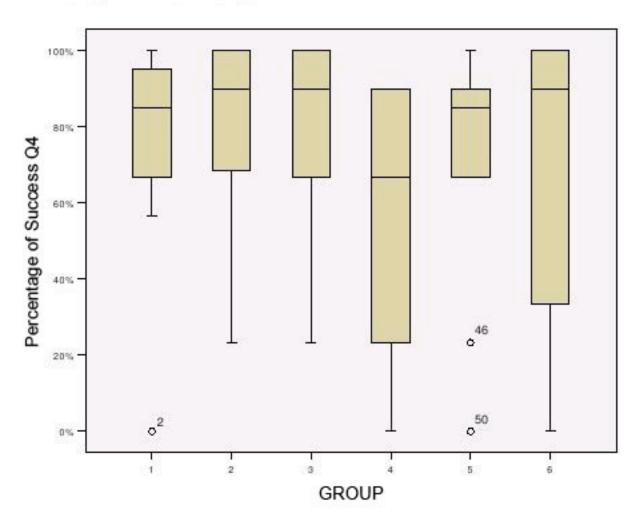
As for the participation of groups, the response to exercises and clinical cases, a task given to the leaders, it was performed timely by all groups, but with clear differences between them. Groups 1, 4, 5 and 6 fulfilled rigorously the deadlines determined for handing in the response, maintained contact through e-mail with the coordination of the discipline and organized internally sending the electronic addresses of their components before stage 2 started. The students reacted positively to the activities, but a few complained about the delay in the comment of professors on their answers.

The first chat extended for 3 to 4 hours and was marked by spontaneity, interactivity, familiarity with the technology and use of linguistic conventions adequate for the virtual world. Such characteristics allow one to point the activity not only as a simple online interaction, but also as a formative evaluation. Only one of the six tutors, the author, managed to save in a file the transcription of activities so as to allow them to be opportunely analyzed by the coordination of the course. Another tutor informed through e-mail that 3 students complained about technical problems during the chat, as they did not have broad band Internet access.

Regarding the performance of the tutors, two facts were noticeable: the first was some resistance to the use of TICs and the second, the difficulty in comprehending the functions of a tutor. It bears noticing that said facts occurred despite the training activity that took place before the DL module. The concomitance of these factors seriously hampered the fluidity of the chats with some groups. However, the performance of the undergraduates in the distance activity was exemplary, even because they belong to a generation that uses natively said technologies. Only 18.7% of the students used the master's degree computer lab.

As for the performance of students, the result of the sum evaluation of Units II and II made in the end of the course (exploratory analysis of success percentiles for the questions) showed that the average in question no. 7 (Epilepsies - module applied with distance) was fourth (0.5905) after questions 4 [Cranial Nerve Syndrome], with an average of 0.715, 6 [Pyramidal Syndrome] , 0.6654, and 8 [Dementptal. Syndrome], 0.625.
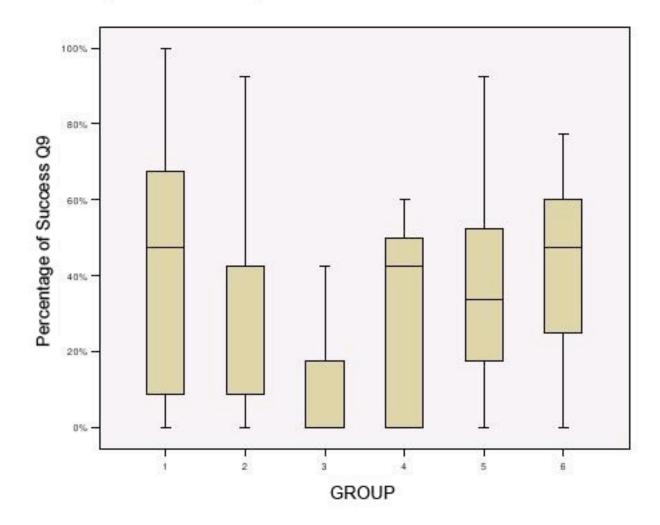
The box diagrams present the success percentile of the groups in questions 4 and 9 (lowest and highest averages, respectively) showing that the performance of groups was quite differentiated in presence issues. The array of analyses also allowed us to see that the performance of the six groups was systematically high in question 4 (Pictures 1 and 2) and low in the no. 9 one (Peripheral Nerve Syndrome). Groups 1, 2 and 4 showed a better performance in question 7, with an average of success percentages above 60% (Picture 3).
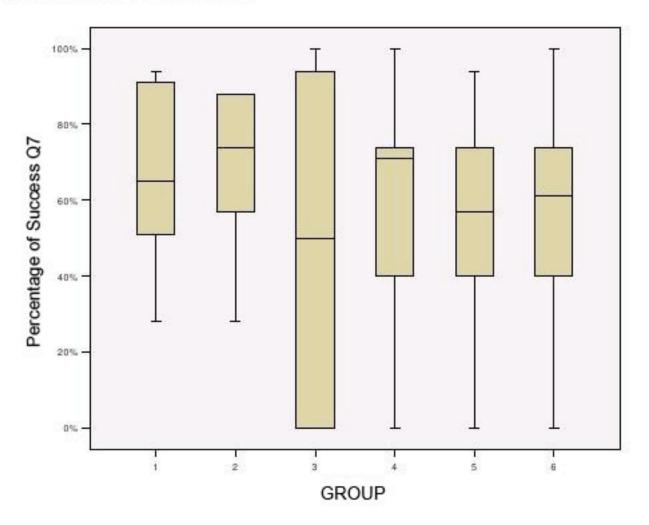

Picture 1: Success percentage of the 6 groups in question 4

Percentage of Success Q9

Picture 2: Success percentage of the 6 groups in question 9

Percentage of Success Q7

Picture 3: Success percentage of the 6 groups in question 7

The results of the correction of question 7 (epilepsy) show that the average of responses in the five items varied from 5.25 (item 2) to 10 (items 1 and 4).
The result of the correction of the five items of question 7 (epilepsy) in the six groups is presented in Picture 4.
The comparison of the correction of question 7 (epilepsy) with the other eight questions referring to other themes of Units II and III is presented in Table 1.

GROUPS	Average of Question 7 Epilepsy	Average of Questions 1,2,3,4,5,6,8 e 9 (*)
Group 1	8,5	7
Group 2	10	8,5
Group 3	5	0
Group 4	8,5	8,5
Group 5	7	7
Group 6	7	7

Table 1: Comparison of the correction result of question 7 (epilepsy) with the other questions in the sum evaluation in the six groups.
(*) about the themes meningeal syndrome, medullary syndrome, miastenic syndrome, cranial nerve syndrome, vascular cerebral syndrome, pyramidal syndrome, demential syndrome and peripheral neuropathies.

From the several definitions found for DL, Baker (2003) presents the one most concise and encompassing, as, in few words, it expresses the basis of DL: the logistic separation between professor and student. The author also comments on TIC tools and the basic structure of a project.

Side by side with the ease of access offered by the TICs, came information overload, new professionals, new professional profiles, new demands and the need for a deep revision of the current educational system. It is a fact that the traditional system is entrapping, if not deeply limiting. Thus it is necessary to mold new principles for the newly-arrived electronic pedagogy. Offering support to those with movement restrictions, allow for differentiated attention to the content of courses, inciting critical thinking based on active and collaborative learning, discussing tasks with tutors and providing case studies are effective ways to stimulate an authentic construction of knowledge. This construction presents itself as the basis for survival of universities and apprentices in the globalized society of the 21st Century.

Technologies such as Internet and personal computers offer support for the democratization of access to information is in sync with a more liberal education with verified instructional quality. Education must be based on a sense of purpose, of goals of transforming society into something bigger than the sum of its parts. At the same time, instructional environments must be projected or adapted under a demand and so as to adjust to specific educational goals for each professional area, allowing for the motto "Education for All" to be fully implemented. It can be said, with a wide margin of safety, that Internet has all requisites to complement, enrich and revolutionize DL.

The interest of the many government spheres and of public and private IES have other roots besides those related to the educational modality. IES see in DL a way to save financial resources, optimize the use of physical resources and, at the same time, meet the demand of students from more distant places. The government comes with a new pedagogic project that favors the widening of access and improvements to education in the countryside, granting equal opportunities for students from the most remote locations from different regions and also helping with apprenticeship in the workplace and offering conditions and resources for permanent updating.

DL already presents itself as a reality in Brazilian teaching and the federal government has been one of its biggest supporters. Several descriptions point to experiments inside and outside the medical field, in graduation courses or solely for professional updating. Even though it has been an object of studies and evaluations in the last 200 years, success and failure cases overlap, pointing to a mosaic of situations, many times punctual. Studies in the medical field grow and the results tend to be promising.

The field of Health has made several incursions in the DL area. An example of this that can be seen in an experience made in the São Paulo University (MAIO *et al.*, 2001), which curiously revealed that the reason for choosing for most of the students subscribed in an optional discipline with distance methodology was content, rather than the facilities offered by the method. Other studies point out the good acceptance of DL in the medical field. Nursing (RIBEIRO *et al.*, 2006) has been noticeable in the usage of this methodology. One special research (RIBEIRO *et al.*, 2006) shows positive results regarding DL and is important due to having performed pre- and post-testing evaluations. In it there was an extremely favorable evaluation by the students and better efficiency in the post-test, even observing that 70.5% of them had no free access to computers; those that were outside the environment of the

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university or at an internship location described the need to move to a location that offered hardware infrastructure and Internet connection. A curious piece of data is presented by Lee *et al.*, (2001) in a project in the field of Ophthalmology. Despite the truancy rate being over 62%, the experience was considered positive and fruitful. No references were found to mention specifically experiences with DL in Neurology or even in the UNIRIO EMC.

The experiment demonstrated the relevance of the choice of a SGA to be used by the university. The standardization of the graphic interface for all projects would facilitate the training of professors and students. A single system would concentrate all documents referring to disciplines, individual and group works. Questionnaires and polls could be better conducted. Truancy itself could be accompanied and its rate could be calculated in several ways (daily, weekly, monthly, by course and/or discipline).

The training in computers for professors and students and the development of a new specific pedagogy for online environments are sine qua non conditions for any DL project that has as its goal improving the quality of superior teaching in Brazil. Multidisciplinary teams made up by content-oriented professors, graphic designers, instructors, computer experts, librarians and administrative personnel are essential to such projects.

As for the new electronic pedagogy, its intent is not the summary elimination of professors, but its adaptation to a new model based on interaction within practice communities. This implies the development of new abilities and not the simple digitalizing of existing content or software choice.

Equally important for the formation of superior level professionals are: Training with the most common operational systems, Internet browsers, e-mail programs, multimedia presentation programs, word processors, electronic spreadsheets and SGA itself. Following the same line of thought, the application of distance modules in graduation and post-graduation courses is of great help for training with TICs. Only then will the use of these technologies become a part of the everyday life of health professionals ever since their formation.

The experience conducted in UNIRIO may be seen as highly important, as it casts light on several important factors for DL projects. The program of the discipline already had teaching material that could easily be converted for distance use. The lack of infrastructure for computers in the Medicine and Surgery School contrasted with the availability of this technology for students. In general, the graduates of Medical schools have good purchasing power and full access to TICs. The length of the chats shows that the acceptance of the activity was very good and that there was a positive mobilization regarding the discussion of themes.

Even without a presential activity, the statistical analysis of Stage 2 showed that the benefit for students in the subject epilepsy, taught fully with distance was similar to the one of other themes that were presented in a presential fashion. Question no. 7 (Epilepsies – module applied with distance) was among the four questions that had more than 55% of success.

Another important point in the analysis of results was the comparison of the performance of the six groups in Question 7 (epilepsy) and in the other questions. The group with the worst performance in question 7 (average value 5) also had the worst performance in the other questions (average value $\emptyset$). In the same way, the group with the highest grade average in epilepsy also had the best placing in the general correction of the test (in both, 8.5 average).

Despite the merits of this experience, it was possible to notice that several points deserve special attention. Part of the graduating students (18.75%) had no timely access to computers. The lack of a specific tool to conduct a research and of a central repository for files was also noted. Said facts could have been minimized or avoided if the university had a

computer lab capable to meet the demand of an entire class. The impossibility for sending videos of focal and generalized epileptic crises, usually presented in presential expositive classes and with great visual impact certainly contributed for difficulties in the comprehension of the semiology of epileptic crises by the students.

The next experiences may enjoy the benefits of an SGA, which may solve these issues, as its internal tools include polling, chats, file repository, bulletin board, one-on-one messages and others.

The matter of copyrights on academic images (image exams, pictures, electrographic lines, etc.) and texts have the same degree of importance. The focus on the theme falls on the coordination of the course, which must provide its own material in advance, or the due use licenses (VIEIRA *et al.,* 2003). Such attitudes may avoid extremely long and troublesome judicial confrontations for the university and for the educational process.

Doubtlessly, EAD has the potential to use en masse all TICs that were created in the last 10 years, democratize the access to information and contribute positively for professional enhancement. National and foreign success projects and the unconditional support of the federal government paved the first meters of this road, but the demand by society for improvements to the quality of teaching, health services and commitment of education professionals with permanent education must always be in everyone's minds.

As for applicability, the distance method presents itself as a possible option, not only for the optimization of human resources and materials it favors but also due to providing one of the necessary means for the much-discussed continued medical education. This methodology allows the professional to establish an immediate relationship between the content of the course and the everyday reality and is another indispensable tool for the transposition of geographical and temporal barriers, highly relevant factors for professional updating. Also, it bears mentioning that there is a current trend for the Constructivist Theory, in which the learner is a protagonist in building his own knowledge.

The experiment conducted in UNIRIO proved unique in several aspects. International literature showed only two works focused on neurosciences; Davies *et al.* (2005) described their experience of a course on neurological diseases aimed at Pediatricians, and Candler & Blair (1998) with their neuroanatomy course converted to the semipresential model. National academic literature showed no experiments related specifically to this field. The UNIRIO Medicine and Surgery School hadn't developed any DL project until 2006. As for neurology students, their most prevalent suggestions were the transfer of distance activities to the beginning of the period and the taking of tests online. The first can be implemented, but the latter is not allowed by current legislation.

The implementation and analysis of the data approximated professionals in the fields of Medicine, Computers and Statistics. The lack of a specific environment for management of learning in 2006 also contributed for the interchange between these departments. Hence, adaptations were needed so that the teaching material reached all, responses went back to correct addresses, all were familiar with the chat tool to be chosen and the inter-relationship between student and tutor could flow naturally. Currently, said adaptations are no longer needed, as UNIRIO already has an SGA. Moodle was chosen by the characteristics of its internal tools, and also due to being open source.

The performance of tutors showed that, despite the training activity, there was some difficulty in noticing the mediating role to be performed and also with the use of the chat software itself. This initial difficulty of the tutors was equally mentioned by other authors. Pedagogic projects that explore the numberless possibilities TICs make available, provisions for public universities, the improvement of the administrative team and professors for the use of these

technologies are indispensable to the success of DL. The performance of most tutors makes it clear that, more than a generic training, the professors need to be widely trained with the technology to be used.

In the case of students, their performance during the chats occurred without difficulties, including discussions and exchange of files. Chats proved to be real formative evaluations, as they were verified as an internal practice to the teaching process, contextualized, interactive, learner-focused and that can be repeatedly applied as the course goes by. They proved to be an efficient way to dynamically evaluate the duo course goal-competence acquired.

The results allow us to infer that the DL experiment in neurosciences was victorious when it demonstrated that the semipresential model is viable. In the same way, it proved fruitful due to opening space for more interactive learning using new information and communication technologies. It is important to highlight that the statistic analysis made to evaluate the UNIRIO experiment was also unique, as no work described a similar method.

Regarding the national works described in literature, their results were considered to be positive by tutors and by students. There are works that show the experience of a course on neurological deficiencies, but it is directed to Pediatricians. Others describe experiences with Medical Computer Science, Public Health, Nursing, Anesthesiology, Radiology and others. Most works describe systematically favorable results, as well as the hope for other experiments in the future.

The first DL experience in a semipresential model conducted in the Medicine and Surgery School by the neurology discipline was viable, taking as a basis the acceptance of students and the demonstration of the benefits in the subject "Epilepsy", taught exclusively with distance.

The deficiency in infrastructure for presential teaching, verified during the realization of this study, has been one of the strongest arguments used by MEC to stimulate in public universities the opening of a space for DL. The lack of physical space, audiovisual resources, computer labs and poorly-equipped libraries has moved the attention focus to distance activities. The federal and state governments seem to see DL not only as a way to democratize access to information and to the superior level, but also to save resources.

The pedagogic strategy employed in the neurology discipline, based in Guilbert's Educational Spiral greatly facilitated the implementation of this experiment. In the same way, it was observed that the teaching material previously used by the discipline of neurology could be easily adapted to distance learning.Another important factor for the success of the project was the neurology master's degree computer lab for training the tutors and having the chats. With 10 computers in a network and broad band Internet connection, six of them were made available exclusively to students.

The matter of online tutorship revealed some equally important points for DL projects. The team of neurologist master's degree students selected to moderate the chats showed difficulty with the technology itself and with the role of tutor. It bears reminding that professionals of several fields have some resistance to the use of technology. Hesitation in face of doubt between the role of the tutor and the one of the professor occurred despite the training activity that took place initially. The global performance of tutors makes clear the need to widen the pre-project orientations and computer support.

The array of statistic analyses made it clear that the academic performance was similar in the presential and distance modules. Acceptance of the DL activity by the students was verified in the grades and in the long duration of the chats. The activity certainly motivated an extensive discussion about relevant neurological themes. It is implied that the nearly unrestricted access

to TICs by public faculty students contributed positively for the good results obtained. Thus, the data again allow us to infer the success of the project.

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