Author's response to reviews

Title: Learner satisfaction and receptivity with a restructured pedagogic model case-based learning and practical activities parallel to the theoretical class programme

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LEARNER SATISFACTION AND RECEPTIVITY WITH A RESTRUCTURED PEDAGOGICAL MODEL CASE-BASED LEARNING AND PRACTICAL ACTIVITIES PARALLEL TO THE THEORETICAL CLASS PROGRAMME
ABSTRACT

Purpose: to analyse students’ receptivity and satisfaction with a new pedagogical model.

Methods: Comparative study between two 4th year classes who had different programme contents, restructured from 2002 to 2003 with the introduction of discussions of cases and practical activities developed in small groups. We have evaluated students’ receptivity and satisfaction in both groups by means of standardized questionnaires. Group I consisted of 108 students (class 2002) and group II of 113 students (class 2003). For the purpose of statistical analysis, the chi-square ($\chi^2$) and Bonferroni tests were used.

Results: There was statistically significant difference in behalf of group II in the assessment of the professors’ theoretical classes and didactics, in the evaluation of tests, of subject learning and in the general evaluation of the subject.

Conclusion: Students’ receptivity and satisfaction with the new pedagogical tool implemented in the 2003 course has proved to be very meaningful.

Keywords: medical education, case-based learning, problem-based learning, medical curriculum.
INTRODUCTION

In Brazil, Medical School courses last six years, and demand a full-time work load. In our School, the curriculum follows the traditional model and it is divided into: Basic cycle (first and second years), Clinical cycle (third and fourth years) and Internship (fifth and sixth years full time ambulatory and hospital practice).

The practice of self-evaluation of institutions in Brazil, mainly as far as educational institutions are concerned, has recently become part of the country’s culture, as a result of the democratic transition that took place in Brazil from 1986 and with the introduction of quality control principles in the last decade. We have introduced a Disciplinary Evaluation Programme (DEP) that has been taking place annually as from of 2000 for self-evaluation. In the middle of the second semester, representative members of each group of students sorted out a standard questionnaire which aims at assessing each subject according to the following variables: didactic ability, teaching quality, professors’ punctuality, student’s improvement and commitment to each subject, test evaluation, stimulus given to discussion and clinical reasoning, guidance on practical activities, emphasis on the doctor-patient relationship, clinical correlation between the subject taught and its general concept. Each of these items is rated by the students within a range of very weak, weak, regular, good and very good. The annual report consists of the evaluations on each subject in all the above-mentioned variables, handed in to each professor in charge and the department representative.

The teaching of medicine centred in the disease, in the hospital and, consequently, in the less prevalent disorders, originally and compulsorily connected
with the current curricular model has proved to be inadequate, inefficient and onerous for the Health sector of the country. Students’ participation in the Health system is practically none in the basic cycle of the current medical curricula. Bearing this in mind, approximately for 15 years there has been a series of movements by institutions aiming at changing the Brazilian Medical School system.

Besides efficient curricular directives, invigorating measures that can stimulate medical students and better prepare them for the professional practice are: the articulation of basic sciences with all the phases of the professional cycle, programmes of scientific initiation affordable by each and every student, support programmes, and academic guidance.

In order to make the instruction of students in the UNILUS Medical Sciences course fit these new conceptions in the Health and Brazilian medical teaching-ambit medium / context / setting, a committee for discussion and preparation of a new pedagogical project has been implemented. This discussion started in the second semester of 2000 and has mobilised, more and more, professors, students, members of the board of directors and Maintainer-Patron / Sponsor of the course.

Thus, in the new model that has been proposed, problem-solving techniques will be the main pedagogical tool. It is also embedded in the basic principles of adult education which require greater self-reliance on the part of participants who, thus, must perform an active role in the learning process. Motivated adults commit themselves to learning much more as a response to their own inner needs, such as their drive to succeed and their satisfaction in learning in order to reach their utmost personal specific objectives, than for outside factors.
Aiming at providing a new pedagogical tool (discussions of clinical cases along with theoretical learning) into practice in this traditional course, in 2003 the 4th year programme content was restructured and the students’ receptivity with these changes assessed, comparatively to the 2002 course. In our hypothesis, we would be promoting four positive actions: a) integration of theoretical and practical learning from the beginning of the students’ contact with the speciality; b) greater sedimentation of knowledge in the speciality; c) optimization of the time made available for the speciality in the 4th year of the course; d) faculty preparation for the curricular model which is to be implemented in the following years.
METHODS

Each group in the UNILUS medical course consists of 120 students. The Obstetrics and Gynaecology course is given in the 4th year (4 hours weekly or 120 hours this year) and years 5th and 6th of internship (925 hours total in this cycle). Until 2002, the 4th year course used to be taught through theoretical classes only, aiming at all normal obstetrics and gynaecology, their semiology as well as the main pathologies of the speciality. In the following years, during internship, other relevant themes about disorders concerning the speciality were brought up in the form of visits to patients as well as seminars specially prepared by the students under faculty supervision. In 2003, small group case-discussions and practical activities based on the normal aspects and semiology of the specialty were introduced in the 4th year, in substitution to 50% of the theoretical content (that of obstetrical and gynaecological pathology). Such theoretical content taken from the 4th year curriculum will be taught during internship, together with the practical learning.

A great part of the faculty has been mobilised. Each week, during the four teaching hours, students were divided into the following activities: 60 students attended two theoretical classes (obstetrics being one of the subjects, the other one being gynaecology), while other 60 students were divided into 6 groups of 10 students aiming at discussions of clinical cases or practical activities of semiology, alternately. It is important to highlight that the theoretical classes were taught by the same professors and using the same teaching material in the two years of study.

The present study started by submitting DEP standard questionnaires in the second semester of the teaching year to all students, on the day of their assessment test,
so that we could make sure the attendance would be total. The questionnaire, printed in paper which carried the institution’s stamp and consisted of several questions (described in the introduction to this work), was sorted out individually to each and every student. The questions used in this study were based on: the use of the workload available for the subject, the professors’ concern as for the students’ learning, clear explanations of theoretical classes, professors’ didactics and punctuality, quality of the assessment tests, the students’ learning of the subject and general evaluation of the subject. In the 2003 questionnaire, the variable new methodology – activity in small groups was introduced. Each of these items was rated by the students within a range of very weak, weak, regular, good and very good. The group consisted of 108 students in the 4th year of the Medical Sciences course who had answered the questionnaire in 2002 and group II which consisted of 113 students in the 4th year of the course in 2003. The findings were displayed on a Microsoft ® Excel 2002 spreadsheet for later evaluation. For the purpose of analysing the results, we have considered positive evaluation of the variable as the sum of the good and very good concepts, and the negative evaluation the sum of the very weak and weak concepts. For the purpose of statistical analysis, the variables were represented by absolute (n) and relative frequency (%) and the difference between them was analysed by the chi-square test ($\chi^2$). The adopted level of significance was 0.05 ($\alpha = 5\%$) and the descriptive levels (p) lower than this value were considered significant and represented by an asterisk (*). The significant values were further submitted to the Bonferroni test in order to ratify its statistical value.
RESULTS

Group I consisted of 66 female (61%) and 42 male students (39%), whose average age was 23.1 years old, and group II consisting of 67 female (59%) and 46 male students (41%), whose average age was 23.6 years old, presented no significant difference between them. In group I, 95 students (88%) rated the use of the workload available for the subject positively and 13 (12%) considered it regular, whereas 101 students in group II (89%) made a positive evaluation and 12 (11%) considered this variable as regular. There was no significant difference in the evaluation of the two groups (Table 1 – item 1).

Eighty five students (79%) in group I found that there was great concern on the part of the professors concerning student learning and ninety eight students (87%) in group II presented this same positive evaluation, therefore, there was no statistically significant difference (Table 1 – item 2).
### Table 1 – Distribution of course’s evaluation

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>ANSWER</th>
<th>Group I 2002</th>
<th>Group II 2003</th>
<th>$\chi^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Workload available for the subject</td>
<td>1</td>
<td>95 (88%)</td>
<td>101 (89%)</td>
<td>0.1106079</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>13 (12%)</td>
<td>12 (11%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Professors’ concern as for students’ learning</td>
<td>1</td>
<td>85 (79%)</td>
<td>98 (87%)</td>
<td>2.4986106</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>14 (13%)</td>
<td>9 (8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>9 (8%)</td>
<td>6 (5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Clarity concerning theoretical classes and professors’ didactics</td>
<td>1</td>
<td>72 (67%)</td>
<td>98 (87%)</td>
<td>12.765231</td>
<td>&lt; 0.05 *</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>31 (29%)</td>
<td>12 (11%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5 (4%)</td>
<td>3 (2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Professor’s punctuality</td>
<td>1</td>
<td>108 (100%)</td>
<td>81 (72%)</td>
<td>32.620532</td>
<td>&lt; 0.001 *</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>32 (28%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Quality regarding cognitive evaluation tests</td>
<td>1</td>
<td>38 (35%)</td>
<td>73 (65%)</td>
<td>21.978341</td>
<td>&lt; 0.001 *</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>49 (45%)</td>
<td>34 (30%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>21 (20%)</td>
<td>6 (5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Self-evaluation of subject learning</td>
<td>1</td>
<td>60 (56%)</td>
<td>97 (86%)</td>
<td>24.619225</td>
<td>&lt; 0.001 *</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>46 (42%)</td>
<td>13 (12%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2 (2%)</td>
<td>3 (2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. General evaluation of the subject</td>
<td>1</td>
<td>80 (74%)</td>
<td>100 (89%)</td>
<td>7.6007955</td>
<td>&lt; 0.05 *</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>25 (23%)</td>
<td>10 (9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3 (3%)</td>
<td>3 (2%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Answers: 1 – Very good and good  2 – Regular  3 – Weak and very weak

Theoretical classes and professors’ didactics received positive evaluation from 72 students in group I (67%) and from 98 students (87%) in group II, statistically significant difference (Table 1 – item 3).

Professors’ punctuality received positive evaluation from all 108 students in 2002 (group I) and only from 72% (81 students) in 2003 (item 4 – Table 1). Only 35% (38 students) rated the cognitive evaluation as adequate for the course in group I, whereas
65% (73 students) rated it as positive in 2003 (group II), with a significant difference (item 5 – Table 1).

In 2002, 60 students (56%) rated their learning in the subject as good or very good; in 2003 ninety seven students (86%) rated it as positive (Table 1 – item 6). Finally, the general evaluation of the subject was rated as good or very good by 80 students (74%) in 2002 and by 100 students (89%) in 2003, statistically a significant difference (item 7 – Table 1).

The new methodology adopted in 2003 for the Obstetrics and Gynaecology course was considered good or very good by 89% of the students, average by 8% and weak or very weak by 3%.

DISCUSSION

In the traditional model of curriculum developed with reference in the Abraham Flexner report in 1910 \(^8\) and which considered medical education as a process of initiation in a science, the professors’ role is that of establishing what a student must learn, transmitting information considered relevant and evaluate the capacity of the student to retain and reproduce the information presented. The theory is dealt with before the practice aiming at preparing the student for its use in the internship phase and, in their future professional lives. In this model the medical practice has been detached from scientific practice, promoting fragmentation of knowledge and neglecting psychosocial and cultural aspects connected with the exercise of medical activity \(^9\). This pedagogical approach has been criticised for the excessive value given to content and
for its low efficacy which brings about the need for further re-qualification. We believe that this “banking concept of education” referred to by Paulo Freire is, definitely, condemned to be part of the history of education.

On the other hand, the pedagogical conception based on meaningful learning requires articulation of the role of University, the health management offices and the instances of social control, suggesting cooperation in content selection, in the production of knowledge and in the development of professional competence. In meaningful learning, the professor is not the main source of information, but the facilitator of the teaching-learning process, whose main aim is to stimulate the learner to assume an active, critical and reflexive posture in the knowledge building process. The content dealt with must be of meaningful potential (functionality and relevance for professional practice), valuation of pertinent elements and related to the students’ cognitive structure. However, students’ absorbing knowledge of the so-called basic subjects in such a context represents a great challenge.

The Brazilian curricular directives for the Medical courses (Report 583/01 of 07 of August 2001) from the National Education Council – Education Ministry – have oriented relevant changes in the pedagogical organization of the courses, namely: involving students in practical activities from the very beginning, promoting active integration between health service users and professionals from the very beginning of their instruction, using methodology which potentiates students’ active participation in building up knowledge, bridging the medical-academic instruction with the social needs of Brazilian Health. Clearly, the new curricular directives have used PBL concepts and logic as a reference for their composition, based on several North American and European curricula which have favoured free time for self study instead of the
traditional lectures in the last decade. Thus, more than half of the North American medical schools have currently been undergoing a process of curricular reform, as well as great part of the medical schools in the United Kingdom.

In the “problematization” methodology, based on the Charles Maguerez Arch method and presented by Bordenave, five phases develop from reality: observation, key-points, theorization, hypothesis of the solution and application to reality (Figure 1). It is alternative methodology appropriate to higher education and it differs meaningfully from problem-based learning (PBL) in some points which may be summarized in Figure 2 (adapted from Berbel, 1998).

THEORIZATION

Key-points

Observation of reality (problems)

Hypothesis of solution

Application to reality (practice)

REALITY

Figure 1 – Marguerez’s Arch
### Figure 2 – Main differences between “problematization” and problem-based learning

<table>
<thead>
<tr>
<th></th>
<th>“Problematization”</th>
<th>Problem-based learning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Observation of reality</strong></td>
<td>Problems constructed by the subject professors where methodology is used (subject option)</td>
<td>Construction of problems by the professors’ committee, in complete vertical and horizontal integration (institutional option)</td>
</tr>
<tr>
<td><strong>Key-points</strong></td>
<td>Not defined</td>
<td>Defined in the curriculum</td>
</tr>
<tr>
<td><strong>Theorization</strong></td>
<td>Investigation – guided study</td>
<td>Investigation – guided study</td>
</tr>
<tr>
<td><strong>Hypothesis of solution</strong></td>
<td>Made after study</td>
<td>Made by students before study, based on previous knowledge</td>
</tr>
<tr>
<td><strong>Application to reality (practice)</strong></td>
<td>Results must intervene in reality as much as possible</td>
<td>It considers the intervention in the social environment fundamental</td>
</tr>
</tbody>
</table>

Moreover, in PBL the cognitive objectives are all previously established, while in the “problematization” theory there is no such thing as total control of the results as far as knowledge is concerned. The essence of PBL lies in that the problems define objective concepts for learning and non-objective concepts. These can be excluded from learning as they are not relevant for the present study.

Although a comparison of results of studies between conventional curriculum (lecture-based learning) and a model like PBL or the one that uses “problematization” in some lectures seems hard and scientifically dangerous—this has not been our intention. Our only objective was to evaluate a pedagogical tool already well known and offer scientific elements for discussions on curricular reform.

This research does not prove the “new” recent / redesigned / modernized is better than the “old” earlier / former / previous, but highlights strengths of the “new” are
worthy of more exploration. In our opinion, the perception of qualitative improvement in the learners’ learning during the course is the first step towards a more substantial and effective change of the teaching-learning process. A recent study has shown that the change of the conventional course to the new integrated course using problem-based learning throughout Manchester University has significantly improved the perception of recently graduated students as regards their preparation to enter the professional market.

In our research the intended intervention was to transform a totally theoretical course into a more stimulating and efficient one, using concepts acquired during lessons and clinically applied on real cases (obtained by the students themselves on the nursing). EM NOSSO TRABALHO, A INTERVENÇÃO DESEJADA ERA TRANSFORMAR O CURSO TOTALMENTE TEÓRICO EM UM CURSO MAIS ESTIMULANTE E EFICIENTE, COM OS CONCEITOS APRENDIDOS DURANTE AS AULAS APLICADOS CLINICAMENTE EM CASOS REAIS, OBTIDOS PELOS PRÓPRIOS ALUNOS NA ENFERMARIA.

Students’ evaluations concerning the use of the available time per subject for application of its content presented no significant difference between the two groups, for the evaluation was already positive in the 2002 group (item 1 of the table1). Positive evaluation, however, without significant change, could also be noticed when students were asked about their perception of the professors’ concern towards their learning - in this question there is a mild tendency towards the increase of positive evaluation in the 2003 group (table 1 – item 2).

Improvement in the course evaluation begins to be noticed in item 3 (table 1), where there is significant increase in the positive evaluation as regards the evaluation of clarity and didactics in the lessons taught. At first, such result seemed a bit
odd, once the teaching material used, as well as the faculty who taught theoretical subjects were identical in the two groups. We concluded that the insertion of clinical cases and practical lessons in the traditionally theoretical course was the decisive factor in the students’ perception that the 2003 lessons had improved. Despite the fact that the questionnaire was applied at the moment of a summative assessment may have an influence on the data, both of the researches were applied during the same time of the two years of study. PORÉM, O FATO DO QUESTIONÁRIO TER SIDO APLICADO NO MOMENTO DE UMA SUMMATIVE ASSESSMENT PODE TER INFLUÊNCIA SOBRE OS DADOS OBTIDOS, EMBORA TENHAM SIDO APLICADOS NO MESMO MOMENTO NOS DOIS ANOS DO ESTUDO.

The decrease in the evaluation of professors’ punctuality could be easily explained due to the fact that the theoretical classes were always predictably held in the same place in 2002 (group I), while group II was provided with various different locations specially booked for them, also taking into consideration that there were unexpected circumstances in the beginning of the activities on some of the occasions (item 4 – table 1).

The assessment tests in the Toco-gynaecology subject are considered traditionally difficult and are said not to globally reflect the knowledge required. THESE TESTS ARE COMPOSED BY FORTY OR FIFTY MULTIPLE CHOICE TEST–ALTERNATIVES (WITH FIVE ALTERNATIVES EACH) AND FIVE DISSERTATIVE QUESTIONS. This concept may be ratified in item 5 (table 1); however, with a more expressive improvement in the group II – 2003 evaluation, which, for us, meant that this group studied with greater satisfaction and interest, stimulated by the new process and, consequently, interpreting that there was greater coherence in the
preparation of tests, for the tests did not undergo any substantial change in both years. Even so, we are still far away from reaching a desired frequency of positive evaluation of the quality of our tests and the study shows us that they must be perfected.

One of the most important objectives in a pedagogical change is to provide greater course efficiency and increased student learning. Item 6 and 7 (table 1) show us, at least as in regards to student perception, that this aim has been reached. As far as we know, the pedagogical change introduced was very stimulating for the development of the students’ study routine. After all, the holistic conception of modern education indicates integration of knowledge, understanding and practice by the learners, where permanent learning is assumed as part of life and not just a preparation for it. Respecting this view, the medical curriculum must inculcate the student with the ethos of self-evaluation.

The receptivity of the new method applied was also very good, as the positive evaluation of 89% of students shows, which provides us with basis for greater advances in the subject itself in years to come and the faculty confidence to make expressive changes in the curricular reform, which has been discussed for three years.

Although this has not been the objective of our study, an initial observation of the faculty’s level of satisfaction shows their great commitment to the course and, probably, better performance. However, if the sedimentation of knowledge and the course efficiency have really been greater, it will only be known in a later longitudinal study.
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