Artigo Original

EaD em foco
Revista Científica em Educação a Distância
10 anos

ISSN 2177-8110
DOI: 10.18264/eadf.v10i1.947

A Gamification Model Applied to Social Network Education

Um Modelo de Gamificação para Redes Sociais Educacionais

Rafael Arnold*[1]
Paulo Ricardo dos Santos[1]
Débora Nice Ferrari Barbosa[1]

[1] Universidade Feevale - Campus II; ERS-239, 2755. Novo Hamburgo, RS, Brasil.

*rafael.arnold@gmail.com

Resumo

The use of social networks associated with gamification strategies can help in the learning process. This study starts from the hypothesis that a gamified educational social network can enhances the involvement and motivation of the subjects in pedagogical practices that involve a social network. This article used a gamification model applied to educational social networks, with the objective of enhancing the motivation and involvement of students in pedagogical practices involving the resources of the network. The study uses the Design Science Research (DSR) method to construct the proposed artifact. The research has a qualitative character, in which were evaluated the gamification techniques applied by the model (artifact), having as a case study its application in the Educational Social Network Teia. Based on two experiments conducted with students from a undergraduate course and with high school students from a university project, the results of the research analyzes showed that the Teia network was helpful in motivating and engaging students, improving their experience during the activities performed.

Palavras-chave: Gamification. Educational social networks. Digital games.

Recebido 14/ 01/ 2020
Aceito 27/ 02/ 2020
Publicado 04/ 03/ 2020

COMO CITAR ESTE ARTIGO

ABNT: ARNOLD,R.; SANTOS, P.R. dos; BARBOSA, D.F.B.A Gamification Model Applied To Social Network Education **EaD em Foco**, V10, e947. 2020. doi: https://doi.org/10.18264/eadf.v10i1947

Um Modelo de Gamificação para Redes Sociais Educacionais

Resumo

O uso de redes sociais associadas a estratégias de gamificação pode auxiliar no processo de aprendizagem. Este estudo parte da hipótese de que uma rede social educacional gamificada potencializa o engajamento e a motivação dos sujeitos em práticas pedagógicas que envolvem a rede. Este artigo propõe um modelo de gamificação aplicada a redes sociais educacionais, com o intuito de potencializar a motivação e o engajamento dos alunos em práticas pedagógicas envolvendo os recursos da rede. O estudo faz uso do método Design Science Research (DSR)*, para construção do artefato proposto. A pesquisa tem caráter qualitativo, em que foram avaliadas as técnicas de gamificação propostas pelo modelo (artefato), tendo como estudo de caso sua aplicação na Rede Social Educacional Teia. Com base em dois experimentos realizados junto a um curso de graduação e a alunos de ensino médio participantes de um projeto junto à universidade, os resultados da análise da pesquisa evidenciaram que a rede Teia gamificada favoreceu a motivação e o engajamento dos alunos, melhorando a experiência destes durante as atividades realizadas.*

***Keywords**: Gamificação. Redes sociais educacionais. Jogos digitais.*

1. Introdução

School-age youths use social media extensively as part of a digital culture. According to Recuero (2012), social networking sites are structures of human groupings, established by the interactions that organize social groups. In view of this aspect, we seek to improve the understanding we have about these resources, since they are already a reality in the on-site educational processes and in Distance Education (EAD) (TENÓRIO et al, 2015; RIBAS, 2015). This is because, according to Santaella (2013), the use of digital platforms, such as social networks and, especially, educational social networks, can support teaching-learning activities (either in person or at a distance), provide resources and information to students. apprentices, in addition to motivating and engaging them through interactivity and collaboration.

For Mcgonigal (2012), this scenario provides that "new practices of user involvement with activities in general, such as gamification" emerge, which can be understood as the application of techniques and characteristic elements of games in "non-game" environments. Gamification has been applied in several areas, mainly driven by mobile devices and social media platforms, due to its elements acting directly in the motivation and engagement of users. In this sense, for Zichermann and Cunningham (2011), the importance of the experience of a given activity depends on how much it can generate motivation, which, according to Hägglund (2012), can be intrinsic or extrinsic. Intrinsic because it is intrinsically related to an autonomous motivation, for something you want to do. The extrinsic motivation is driven to achieve a certain result or reward, that is, a controlled motivation.

Thinking about these issues, the gamified educational social network called Rede Teia (WINTER et al., 2014) was developed with the objective of providing a favorable environment for the exchange of knowledge, experiences and interaction, with a view to learning, both in relation to teaching presence mediated by technologies, such as Distance Education processes, since gamification elements can keep subjects engaged in a network and have a more interactive and pleasant experience of using online

resources (MONTEIRO, OLIVEIRA & SILVA, 2017), which contributes to distance learning to be more significant, as courses in this modality will have characteristics similar to other digital resources with which users interact.

Although the Teia network has gamification elements such as scores, medals and scoreboards, it is important to increase its current gamification structure, in order to increase socialization and engagement. To achieve this result, the main question of this work arises: can the application of gamification elements in educational social networks foster students' motivation and engagement, enhancing and involving the subject in the proposed pedagogical strategies? Thus, this work aims to propose a gamification model applied to educational social networks, in order to enhance the motivation and engagement of students in classroom or distance teaching practices, involving the network resources. Thus, the article is divided into 6 sections. In addition to this Introduction, section 2 presents the methodology of the work. In section 3, the proposed gamification model is presented. In section 4, the prototyping in the Teia network is exposed, and the evaluation of the model is highlighted in section 5. Finally, section 6 presents the final considerations of the work.

2. Methodology

The construction of the gamification model for educational social networks is based on the Design Science Research (DSR) method (VAN AKEN, 2004). The proposed model has as its object of instantiation the artifact developed in the Social Educational Network Teia. To this end, it was necessary to develop a new version of the network, conceptually and technologically more evolved, in order to meet the proposed objectives.

To validate the artifact, the network was used in pedagogical practices in the form of a "Gymkhana", developed with the Civil Engineering course, and in an Online RPG, developed with high school students participating in a university project at this project belongs to. The pedagogical practices involved the gamification resources from the proposed model and implemented at Rede Teia, in addition to the use of an educational game. Approximately 76 students participated in the proposal, 16 from undergraduate courses and 60 from high school.

Data collection took place through the application of a questionnaire to users and observation during the application of the proposal and, also, through a documentary research on the data generated when using the network. Thus, based on the theme and objective of this work, the following categories of analysis stood out: 1) Gamification techniques for motivation and engagement in an educational social network, in which it was analyzed how the use of game mechanisms applied to a network social educational motivate and engage users; 2) Gamification model proposed, in which the proposed artifact model and its effects were analyzed, according to the perception of the subjects who participated in the experiments. For data analysis, a simple weighted average was performed on the data obtained through the questionnaire applied in each experiment and a simple weighted average on the responses obtained from both experiments. The averages obtained were crossed with the data collected through the researcher's observation and a confirmation was sought through the documentary research carried out at Rede Teia.

3. Gamification model for educational social networks

Based on the Octalysis framework by Chou (2016), the model seeks, in addition to motivation and engagement, to give the necessary attention to learning, so that the activities intermediated by the elements proposed by the model are not just a game. The proposed model used the study by Csikszentmihalyi (2008) on flow theory, the Self-Determination Theory by Ryan and Deci (2000) and the gamification model by Chou (2016).

The best way to attract users to an experience, according to Chou (2016), is through extrinsic rewards (gift cards, cash, discounts). In this sense, the model proposes to foster extrinsic motivation through rewards from the achievement and ownership centers, as well as, for the achievement and property centers, the implementation of points, medals, scoreboards, progression and the creation of own profiles is proposed. For scarcity, it is proposed to implement pending strategies, random opportunities and countdown. Intrinsic motivation is related in the Octalysis model by Chou (2016) with the nuclei of Strengthening, Social and Unpredictability.

Therefore, it is necessary to foster the user's interest through intrinsic rewards (recognition, status, progress) and, subsequently, use intrinsic motivation to guarantee their long-term involvement. Through this process, users will start to enjoy the activity, they will start to focus on enjoying their own experience without thinking about other rewards.

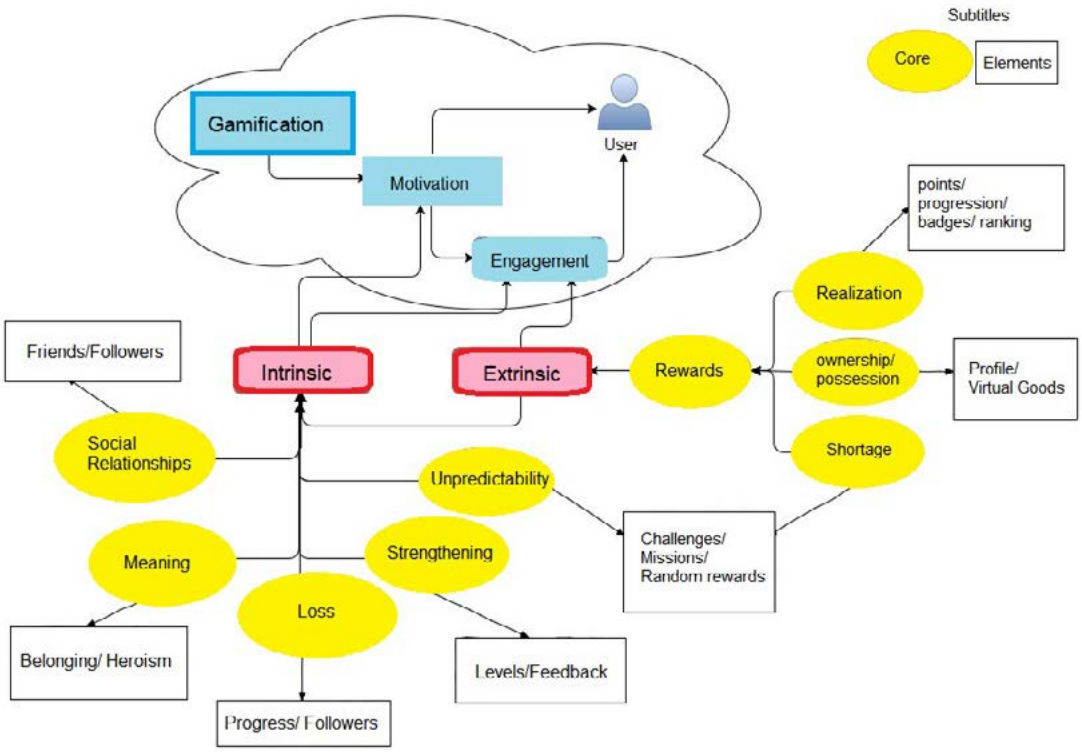

Figura 1: Proposed model
Source: The authors

To intrinsically motivate users, the model proposes the implementation of challenges, missions, random rewards, the possibility of following and being followed by other users of the network, in addition to a collaborative environment, where the subjects help each other in the performance of tasks. Continuous feedbacks are also proposed with recognition for the achievements of each individual. As for the loss, non-realization can cause loss of progress, of followers, and affect the social relevance of the user.

An important aspect to be considered is that the proposed gamification modeloperates in non-game contexts, since activities may involve network resources and physical resources, such as obtaining a QrCode, for example. This can mean (or motivate) behavioral changes, if the subject does not feel motivated by the activity. One of the goals of the model is to allow the creation of dynamic and fun practices, making the subjects participate voluntarily, and must be integrated into a pedagogical practice. Therefore, the practice must involve means of student engagement for the gamification model proposed in Rede Teia. If the student does not wish to participate in the gamified process, this should be done with the teacher / educator, since the use of Rede Teia presupposes gamification.

4. Prototype

The prototype implemented in Rede Teia represented by figure 2 aims to encourage users' motivation through the elements described in the model, in a cyclical process of extrinsic motivation through actions and continuous feedback. The educational games represented in the figure are part of the context of the Teia network and can be used in pedagogical practices involving the network.

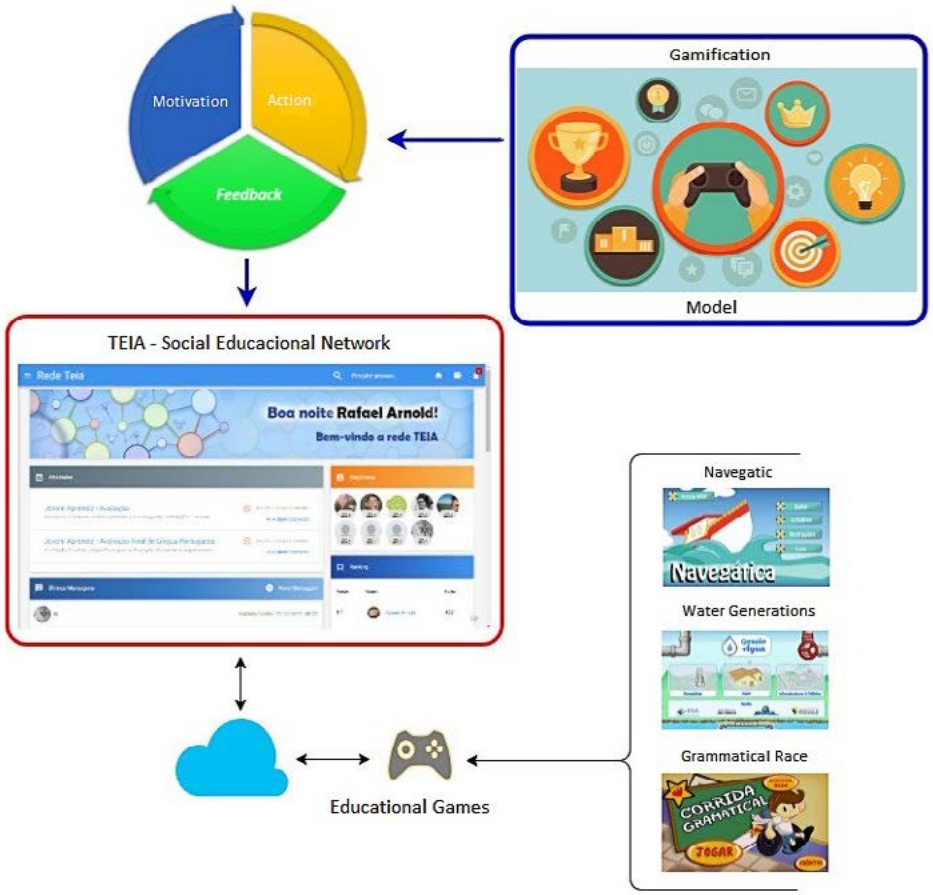

Figure 2: Desired implementation model
Source: The authors

The gamification model implemented aims to foster user motivation in a cyclical process of extrinsic motivation through actions and continuous feedback. The educational games represented in the figure are part of the context of Rede Teia and can be used in pedagogical practices involving the network. The following functionalities were implemented to meet the proposed model: 1) Dashboard: The elements implemented in this functionality are present in the Unpredictability, Loss and Scarcity nuclei proposed in the gamification model; 2) User Profile: The elements aim to attend the nuclei of Strengthening, Ownership and Possession and Realization of the gamification model; 3) Points, Medals, Stamps and Score: The elements contribute to the strengthening, loss and realization nuclei of the gamification model; 3) Spaces, Groups and Followers: Elements aim to serve the model's Social and Relationship nucleus; 4) Activities, Challenges and Missions: These elements seek to make sense of the meaning, strengthening, unpredictability and scarcity of the gamification model.

The dashboard presents all the basic information about the user, their pending issues, the general scoreboard, messages, available and pending activities, groups in which they participate, notifications, among others. Challenges and missions are available on this screen and may or may not have a deadline

for completion. This view summarizes the elements present in the Unpredictability, Loss and Scarcity nuclei of the proposed model, in addition to the Social and Relationship nucleus, through followers and the exchange of messages between users. The messages are posted in a forum format.

The user profile dashboard allows the visualization of the user's synthesized statistical data, progression in terms of levels, their score, medals and other aspects. This same dashboard is displayed to all users who may want to check the progress of their friends on the network. This aims to meet the nuclei of Strengthening, Ownership and Possession and Realization of the proposed gamification model, through extrinsic motivation. In this way, the system aims at continuous and dynamic feedback, demonstrating to the user the result of their actions on the network. This functionality contributes to the strengthening, loss and realization nuclei of the gamification model.

The construction of a space at Rede Teia to create groups aims at collaboration between students, teachers and other participants to carry out the activities proposed on the network. Based on that, the objective is to serve the Social and Relationship nucleus in the network. Among the possibilities of activities, it is possible to establish Challenges, Missions or simple Tasks. The network allows a variety of features for the activities created, such as images, texts, objective and essay questions, in addition to validating responses in real time.

Rede Teia allows the registration of challenges and missions that require an answer to be validated to unlock the next activities. Elements of the Unpredictability and Scarcity nuclei are present in this dynamic. The task subsequent to the challenge generates an urgent need for unlocking, creating a sense of loss, if not performed within the stipulated time. To meet the concepts of educational social network, the set of functionalities implemented in the Teia network allows the division of the roles of teacher and student, spaces (schools, classes), groups (classes, groups of students) and the activities to be carried out from the pre-established composition, which can also be proposed as a distance educational activity, with or without a deadline for resolution. Teachers are the "owners" of spaces, groups and activities and have access to responses sent by students.

5. Model evaluation

The first experiment took place in conjunction with students of the Civil Engineering course, through challenges and tasks organized according to the course's curriculum basis. The second experiment took place with the Jovem Aprendiz Feevale project, in which Rede Teia was used as a support platform for an online RPG activity

> and the tasks involved the research project in which this work is inserted and the theme of sustainability in relation to water.

5.1. Engineering "Gincana"

Rede Teia was used as a support platform in an activity called "Civil Engineering Challenge". Sixteen students enrolled in the activity, divided into four groups. The activity was characterized as a kind of gymkhana, in which the groups competed with each other. According to the results of the activities, the system updated the score of the groups from the points generated with the conclusion of each participant. At first, each student registered on the platform, so that they could later be added to the group previously created on the network by teachers.

In order for the groups to have access to the questions in the blocks, a challenge was proposed and should be completed before each block of questions. The challenge was concluded from the insertion of a "key" that unlocked the blocks of questions. Each challenge and block of questions had a maximum deadline for completion. If it was not answered within the deadline, it was automatically unavailable to be answered - which generated a sense of urgency in the students.

Each question answered generated a score, which was assigned to the group. All members of the group should answer the questions, as the group's points were counted through the scores of each member. As a rule of activity, incorrect answers penalized the group with a negative score. The need for all members to respond to activities on behalf of the group and the penalty for errors aimed at the participation and cooperation of all students, especially regarding the resolution of the proposed problems.

At the end of the activities, students were submitted to the platform evaluation questionnaire on Rede Teia itself. The analysis of the data (figure 3) obtained was performed from the data collected on the network, through the questionnaire applied at the end of the activity and observation of the task developed as a whole.

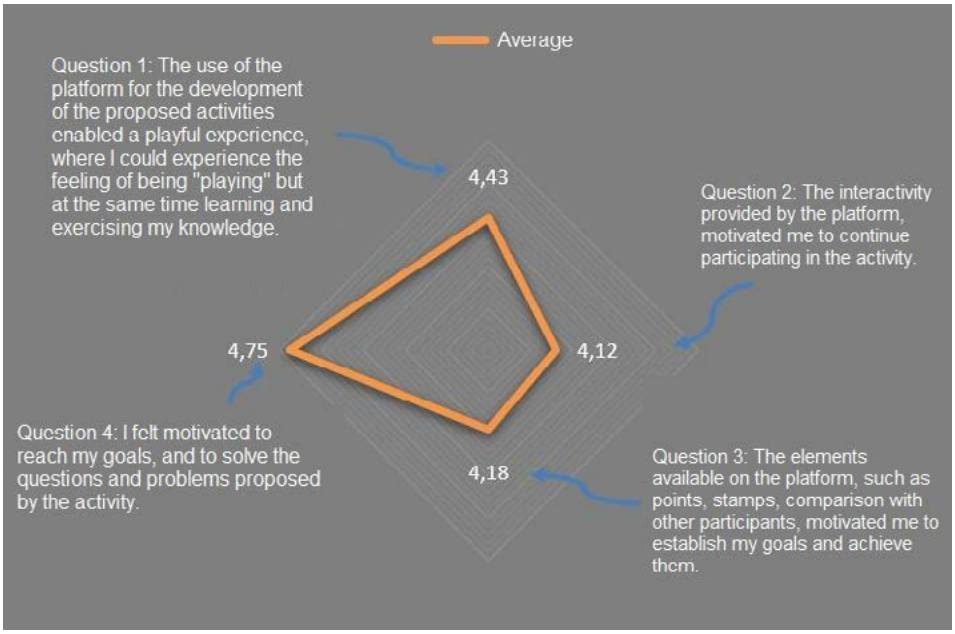

Figure 3: Civil Engineering evaluation chart
Source: The authors

As shown in Figure 3, it is observed that all questions obtained an average higher than 4.0, that is, on average, the participants agree with the statements of the questions in the questionnaire. Question 4 had the highest average, highlighting the student's motivation for group work to achieve the objectives and solve the tasks proposed by the activity. Question 3 demonstrates that the proposed artifact model had a positive effect, since, on average, everyone agreed that the gamification elements available at Rede Teia motivated them to establish their goals. Question number 1, which deals with the playfulness of the game, highlights the game environment that the gamification techniques provided. Question 2 highlights the need for a more interactive, more dynamic environment. It was evident, during the observation, the students' enthusiasm, willingness and interaction to find the keys, solve and unlock the other tasks, which corroborates with the average of the evaluation of 4.75 for question number 4, regarding it refers to motivation for teamwork and engagement with the group.

5.2. *On-line* RPG

Along with a university project involving high school students, Rede Teia was used as a support platform for an online role-playing activity entitled "Water Generation" with the theme of water resources sustainability. The activity was applied in the morning and afternoon classes, involving approximately 60 students. In this practice, students participated individually in the challenges and activities to be carried out. After registering on the network and the initial guidelines, each student received a mobile device (tablet) to carry out activities on Rede Teia. The dynamics were concentrated in a single building, where students needed, from the tips of the challenges, to find the QR codes that contained the issues to be resolved. In order to find the codes that were scattered throughout the building, challenges to be solved gave the location tips.

The first mission sought to give meaning to the activity, a form of motivation to carry out the proposed tasks. In this activity, the network waited for answers to the statements of the questions that were in the QR codes that needed an application available on the tablet to be read. With the questions in hand, students accessed Rede Teia on the tablet itself to insert their answers. The mobile devices made it possible for students to move around the building in search of codes and the respective issues to be resolved. As the questions were being resolved, a new challenge was proposed, in order to direct the student to the location of the next QR code and its respective question. For each activity, a maximum period of time for completion was stipulated, in order to generate some urgency and a commitment to the sequence of the activity, an element that corresponds to the scarcity core.

Soon after registration, students started to interact with the tools available on the network, without any kind of guidance or instruction, and started to follow other colleagues and post messages. Some realized that following others and being followed resulted in an increase in the overall score of the network, due to the points generated, as well as the bonus for each activity completed. As in the experiment carried out with the Civil Engineering course, at the end of the activities, the students were submitted to the platform evaluation questionnaire on the Teia Network itself.

The results of this experiment are described below. Of the 60 students who performed the activity, 47 answered the four questions in the proposed questionnaire. Figure 4 represents the graph of the result of the average obtained on each question. According to the figure, it is observed that two questions obtained an average greater than 4.0 and two questions obtained an average close to 4.0. On average, the participants agree with the statements of the questions in the questionnaire. Likewise, as presented in the experiment carried out with the Civil Engineering course, questions number 4 and number 1 stood out, respectively, in which question 4 had the highest average. Therefore, the student's motivation to achieve the objectives and solve the tasks proposed by the activity was highlighted.

It is also observed that everyone agreed that the elements of gamification available in Rede Teia motivated participation in the proposed activity. Question number 1, which deals with the playfulness of the game, helps to highlight this playful environment that the gamification techniques provided. Question number 2 highlights the need for a more interactive, more dynamic environment. Comparing the two experiments, it is clear that both, even in different contexts and practices, had a very similar perception of the platform.

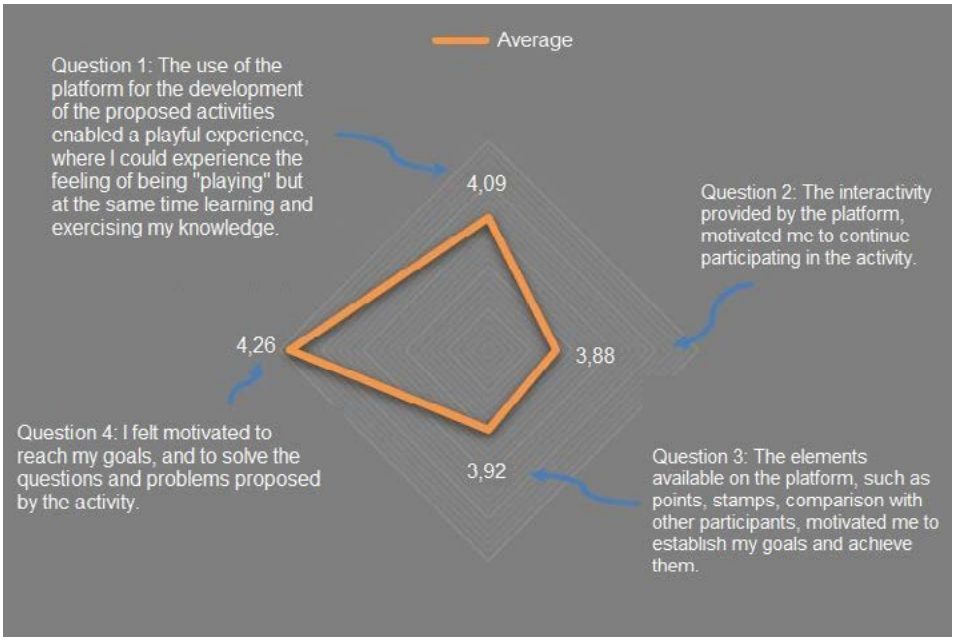

Figure 4: Evaluation chart of the Young Apprentice Program
Source: The authors

The questionnaire had a fifth, descriptive question, from which some interesting observations emerged, such as "I really liked the platform and felt very comfortable to complete the tasks. It was a new experience "and" Very good for developing team creativity and cooperation ". It can be seen from the responses that the platform involved these students in the activities, as they had the experience of playing and learning at the same time, which made the activity pleasurable. To contribute to the analysis, a documentary research was carried out at Rede Teia. For analysis, data were collected from the database of Rede Teia and stratified by user, with only those with a "student" profile selected. The data considered are from the publication of the current version of Rede Teia already gamified, 08/01/2017, until the cut-off date for analysis, 10/31/2017. Through the research, 114 different users registered with the student profile were identified and who had at least one access to Rede Teia within the period mentioned above.

From the data collected, it was identified that 68 users made 2 or more accesses, that is, a rate of return to the platform of 60% of the students who made the registration was obtained. Of the 114 users analyzed, 67 of them (58.8%) had some kind of social relationship, followed or were followed by another user of the network. The social core, according to Chou (2016), intrinsically motivates people, including guidance, acceptance, companionship and a sense of competition. Still, 92 users (81%) performed at least one activity involving the network, whether performing a task, a mission or a challenge. Regarding the interest in maintaining a complete profile, only 26 users (23%) were interested in maintaining their data on the network.

6. Final considerations

The results of the research analysis showed that the Gamified Web Network favored the students' motivation and engagement, improving the experience of the subjects during the practical activities carried out. In addition, it is important to develop good pedagogical practice so that learning and involvement go together; otherwise, the activity will tend to be just a game or computer-based training.

For face-to-face teaching contexts, gamified educational social networks can be a resource for a more meaningful and attractive pedagogical practice for subjects. For the processes of Distance Education, its

use can contribute to the creation of a learning network in which users assimilate to the online course a new experience, for which their engagement generates rewards - which can contribute to the motivation of the use these virtual spaces to share information, interact with colleagues, complete tasks, among others.

It is noteworthy that the proposed model is not unique and immutable. It is known that, depending on the context to be explored on the platform, improvements will be necessary. It is suggested, then, the continuity of this research. In future work, improvements to the platform are proposed, allowing more autonomy for users proposing activities on the network, an administration panel for each one, usability adjustments for better user experiences when using the platform. Still, it is suggested to use the platform in different spaces, schools and projects and in remote activities, enabling studies, comparisons, analysis and data mining for continuous improvement of the environment.

References

CHOU, Y. **Actionable Gamification - Beyond Points, Badges, and Leaderboards**. Leanpub book, 2016.

CSIKSZENTMIHALYI, M. **Flow: the psychology of optimal experience**. 1st ed. HarperCollins e-books, New York, 2008.

HÄGGLUND, P. **Taking gamification to next level: A detailed overview of the past, the present and a possible future of gamification**. 2012. Disponível em:<http://www8.cs.umu.se/education/examina/Rapporter/PerMafrost.pdf>. Acesso em: Nov 2019.

MCGONIGAL, J. **A realidade em jogo – Por que os games nos tornam melhores e como eles podem mudar o mundo**. Rio de Janeiro: Best Sellers, 2012.

MONTEIRO,W. M. ;OLIVEIRA,T. M.; SILVA, D. J. M. Gamificação na Educação a Distância: Possibilidades para o ensino de programação; **Revista Tecnologias na Educação**, 2015.

PRENSKY, M. **Aprendizagem baseada em jogos digitais**. Editora Senac – São Paulo, 2012.

RECUERO, R. **A Conversação em Rede – comunicação mediada pelo computador e redes sociais na internet**. Porto Alegre: Sulina, 2012.

RIBAS, C.C.C. As redes sociais como ferramenta em EaD: Um estudo sobre a utilização do facebook. **Revista Eletrônica do curso de pedagogia das faculdades OPET**. Jun. 2015

RYAN, R. M.; DECI, E. L. Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. **Contemporary Educational Psychology** 25, p. 54–67, 2000.

SANTAELLA, L. **Comunicação ubíqua: repercussões na cultura e na educação**. 1ª ed. São Paulo: Paulus, 2013.

TENÓRIO, T.; MARQUES, T.; PATTERSON, N.; TENÓRIO, A. O Emprego do e-Mail e do Facebook na Educação a Distância com Base nas Percepções de Alunos e Egressos. **EaD em FOCO**, 5(3), 2015.

VAN AKEN, J. E. Management Research Based on the Paradigm of the Design Sciences: The Quest for Field-Tested and Grounded Technological Rules. **Journal of Management Studies**, v.41, n.2, p.219-246, 2004.

WINTER, N. J.; SANTOS, G. N.; STRACK, T. L.; MOSSMANN, J. B.; BARBOSA, D. N. F.; BEZ, M. Incentivo ao Estudo Através dos Jogos: experiências no desenvolvimento de uma rede social "gamificada". **Revista Hipertexto**. V4, n. 3, 2014.

ZICHERMANN, G.; CUNNINGHAM, C. **Gamification by Design: Implementing Game Mechanics in Web and Mobile Apps**. Sebastopol, CA: O'Reilly Media, Inc. 2011.