

Experience report in teaching Dentistry based on active teaching-learning methodologies: gamification and ludic practices

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ABSTRACT

The aim of this study was to demonstrate a teaching-learning process of a ludic nature and student engagement, in a dental graduation course, at a time when the transition in the teaching of subjects is taking place. The basic cycle will be highlighted by walking through the laboratory environment. Even the clinical care of patients will be considered beyond the level of mere technical training. In higher education, learning fragmented by subjects and areas of specialization prevails, and there is no connection between laboratory and clinical purposes. The application of two tools, with the contribution of Active Methods of Teaching and Learning (AMTL), became a report of successful teaching experience in Dentistry, namely: (1) three-dimensional demonstration of the formation of cavities with accessible materials, based on painting the cavity walls and angles of plaster macromodels with gouache paint, representing intracoronal and partial extracoronal (onlay) preparations; and (2) gamification, by means of projecting the images of puzzle of different types of cavity preparations. The use of resources based on the AMTL has shown promising results, by interconnecting areas of teaching dentistry, seen as dichotomous, theoretical and practical, basic and clinical teaching, as well as promoting the awakening, adherence and development of students' manual skills.

Descriptors: Education. Active Learning. Dentistry. Operative Dentistry.

1 INTRODUCTION

The teaching-learning process in the Brazilian pedagogical model is fundamentally traditional-transmissive, with a physical, relational and contextual distance between the

teacher and student. Unfortunately, education of the majority of dentists is no exception to this rule, and this still occurs in a fragmented way, by disciplines or areas of specialization¹⁻³. Paradoxically, there is massive use of

lectures and disjointed emphasis and priority on technical and practical development³. In this context, the student acts in a passive and receptive manner and is devoid of the basic elements of reflection, criticism and creation. In an attempt to overcome these deficiencies, the use of Active Methods of Teaching and Learning (AMTL) emerges as an alternative to transform the student into a protagonist and the teacher into a mediator-facilitator⁴.

Traditionally, the teaching of Dentistry does not make significant use of AMTL. Only 9.3% of the results published in the area, including Dentistry and Cariology, have made use of this resource². During graduation, the future dentist must become competent to perform the selective removal of decayed tissue, while preserving the tooth structure⁵. The use of active methodologies in constructive stages, by joining practical and theoretical fragments of dental education, enables technical development to be instituted through training in manual skills. This has demonstrated better assimilation by the students since the way students learn and apprehend their clinical practice depends on other variables, including the clinical procedure itself; interactions with patients; oral health technicians and clinical/laboratory partners⁶.

Among the most widely used active teaching-learning methodologies refers to *Problem Based Learning (PBL)*⁷⁻¹¹, which originated in the 1960s in Canada, and represents a milestone in the health teaching area^{8,9,11}. This pedagogical tool uses real cases, by creating learning triggers. The learning environment becomes motivational for active engagement and critical thinking. Gaining self-awareness of skills and deficiencies, discovered from coping with problems, generates a cognitive process, which results in self-confidence of knowledge itself, which improves competence, performance and allows the choice of the best decision to be made for the patient¹⁰. However, the use of PBL alone, in the educational context, does not cover all aspects and facets of dental education, in the pursuit of

the students' protagonism, meaningful learning and the formation of a critical-reflective graduate. It is important to emphasize that between the basic[learning?] cycle and clinical care there is dental laboratory teaching, which is essential for the development of student's manual and cognitive skills that precede clinical care. Dental laboratory teaching still continues to be deficient in the use of techniques based on the AMTL⁹.

The use of AMTL strategies in the laboratory environment is expected to trigger the integration of cycles and disciplines, in addition to discovery, adhesion and development of manual skills. Thus, the aim of this study was to report a successful experience?/experiment?/ related to the use of techniques with the support of AMTL, such as gamification and painting of macromodels, in the transition from the laboratory environment to the clinical environment.

2 REPORT ON EXPERIENCE

The teaching of cavity preparation was divided into three classes (10 total hours, divided into three weekly classes of 3h20min), representing different stages of knowledge, with a weekly break between classes. The classes dealt with the same theme, cavity nomenclature and classification of cavity preparations, according to Black's classification.

The beginning of the learning process took place by means of an expository, dialog class with students, on the classification of Black's cavity preparations, nomenclature of walls and angles. Images of Black's cavities in enlarged size were projected and their respective characteristics explained. To improve the student's understanding, a cardboard box was used, with approximate dimensions of 40 x 50 x 35 cm, with the aim of maintaining the three-dimensioning of the cavity preparations, as well as transposing?/overcoming?/ the difficulty of dimensioning from the macro to the microenvironment. The intact box represented the healthy tooth and on each surface of the removed box, one of the preparations was exemplified, starting with Class I, then for Class

II and ending with extracoronal preparations (figures 1 to 5). Specific literature on the topic of

the class was recommended for prior study before the next meeting.



Figure 1. Expository dialog class

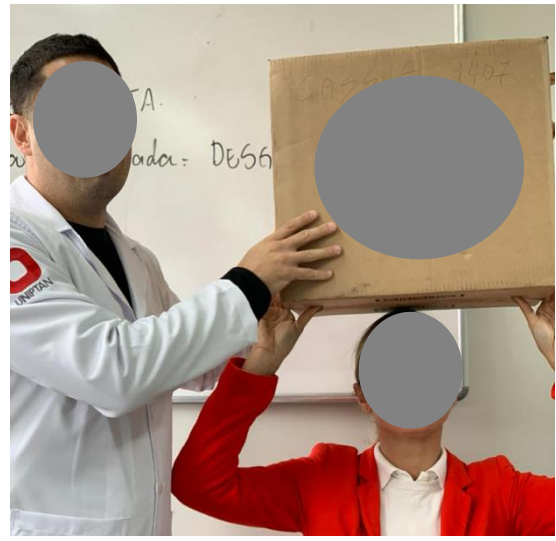


Figure 2. Explanation with a cardboard box in order to maintain three-dimensionality



Figure 3. Three-dimensional demonstration of a Class I cavity



Figure 4. Three-dimensional demonstration of a Class II cavity



Figure 5. Three-dimensional demonstration of a Class II MOD cavity

In the two subsequent classes, different types of resources based on AMTL were applied, in order to achieve the best result of the learning process, fixation of the content, and beginning with development of manual skills. In the environment of the Dental Laboratory of Specific Skills, the professors provided white plaster macromodels, representing teeth with cavity preparations. The student individually received a plaster model with an intracoronal preparation (Black's Class I), a plaster model with a partial extracoronal preparation (onlay) and a brush n°0. Each pair of students was also provided with water-based paints in red, blue, green, yellow, white and black (figure 6).

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Colors to be used for painting each of the walls of a cavity were pre-established, according to their classification: surrounding walls (mesial, distal, buccal, lingual and gingival) and background walls (axial and pulpal). The professors set up a table and determined a water-based paint color for each wall and angle (Figure 7). At this point, students had to identify each of the walls and angles of the types of cavities presented (intracoronal - Class I Black and partial extracoronal onlay) and then paint them with the previously stipulated colors (figures 8 e 9).



Figure 6. Materials used for painting the macromodels

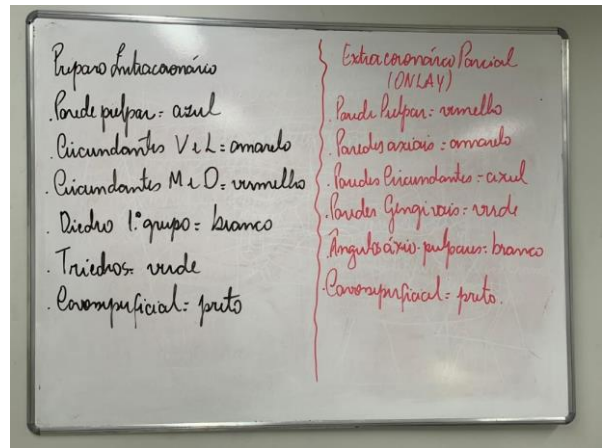


Figure 7. Instructions for performing the practice of model painting.



Figure 8. Students painting plaster models



Figure 9. Plaster Macromodels painted as instructed

In a third class, a gamification process took place. Students were divided into groups of up to 5 members and for each group a puzzle was made available with the image of one of the five types of cavities in Black's classification.

Students were asked to assemble the puzzle and label the cavity according to Black's

classification. The group that assembled and agreed on the classification of the image reproduced in the shortest time possible was nominated as the winner and received a prize. Once all the puzzles were assembled, they were rotated so that all students could identify the Black classification represented in all of the images (figure 10).



Figure 10. Gamification using jigsaw puzzles with images of cavity preparations

3 FINAL CONSIDERATIONS

At first, teachers adopted the feature of exposition dialog and explanation, characteristic of the traditional method in which the teacher is the protagonist, and after this the resources of the active methods were added. In this way, the resources of the traditional and active methods were alternated during the educational process. The application of the two resources during the same theme, demonstrated that the active approach, strengthening the role and proactivity of the students during laboratory teaching, showed evidence of a favorable, active and ludic experience, for both students and professors. The mismatch between basic education and clinical care was overcome in the laboratory environment, concomitantly with the first steps of the students' technical training. There was a benefit in terms of the development of manual skills in progress, as well as the integration of learning cycles, based on knowledge built with the student as protagonist of their own learning

process.

RESUMO

Relato de experiência no ensino da Dentística com base em metodologias ativas de ensino-aprendizagem: gamificação e práticas lúdicas

O presente estudo tem por objetivo demonstrar um processo de ensino-aprendizagem na graduação odontológica de cunho lúdico e engajamento do estudante, no momento em que ocorre a transição no ensino das disciplinas, destacando-se: do ciclo básico; percorrendo o ambiente laboratorial; até o atendimento clínico aos pacientes, para além do mero treinamento técnico. Prevalece no ensino superior o aprendizado fragmentado por disciplinas e áreas de especialização e nota-se uma ausência de conexão entre os propósitos laboratorial e clínico. A aplicação de duas ferramentas, com o aporte das Metodologias Ativas de Ensino-Aprendizagem (MAEA), converteu-se em um relato de experiência de ensino da exitoso da

Dentística, a saber: (1) demonstraco tridimensional da formao de cavidades com materiais acessveis, com base na pintura com tinta guache das paredes cavitrias e ângulos de macromodelos de gesso, representando preparos intracoronrio e extracoronrio parcial (*onlay*); e (2) gamificao, por meio de quebra-cabea de projeo de imagem dos diferentes tipos de preparos cavitrios. O uso de recursos com base nas MAEA demonstrou resultados promissores, interconectando reas de ensino da dentstica, vistas como dicotmicas, terica e prtica, ensins bsico e clnico, assim como promovendo o despertar, a adeso e o desenvolvimento de habilidades manuais do estudante.

Descritores: Educao. Aprendizagem Ativa. Odontologia. Dentstica Operatria.

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