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Active Learning in Pharmacology Teaching: a Report of Experience

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Abstract Pharmacology studies active substances and interactions with living organisms, being complex, and traditional teaching methodologies do not favor student learning. Thus, active methodologies such as educational games can overcome this problem. The objective was to describe the experience report about the use of active methodology in pharmacology teaching. This is an experience report about the use of active methodology in the teaching-learning of pharmacology in a public college of northeast Brazil. It was used a game of hangman-game, with a definition of term, where the students (pair) should associate to one the secret word, in up to 2 minutes. Topics on drug excretion, pharmacodynamics and pharmacology of the CNS were discussed. The students reported acceptance and enthusiasm, since they were able to act in a motivating and fun activity. It turns out that, the game is a form of interactive learning offering a variety of dynamic and informative educational experiences.

Keywords: *pharmacology, active learning, hagman game*

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1. Introduction

Pharmacology involves the study of drugs encompassing knowledge about physicochemical properties, interactions with living organisms and their respective pharmacological and toxicological properties. It combines basic and clinical pharmacological aspects in order to improve student training for drug management, analysis of adverse reactions and therapeutic responses [1,2,3,4].

This discipline presents a variety of content, so that traditional lectures (the teacher focused with minimal active participation of the students, minimal or no integration of subjects both horizontal and vertical) have not demonstrated satisfactory results in relation to student learning. This is due to the amount of information students need to know and how to apply it in clinical situations [4,5,6].

In this sense, it is necessary to re-adjust teaching methodologies that promote student learning. One of these is the active learning technique that facilitates cooperative work and can be more effective than traditional methods, strengthening the development of relational communication skills and concepts already taught, such as the use of educational games [4,5,6,7,8].

The use of games in the process of learning and trade is an idea known as "Gamification" that has existed for centuries. They basically correlate actions that generate some reward. Currently used terms such as "educational games," "serious games" and "game-based learning" [9].

Kaylor [10] states that: "The educational game is a technique that can improve learning by stimulating student interest and motivation through social interactions with educational content. From a theoretical perspective, the group educational game as an active learning strategy incorporates aspects of the theory of experiential, theoretical, social and playful learning".

Among the games that can be used is the game of guessing words; hangman game where the player is instigated by a key statement to find a secret word over a pre-set time. The student will not be punctuated if there are wrong letters or incomplete answers [11].

This type of game allows through innovations in teaching, reinforcement of a previously covered material, to the understanding of concepts and, at the same time, motivating participants, contributing to the development of critical thinking, communication, cooperative learning skills and promote the formation of concepts [4,11].

In this way, the present study aims to describe the experience report about the use of active learning in pharmacology teaching of in northeast Brazil.

2. Methods

This is an experience report about the use of active learning in the teaching of pharmacology in a public education unit in Northeast Brazil. It used game, type of words, hangman game, where a statement instigates the student to find a secret word in a pre-established time. The keyword would be answered in spaces with certain number of letters

corresponding to completing a statement (Figure 1). The players were divided into doubles, with replies to fill in the keywords.

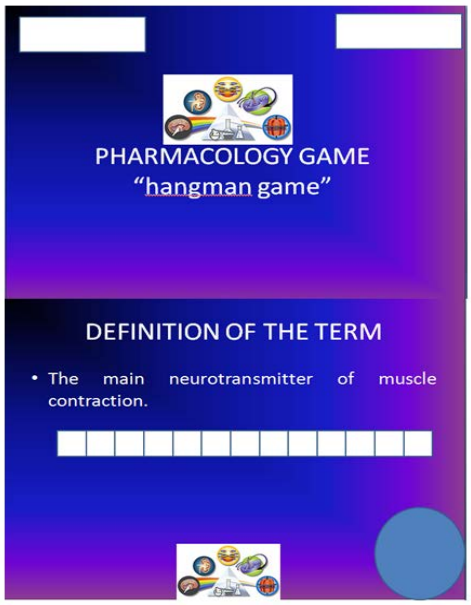

Figure 1. Base structure of hangman game

The methodology was used with students of the second year of nutrition graduation, including topics on drug excretion, pharmacodynamics and pharmacology of the Central Nervous System. The pair of students had two minutes to answer the statements, the time being marked with a timer (Figure 2). There were no punishments for errors.

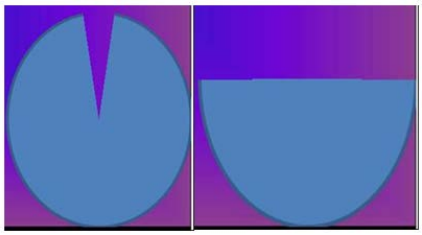

Figure 2. Timer for determination of 2 minutes for responses

3. Results

The students were divided into small groups (2) and the rules were initially explained, followed by the release of the definitions of terms to start the game (Figure 3). Each pair had an answer sheet.

Figure 3. Activities in small groups with timer

The topics covered in the definition of the terms involved subjects of drug excretion, pharmacodynamics and pharmacology of the CNS, as exemplified in Table 1.

Table 1. Definitions of terms and keywords used in hangman game

Definition of the Term	Keyword
The main neurotransmitter of muscle contraction.	Acetylcholine
Enzymes produced by some bacteria and are responsible for their resistance to antibiotics such as penicillins.	B-Lactamase
These drugs are used primarily for sleep induction and/or maintenance.	Hypnotics
Depressive drugs of the Central Nervous System, being able to act in the anxiety, sleep induction or anticonvulsive, being an example the Gardenal.	Barbiturers
Benzodiazepines present action to treat anxiety and induce sleep by acting on receptors.	Gaba

4. Discussions

The teaching-learning of pharmacology involves not only simple memorization of concepts, it is necessary to understand the mechanisms of action, the side effects and the considerations involved in the administration of medications. In addition, aspects of physiopathology, human physiology and biochemistry are involved, being considered by many students the difficult subject [12]. All these factors sometimes serve as barriers to learning, generating discontent, disinterest and low performance in the discipline.

Learning is defined as an essentially individual and internal process in the construction of knowledge, being dependent on cognitive aspects, motivational and emotional components, coupled with the socio-cultural environment in which this occurs [13,14].

In this way, active methodologies become important, since they configure learning strategies where the student interacts, participates or builds his own knowledge through critical analysis, finding solutions, analogical thinking, but above all, his role as a center of teaching and learning [14,15,16].

A particular form of active methodology is the educational game, because they have active, non-linear and immersive environments, since games require the use of logic, memory, problem solving and thinking skills. In addition, educational games contribute to motivation and fun for students, in the teaching-learning process [15,16,17].

The methodological proposal of the present study was the application of the hangman game, similar to that observed by Pront [11], the student will try to find a secret word and the player has to guess, one letter at a time over a pre-set time. The student will not be punctuated if there are wrong letters or incomplete answers [11,12,13].

In this way, there was an excellent acceptance and enthusiasm on the part of the students, since they were able to act in a motivating and fun activity, allowing the cooperative work, the strengthening of communication skills and reinforcement of contents already given.

In this way, it was possible to contribute to the breakdown of paradigms that pharmacology is a tedious discipline and difficult assimilation. Therefore, it is important for teachers of this discipline to heed the statements of Foster [12], which indicate that innovations in the teaching-learning process of this subject are necessary, allowing motivation and encouragement to the students, and as a consequence, if they observe greater performance in the discipline.

5. Conclusions

Innovation in the teaching-learning process, mainly through educational games, student-centered, does not require the use of complex and high-tech systems. Through a small dose of creativity and a simple strategy of hangman game games, they often serve as alternatives to help in the animation of educational content, stimulating student learning.

In this way, there was great acceptance and enthusiasm of the students with the use of this educational methodology. Allowing cooperative work, strengthening of relational communication skills and reinforcement of already taught concepts, which may contribute to the improvement of students' academic performance in the discipline of pharmacology.

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