

# Three Hundred Method in the discipline of Physiology in the Dentistry course: collaborative learning

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## ABSTRACT

Three Hundred is a teaching and learning method that seeks to awaken the eyes of the student towards the colleague with learning difficulties, promoting collaboration between students. The objective of this work is to report the application of the Three Hundred method in the discipline of physiology and to compare the performance of students before and after the method. Thirteen students participated in the study and were divided, by lot, into 3 groups. The groups were composed of one student who had above-average grades in a previous assessment and 3 or 4 students who had below-average grades. These groups met in extra classes twice a week for three weeks. In these meetings, students with higher averages helped others in activities that were directed by the discipline's teacher. At the end of the meetings, a new evaluation was carried out. The data were tabulated and analyzed using SPSS version 16. It was found that all students were able to increase their averages compared to the grades of the first assessment. Thus, it is concluded that the method can have benefits in the performance of students, as well as stimulate collaborative learning.

**Descriptors:** Learning. Education, Dental. Students, Dental.

## 1 INTRODUCTION

Currently, the teaching-learning process has undergone several transformations at different levels of education, occurring in a correlated manner in the higher education of health professionals. Research shows that students learn more when actively involved in

the classroom than in a passive learning environment<sup>1,2</sup>. In addition, active teaching strategies increase the participation and involvement of students in class and help them to acquire skills concerning the knowledge of the discipline<sup>3</sup>.

Several active teaching methods are being

researched in the training of health professionals, such as problem-based learning<sup>4</sup>, team-based learning<sup>5</sup>, gamification<sup>6</sup>, and flipped classroom<sup>7</sup>. Among these methodologies, the Three Hundred method has been used in an attempt to improve student performance, from the perspective of collaborative learning<sup>8</sup>.

Three Hundred is a teaching and learning method that seeks to awaken the student's gaze to the colleague with learning difficulties, promoting collaboration among students through groups that are formed according to their performance in the assessments. These groups comprise some students who had a good performance, called assistants, and some students who had an income considered unsatisfactory, called assisted<sup>8,9</sup>.

The Three Hundred method was initially described by Fragelli (2015)<sup>10</sup>, being applied in a Calculus discipline, which has a high failure rate in engineering courses. Since then, this method has been applied in other disciplines and other areas, including health sciences<sup>9</sup>. The Three Hundred method is based on Collaborative Learning, which can be defined as a learning methodology, in which, through group work and the exchange of knowledge among peers, the people involved in the process learn together<sup>10</sup>.

Collaborative Learning seeks to prevent the teaching/learning process from becoming something passive and exclusively one-way teacher-student, and, therefore, uninteresting and dynamic. Thus, more space is obtained for the active involvement of the student, making him/her involved in such a way that, through this motivation, their learning is presented in an active and meaningful way, all guided by dialogue between the group's participants, which takes place in the construction of knowledge<sup>8, 10</sup>.

Given the absence or insufficiency of

dialogue, the learning process of the Physiology discipline would be compromised, as this is one of the foundation disciplines of health courses that discusses and problematizes, among its contents, the functional relationships of cells, systems, and organs in an isolated and integrated way. These processes are loaded with students' previous experiences and experiences that make learning meaningful. Physiology is the basis for the disciplines of the professional cycle and, consequently, for the training of health professionals. Thus, this study aimed to report the experience of applying the Three Hundred method in the discipline of General and Oral Human Physiology at a higher education institution in the drylands area of Pernambuco, Brazil, and to compare the performance of students before and after the method.

## 2 METHOD

Students enrolled in the second semester of the Dentistry course at a private higher education institution, which uses the traditional-transmissive methodology as the basis for the pedagogical project of the course, in which the teacher is the narrator of the fact and the student the receiver. Students who were taking the course of General and Oral Human Physiology were invited to participate in a different way of the teaching-learning process, using the Three Hundred method. After identifying the low performance they obtained in the evaluation of the first assessment paper, the use of the method was proposed to the class. The method was divided into three steps: (1) identification of students who were assistants and assisted; (2) directing collaborative learning and group study and; (3) new assessment.

In step 1, all students who scored above seven marks (out of ten) in the first assessment paper were identified, designated as "assistants", and the others as "assisted". The assistants had

the role of assisting those assisted in the development and learning of the content, based on collaborative learning carried out in predetermined groups. The groups were defined

by drawing lots, and 3 groups were created, whose distribution can be seen in figure 1. This division is the basis of the Three Hundred method<sup>10</sup>.

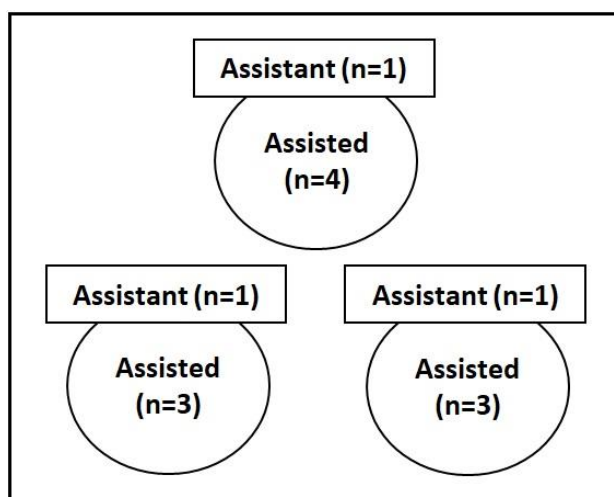


Figure 1. Distribution of student groups for collaborative work

The second stage, the direction of collaborative learning, consisted of two weekly meetings for three weeks, respecting the regular class schedule. Students were committed to dialoguing about the content, debating specific topics of the discipline, exposing their experiences and previous experiences about the topic, answering activities, and putting together a conceptual map. Before each meeting, the teacher emphasized the importance of giving voice and prominence to all members of the group, throughout the process.

In the third stage, after the six pre-established meetings, those assisted had the opportunity to redo the assessment. The assistants, even without redoing the assessment, were also able to improve their averages by 10, 15, or 20% based on the number of students assisted, belonging to their group, who managed to improve their performance.

At the end of the new evaluation, the data referring to the means and scores of the two

evaluations (first assessment paper and evaluation after the application of the method) were tabulated and submitted to descriptive and inferential statistics, using the SPSS version 17 program (IBM, Armonk, NY, USA).

### 3 RESULTS

All students agreed to participate in the proposal and completed all the steps/activities requested. We found an increase in the average grade of students after the weekly study meetings, with a significant difference when comparing the two evaluation moments, whose means and standard deviations can be seen in table 1.

Of the thirteen students who participated in the method, ten had grades lower than 7.0 (assisted) and three grades higher than 7.0 (assistants) before applying the Three Hundred method. After the meetings, nine had scores higher than 7.0 and four scores lower than 7.0, but higher compared to their previous scores.

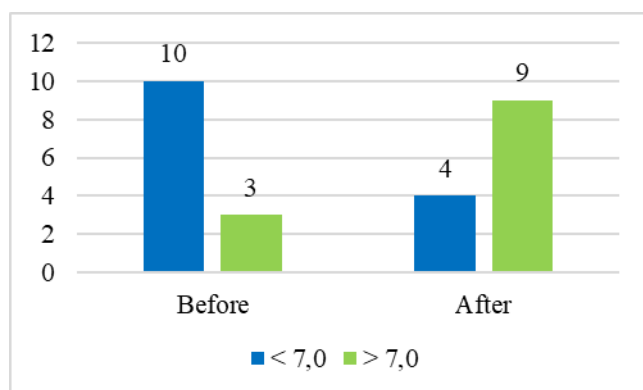
Table 1. Distribution of means and standard deviation of assessment scores before (first paper) and after study meetings

Assessment units	Mean ± Standard-deviation	p*
First assessment paper	3,9 ± 2,8	0,000
Assessment after the method	7,0 ± 1,9	

\*Paired t-Test

Students reported being satisfied with the applied methodology, considering it is a subject with a lot of content and a history of failures in previous classes, the tension was inevitable. Another point raised concerns the interaction and dialogue between them during group studies, which is a positive aspect of the applied methodology.

Graph 1 shows the distribution of the number of students who obtained grades greater than and less than 7.0 before and after applying the Three Hundred method.



Graph 1. Distribution of the number of students who obtained grades greater than and less than 7.0 before and after applying the Three Hundred method

#### 4 DISCUSSION

Physiology is the branch of biological sciences that studies the physical-chemical

processes that take place in a living organism, being essential for the health sciences<sup>11,12</sup>. Considering that it is a discipline that has numerous content and a high degree of complexity, anxiety, and nervousness may be linked to the low performance of students.

With the results of this experience report, it can be seen that after applying the method there was a significant improvement in the performance of the class in general. A possible, unprecedented, and unusual factor that contributed to this fact is the interaction between students, favoring learning. Additionally, it contributes to reducing anxiety and nervousness at the time of assessment, as students had the opportunity to review concepts and prepare better for the new assessment moment.

This fact corroborates the results of the study carried out by Fragelli (2015)<sup>10</sup>, in which 85% of the participants in a study that used the Three Hundred method felt calmer during the tests, considering that there is another opportunity to improve their performance after the evaluation. In addition, 90% agree that collaborative study through a group organized according to the methodology of the Three Hundred reduces nervousness on the test.

Fragelli and Fragelli (2017)<sup>8</sup> applied the Three Hundred method to a group of 85 students enrolled in the Calculus discipline. The

authors observed that in almost all the testimonies, the fact of leaving the traditional and the competitive environment was highlighted, giving rise to active and collaborative learning. The same was observed in this experience report, in which the Three Hundred method provided more active learning for students, considering the contents of the Physiology discipline. It is important to emphasize that the students who participated in the method were used to a transmissive teaching-learning process, in which the teacher is the holder of knowledge, and the students act only as passive receivers. With the application of an active methodological approach, such as the Three Hundred method, a promising student acceptance of the method can be verified.

Regarding the results of the assessments, the initial average for the whole class was 3.9 (as can be seen in Table 1). After applying the Three Hundred method, there was an increase of 55% in the general average grade of the class. This result is similar to that seen in other studies that applied the Three Hundred method in other courses, such as Physiotherapy<sup>13</sup> and Engineering<sup>10</sup>, showing an improvement in means with an increase of around 40%. Another study emphasizes the application of the Three Hundred method in the Preclinical discipline of the Dentistry course and reported a 90% increase in means after the new evaluation<sup>14</sup>. This reported increase is different from what is usually found in articles that applied the method, showing higher averages of around 40 and 50% improvement in student performance<sup>10,13</sup>.

Another point raised by students who participated in all stages of the method in this study concerns the dialogue and interaction between the group of students. This fact was brought up as a positive point of the methodology and favored the teaching-learning

process. Paulo Freire<sup>15</sup> in one of his works reports that thinking and dialoguing are collective and never individual acts. That dialogue does not reduce one another is not a favor that is done, nor is it a tactic used to confuse the other. On the contrary, it implies the essential respect for those who are engaged in it.

Dialogue is not establishing an uncommitted chat, which moves randomly among people seeking knowledge about something; it is neither a warlike nor a polemic discussion, in which the imposition of ways of being and acting is sought, or the donation of one to another<sup>15</sup>. The results and the statements of the students who participated in this experience report corroborate this statement by Paulo Freire. It can be seen that respect for thought and placements among students was a very enriching factor of the Three Hundred method, resulting in the exposure of students' ideas in groups or learning communities, their backgrounds, their experiences on the topics worked and so strengthened the construction of collective knowledge based on mutual respect.

## 5 CONCLUSION

It was found that mutual collaboration between students can be an ally in the teaching-learning process, in the discipline of physiology for the Dentistry course, because it values and strengthens the autonomy and protagonism of the student in their teaching-learning process. This method presents good perspectives for application in other subjects of the course, both in the foundations and professional cycle, contributing to the performance and learning of students.

## RESUMO

**Método trezentos na disciplina de Fisiologia para o curso de Odontologia: aprendizagem colaborativa**

Trezentos é um método de ensino e

aprendizagem que procura despertar o olhar do estudante para o colega com dificuldades de aprendizagem, promovendo a colaboração entre os estudantes. O objetivo desse estudo é relatar a aplicação do método trezentos na disciplina de Fisiologia e comparar o desempenho dos estudantes, antes e depois do método. Participaram 13 estudantes que foram divididos, mediante sorteio, em 3 grupos. Os grupos eram compostos de um estudante que possuía notas acima da média, em uma avaliação prévia, e 3 ou 4 estudantes que apresentaram notas abaixo da média. Esses grupos se encontraram em horários extraclasse duas vezes por semana durante três semanas. Nesses encontros os estudantes com maiores médias auxiliavam os demais em atividades que eram direcionadas pelo professor da disciplina. Ao final dos encontros uma nova avaliação foi realizada. Os dados foram tabulados e analisados por meio do teste t pareado. Foi verificado que todos os estudantes conseguiram aumentar suas médias em comparação com as notas da primeira avaliação. Dessa forma, conclui-se que o método pode apresentar benefícios no desempenho dos estudantes, bem como estimular a aprendizagem colaborativa.

**Descritores:** Aprendizagem. Educação em Odontologia. Estudantes de Odontologia.

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