

# Chapter 239

## Experience report: Use of gamification as a learning tool in biochemistry

  <https://doi.org/10.56238/devopinterscie-239>

### **Camila Daiane das Chagas de Lima**

Graduanda em Farmácia, pelo Polo Biopark da Faculdade União das Américas.

E-mail: mmarcante123@gmail.com

### **Michele Fernanda Bortolini**

Doutora em Agronomia, pela Universidade Federal, Professora da Associação de Ensino e Pesquisa do Parque Científico e Tecnológico de Biociências - O Biopark.

E-mail: michele.bortolini@biopark.com.br

### **André Rabelo Peixoto Bertocco**

Mestre em Bioquímica, pela Universidade Federal, Professor da Associação de Ensino e Pesquisa do Parque Científico e Tecnológico de Biociências - O Biopark.

E-mail: Bertoccoandreh@gmail.com

biochemistry to motivate and develop new skills, creativity, and oral and written communication in the academics of pharmacy. The experience reported was given by the proposal of the current educators of the discipline of biochemistry, which was based on the use of the pedagogical practice of project-based learning. Thus, the proposed challenge was to create a game for high school students, to explain the development of the disease hypercholesterolemia. This study revealed that the use of games as a teaching-learning tool is effective, attractive, and dynamic, which can be used as a pedagogical resource to increase students' motivation and engagement and develop their cognitive skills.

**Keywords:** Gamification, Classcraft, Apprenticeship.

### **ABSTRACT**

This study aims to describe a report of experiences on the use of gamification as a tool of learning in

## **1 INTRODUCTION**

When reflecting on the current situation it is noticeable to observe that society is constantly transformed in the socioeconomic, political, cultural, and technological fields. In this context, the advancement of technology stands out. It is true to describe that the contemporary society in which we live is involved not only in the information age but also in digital culture (LACERDA; SAINTS, 2018; REZENDE, 2018). Technological development, directly and indirectly, influences the individuals of society, and this reflects in teaching and learning, provoking significant changes (SANTOS; ALMEIDA; CRUZ, 2018).

Thus, one method that stands out is gamification. "Gamification derives directly from the popularization and popularity of games, and their intrinsic capacities to motivate action, solve problems and enhance learning in the various areas of knowledge and life of the individual" (FARDO, 2013). Educational games can give a new dynamic and innovation to education, contributing to a collaborative and interactive process, and at the same time social (FRAZÃO; NAKAMOTO, 2020).

There are several possibilities for the practice of gamification, this study was limited to the Classcraft platform which is an online role-playing game. For the author Brizola (2020) the use of the Classcraft tool, "among the members of the group stimulates the effective participation of the students, activating their protagonism. It's a game that can be used on your computer, tablet, notebook, or mobile device."

The objective of this study was to report the experience of pharmacy students from the Biopark Pole of the Union of America's College. During the unfolding of the human metabolism project. The students divided into teams were given the challenge of developing a game, to facilitate the understanding of high school students about diseases caused by metabolic changes and stimulate healthier habits, the intention was to instigate in the pharmacy students, the discovery of new skills, creativity, oral and written communication. In addition, as future health professionals, it is necessary to adapt the communication to different types of audiences, in this challenge, the players would be from high school

According to the philosopher Confucius: "What I hear, I forget; what I see, I remember; what I do, I understand" What I hear, I forget; What I hear and see, I remember; What I hear, see, and ask or discuss, I begin to understand; What I hear, see, discuss, and do, I learn by developing knowledge and skill; What I teach someone, I master with mastery (BARBOSA; MOURA, 2013, p.54).

## 2 DEVELOPMENT

Thus, the game elaborated on the disease hypercholesterolemia, which refers to high rates of cholesterol in the blood. Therefore, the Classcraft platform was chosen for its versatility and the possibility for the player to use their imagination to live adventures and learn at the same time. In addition, the platform contributes to increasing engagement and performance, acting positively on student behavior.

Classcraft is a game platform that is similar to the online RPG format, which provides the free version and the pro version. Its educational purpose is that teachers and students can play together in the classroom or another environment. Teachers can work with the platform according to its methodology, an interesting fact is that the tool provides benefits in the virtual world such as creating your avatar, leveling up, gaining powers, and working as a team. Thus, the student also has privileges during classes such as; earning an extra hour to perform a task, among others. In the meantime, there is the possibility of applying sentences, for example, when the student arrives late in class, does not perform the proposed activities, or even presents a negative behavior. However, it is worth remembering that the sentence applied in the game is not intending to discredit the student, but rather, to stimulate him to learn, so usually the sentence is to write a positive message (kudos) of<sup>1</sup> encouragement to a colleague or a team in the game.

Notably, one of the advantages of this tool is the possibility of adapting any discipline, presenting specific configurations that helped in the assembly of the control panel. Having access to the panel it is

---

<sup>1</sup> Kudos is a term used within the game that allows you to send messages from one player to the other.

possible to type questions, link videos, and images, you can make the attendance list, direct missions to the players, and insert points according to each mission completed by the player, among other functions. It is relevant to highlight the diversity that this tool provides, about technology and the knowledge acquired, developing autonomy. This practice was like entering a parallel world, which until now was unknown, it was possible to reflect on the different ways of teaching and learning. The following follows illustrative images about the developed stages of the game related to hypercholesterolemia disease;

U ma of the first and main stages regarding the assembly of the game presents the six missions that players will have to complete to finish each level. Which can be seen in Figure 1.

Figure 1: Location of missions on the map.



Source: Photo taken by the authors (2022).

It was a complex stage because it was realized that it is necessary to have mastery of the content to be able to adapt it to a language easier for the players, in the situation of high school students. Some of the questions to follow up on the activities were:

What is hypercholesterolemia? What enzymes are part of the metabolic pathway? What are lipoproteins and lipids and their functions?

The second stage was a video, in which an avatar called Meriva was created, as can be seen in Figure 2.

Figure 2: Representative image of the video.



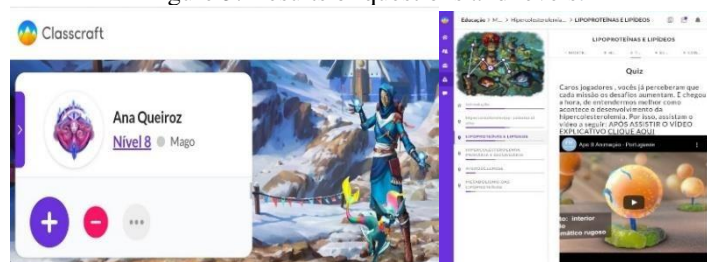
Source: Photo taken by the authors (2022).

In this process, the experience of using her voice to give life to the character was to involve the players in this virtual world, where she mentioned the names of some participants in the game.

The next step was the organization of the list of participants and distribution into different teams, which is shown in Figure 3. In addition, it was necessary to think about the division of the theme into subtitles to facilitate the understanding of the player. The central theme was hypercholesterolemia and the

subtopics were lipoproteins, lipids, atherosclerosis, and metabolism. Thus, the difficulty encountered was trying to elaborate the questions with simpler and clearer language.

Figure 3: Results of questions and levels.



Source: Photo taken by the authors (2022).

Thinking about the fun and learning of the players inserted questions of multiple choices, such as the Quiz, Labyrinth, and Wheel to Wheel, with different animations, providing surprises throughout the missions, so that each phase of the game, stimulates them to want to play more.

### 3 FINAL CONSIDERATIONS

The elaboration of the game for the process of teaching and academic learning, stimulated creativity, teamwork, protagonism, autonomy, communication, and interest of the academic in the face of the proposed content. This dynamic was enriching because it evidenced the use of gamification as a method in education. Including elements of digital games in educational institutions can provide promising experiences with significant results for education.

## REFERENCES

- BARBOSA, Eduardo Fernandes; MOURA, Décio Guimarães de. Metodologias ativas de aprendizagem na educação profissional e tecnológica. *Boletim Técnico do Senac, Rio de Janeiro*, v. 39, n. 2, p. 48-67, maio/ago. 2013.
- BRIZOLA, Alana Stefany. Gamificação: uma proposta de aplicação da plataforma Classcraft nas aulas de matemática do ensino médio. 2020.
- FARDO, Marcelo Luis. A gamificação aplicada em ambientes de aprendizagem. **Renote**, v. 11, n. 1, 2013. Disponível em: <<https://www.seer.ufrgs.br/renote/article/view/41629>>. Acesso em: 26/jun./2022.
- FRAZÃO, Leide Vânia Vieira Duarte; NAKAMOTO, Paula Teixeira. Gamificação e sua aplicabilidade no Ensino Médio: uma revisão sistemática da literatura. **Research, Society and Development**, v. 9, n. 8, p. e141985235-e141985235, 2020. Disponível em: <<https://rsdjournal.org/index.php/rsd/article/view/5235>>. Acesso em: 23/jun./2022.
- LACERDA, Flávia Cristina Barbosa; SANTOS, Letícia Machado dos. Integralidade na formação do ensino superior: metodologias ativas de aprendizagem. **Avaliação: Revista da Avaliação da Educação Superior**, v. 23, n. 3, p. 611-627, 2018. Acesso em: 20/jun./2022.
- REZENDE, Bruno AC. **Gamificação como prática docente: possibilidades e dificuldades**. 2018. Tese de Doutorado. Dissertação de Mestrado em Educação. Disponível em: [http://www. Univas. Edu. br/me/docs./dissertacoes2/145](http://www.Univas.Edu.br/me/docs./dissertacoes2/145). Acesso em: 24/jun./2022.
- SANTOS, Bruna Batista dos; ALMEIDA, Andrea Chagas Alves de; CRUZ, Ariane Nogueira. Gamificação aplicada a educação: um relato de experiência na disciplina Hermenêutica jurídica. **Unifor**, [s. l.], 2018. Disponível em: [file:///C:/Users/PC/Downloads/exemplo%20com%20gamefica%C3%A7%C3%A3o%20\(1\).p df](file:///C:/Users/PC/Downloads/exemplo%20com%20gamefica%C3%A7%C3%A3o%20(1).pdf). Acesso em: 21 jun. 2022.