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GAMIFICATION AS A TOOL FOR ENGAGEMENT IN THE MAINTENANCE SECTOR

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Abstract. *The current crisis situation is complex for companies, since one has to produce products of the same quality at the lowest cost, so the motivation of the team is important, and this can be done in a way that does not cost in the company's budget. The company APB S. A Mining aims to search for the quality and satisfaction of its employees and clients, thus making the lives of associates easier. In its routine activities, it has set up a project that includes technology in inspections, minimizing future administrative problems. The idea of introducing gamification in the inspection sector was a way to motivate and make the work environment more pleasant and thereby achieve greater participation of the team in carrying out the road map.*

Keywords: *Gamification, maintenance, inspection, mining, PCM*

1. INTRODUCTION

The company APB S. A is a multinational in the mining field present in several countries. In Brazil, the plant is located in the Alto-Paraopeba region in the state of Minas Gerais. The plant has the capacity to produce one million tons of iron ore. It is a reference in organizational management, which demonstrates employee satisfaction. It guarantees to its clients products of good quality and affordable prices, being focus in mining its mission, seeking to satisfy and to create value for the partners.

For progress of the indicators, each department of the company verifies the potential of gain according to its particularities and established goals. In the maintenance section, one of the greatest contributions is guaranteeing the availability of equipment for the production process, so a strategic way to reach greater potential of the equipments is of the utmost importance.

There has been an exponential growth in the application of information and communication technology in the areas of knowledge as a whole and a growing search for process control in companies that manufacture products or services that make strict control fundamental.

Electrical inspection plays an important role in maintenance, guaranteeing the availability of the equipment, controlling the cost, boosting the production and guaranteeing a greater safety of all those involved in the process. This sector is responsible for conducting inspections on the equipment conditions, opening a service order describing the activities to carry out maintenance, requesting spare parts, making improvements and controlling the cost.

This case study will analyze a challenging situation regarding the creation and implementation of inspection plans for the electrical equipment of the beneficiation, due to the fact that the sector does not have control of the activities performed by the inspection technician. The inspector does not have a guideline to analyze his routine activities.

Therefore we will use the gamification method for the creation, implementation and sophistication of periodic online road maps, with the use of tablets in the SAP PM module, facilitating the fieldwork, referring to the routine in the sector of electrical inspection, assigning information about what the inspector will check on each equipment and

the periodicity of his routine. We will address a situation in which the project should be developed in two (2) months.

2. GAMIFICATION

Gamification is an English expression and is based on the use of interactive games to increase the involvement of members in the day-by-day production. When used correctly, the process of applying gaming techniques has the ability to engage and attract members, to educate and communicate. However, as it is a new field of study, the designation of gamification is not totally fortified so far.

The goal is to be able to visualize a certain obstacle or situation and to study solutions based on a game designer's point of view, since this professional in general presents a unique knowledge in realizing experiences that gather the focus and effort of many users to solve problems in the virtual environment (Mcgonigal, 2011).

Gamification's proposal is elaborating an amusing subject based on the definition seen. A problem situation and the place where the players will play will be chosen and presented and no doubt there will be a choice of their avatars on the field of play. Through gamification, the objective will be to stimulate and encourage the team and engage them in the market.

The gamification will be developed through exercises performed within the inspection to monitor and control the activities in the area inside the company APS S.A, where this monitoring and control will happen all the time during the development of the project. These activities were considered in three levels of complexity x term with the classifications below:

- Gelatine tasks – low complexity
- Ok tasks – average complexity
- Hot potato tasks – high complexity

Regarding critical activities, we have the Task named VDM, which is based on critical tasks with high risk.

2.1 TASKS

The task chart bellow shows what the players shall meet and their correlation with task type rating.

TASKS	COMPLEXITY X TERM	CRITICALITY
Scope reading for project understanding	Gelatine Task	Low – Green color
Mapping of all equipment	Ok Task	Average – Yellow color
Creation of the equipment Road map scope	Hot Potato Task	High – Red Color
Insertion of the Road maps in SAP program (PM module)	Gelatine Task	Low – Green color

Verification of the inspection periodicity of each equipment	Ok Task	Average – Yellow Color
Creation of inspection plans in SAP program (PM module)	Ok Task	Average – Yellow color
Implementation of tablets to facilitate Field inspection	Hot Potato Task	VDM – Orange color
Training for inspectors	Ok Task	VDM – Orange color
Perform inspection Road maps	Hot Potato Task	VDM – Orange color

Figure 1. Task Chart. Source: Author Own

The tool Engage was used for the execution of the game, where the following characteristics were attributed to it.

The board theme chosen was soccer; this theme is intended to encourage people to work in teams and in a fun way in the project. Our competition will be called "Little Horses' Game".



Figure 2. Task Chart. Source: Author Own

All people involved are called players responsible for the project finished and delivered to carry out the activities in order to guarantee the quality of the final product.

There will be three players. They are called Leo, Geo and Roberta, and they have to attend their activities to earn points. The team who has the highest point number will be the champion.

2.2 SCORE

The punctuation is based on and divided into three branches, those related to deadlines, quality and criticality. Each one has a predetermined score according to the progress of the activity.

See below the definition of punctuation.

2.2.1 Score related to complexity x Project term

Activity	Event/Description	Points earned
Accomplish Gelatine Tasks (Low complexity – Green color)	Earn 5 points for each gelatine task completed late.	5 – minimum score (1 gelatine task late) 20 – maximum score (1 gelatine before the deadline)
	Earn 10 points for each gelatine task completed on time.	
	Earn 20 points for each gelatine task completed before the deadline.	
Accomplish OK Tasks (Medium complexity – Yellow color)	Earn 25 points for each OK task completed late.	100 – minimum score (4 OK task late) 160 – maximum score (4 OK tasks before the deadline)
	Earn 30 points for each OK task completed on time.	
	Earn 40 points for each task completed before the deadline.	
Accomplish Hot Potato Tasks (High Complexity – Red color)	Earn 45 points for each hot potato task completed late.	135 – minimum score (3 hot potato task late) 210 – maximum score (3 hot potato tasks before the deadline)
	Earn 50 points for each hot potato task completed on time.	
	Earn 70 points for each hot potato task completed before the deadline	

Figure 3. Complexity x Project term. Source: Author

2.2.2 Criticality

Activity	Description
Accomplish VDM tasks (Critical tasks with High Risk – Orange color)	Earn 110 points for each VDM task completed (on time or not)

Figure 4. Criticality. Source: Author

2.2.3 Quality

Because of the kind of work in this sector, which requires a high level of attention to be executed due to the maximum level of quality, excellence has become of the utmost importance and it was thus decided that this criterion would not be evaluated.

2.2 BADGES

Conquest	Avatar	Description	Points
La Bestia Negra Little Horse Cruzeiro – He is always dedicated to conquer titles.		Complete 02 Hot potato tasks	200

<p>Gaviões Little Horse – He is concerned about maintaining leadership and distance for others</p>		<p>Complete 01 Ok task</p>	<p>150</p>
<p>Urubu Little Horse – The crowd motivates the team.</p>		<p>Complete 01 Gelatine Task</p>	<p>100</p>
<p>Galo Little Horse – He likes to take risks.</p>		<p>For each VDM task resolution</p>	<p>50</p>

Figure 5. Badges. Source: Author

2.4 AWARD

Prize	Points needed
Ticket for “Libertadores” championship final	5000
Visit to the training of the soccer club of your choice	2000
Your beloved soccer club official T-shirt	1500
Soccer match tickets	500

Figure 6. Award. Source: Author

2.5 GAME RESULTS

There was an engagement and determination of the players in the Gamification method, seeking a greater dedication to achieve the team’s results.

	1	2	3	4	5	6	7	8	9	10	11	12	13	Score
1 Leo	!	✓	!	✓	✓	✓	✓	!	✓	✓	!	!	!	4455
2 Roberta	!	✓	!	✓	✓	✓	!	!	!	!	!	!	!	1760
3 Geovana	!	✓	!	✓	✓	✓	!	!	!	!	!	!	!	1045

Figure 7. Results. Source: Author

3. RESULTS ACHIEVED (SUCCESS FACTORS)

The gamification methodology applied at the company APB S.A Mineração was effective, since it had the participation of the entire sector, showing a connection between the team and technology applied.

It increased performance quality and equipment availability as inspections were done with better detailing providing a relaxing and interactive environment, since the employee had the technology to their advantage and still participated in a game with free gifts.

The project is being seen as the first of many games to be adopted in the company, aiming at achievements with clear objectives of collective interaction of the team.

4. LESSONS LEARNED AND FINAL CONSIDERATIONS

It was a great challenge to adopt this methodology within the company, since it is an attempt to introduce something new, and the human being has some problem about changes, which is considered a normal attitude.

The case study was fictitious. The company APB S.A Mining does not exist, but the whole context regarding the inspection plans, processing plant and even the examples of activities are real.

It was noted that the gamification is the fun way to manage, outlining the competitiveness of employees, making them more attentive to their tasks.

The Engage tool was instrumental in making the competition and results clear, this theme is great for teamwork and goal pursuit.

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6. RESPONSIBILITY NOTICE

The authors is are the only responsible for the printed material included in this paper.